UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Eugene District Office
P.O. Box 10226
Eugene, Oregon 97440-2226

IN REPLY REFER TO:
1792A
Mohawk East
EA-06-05

August 29, 2006

Concerned Citizen,

The Upper Willamette Resource Area of the Eugene District Bureau of Land Management has completed the Environmental Assessment (EA) and Finding of No Significant (FONSI) for the proposed Mohawk East Project located in Sections 13 and 27, T. 15 S., R. 1 W.; Sections 3, 19 and 27, T. 16 S., R. 1 W. and Section 25, T. 16 S., R. 2 W., W.M.

You have expressed an interest in receiving copies of Environmental Assessments for district projects. Enclosed is a copy of the EA for your review and any comments. Public notice of this proposed action will be published in the Eugene Register Guard on August 30, 2006. The EA will be available on the internet at http://www.blm.gov/or/districts/eugene/index.php if current internet access problems related to ongoing litigation are resolved. The public comment period will end on September 29, 2006. Please submit comments to me at the district office, by mail or by e-mail at OR090mb@or.blm.gov by close of business (4:15 p.m.) on or prior to September 29, 2006. If you have any questions concerning this proposal, feel free to call Christie Hardenbrook at 683-6110.

Comments, including names and street addresses of respondents, will be available for public review at the district office, 2890 Chad Drive, Eugene, Oregon during regular business hours (7:45 a.m. to 4:15 p.m.), Monday through Friday, except holidays, and may be published as part of the EA or other related documents. Individual respondents may request confidentiality. If you wish to withhold your name or street address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your written comment. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in their entirety.

Sincerely,

Emily Rice, Field Manager
Upper Willamette Resource Area

Enclosure

MOHAWK EAST PROJECT

UPPER WILLAMETTE RESOURCE AREA
BLM EUGENE DISTRICT
ENVIRONMENTAL ASESSMENT
OR090-EA-06-05

1.0 PURPOSE AND NEED FOR ACTION

The BLM proposes to initiate forest management activities on stands located in T.15 S., R. 1W., Sections 13 and 27, T. 16 S., R. 1 W., Sections 3, 19, 27, and T. 16 S., R.2 W., Section 25. The land use allocations for these areas are Matrix and Riparian Reserve.

The objectives for these actions are to: (1) provide a sustainable supply of timber from the Matrix lands while maintaining valuable structural components (i.e. snags and down woods) and habitat for special status species, (2) treat stands to accelerate the growth of trees to restore large conifers in Riparian Reserves. Many of the 50-70 year old stands in these sections are overstocked, causing reduced tree growth and stand vigor.

This project also proposes aquatic habitat restoration and road improvements in the same sections. Actions may be proposed on timber haul roads that lead from harvest areas to county roads. The objectives of these actions are to: (1) reduce road related sediment sources to stream habitat, (2) enhance stream habitat conditions for the various life stages of fish and other aquatic-dependent species, and (3) improve migration passage to suitable upstream habitat.

These actions are needed to address these current conditions:

1. Portions of the timber haul roads are contributing sediment to streams due to inadequate surfacing and undersized and/or failing culverts,
2. Haul roads and skid roads from previous harvests continues to alter stream flows
3. Streams in these sections lack in-stream structure which creates habitat diversity and complexity for the various life stages of aquatic species
4. Culverts that limit aquatic species movement.

1.1 CONFORMANCE

This environmental assessment (EA) is tiered to the Northwest Forest Plan ROD and the Eugene District RMP, as amended by the Record of Decision (ROD) for Amendments to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (January 2001), and the Record of Decision to Clarify Provisions Relating to the Aquatic Conservation Strategy (March 2004). These documents are available for review at the BLM Eugene District Office or on the internet at http://www.or.blm.gov/nwfp.htm. The Mohawk East project file contains additional information compiled by the Interdisciplinary Team (ID Team) to analyze effects and is available for review at the Eugene District Office.

2.0 ALTERNATIVES

This section describes alternatives identified by the interdisciplinary team. Please refer to Appendix B for a map of the project proposal.

2.1 Alternative 1: No Action

Under this alternative no actions would take place. No thinning, road management or aquatic habitat restoration actions would occur within the proposed project area. The purpose and need of the project proposal would not be met.

2.2 Alternative 2: Proposed Action

Upland Thinning

This alternative consists of six commercial thinning areas of approximately 750 acres (see Table 1). Thinning would reduce the number of trees from approximately 100 trees per acre to approximately 65 - 70 trees per acre, with an average spacing of 25 feet. Thinning would be designed to increase tree size through time, extend the culmination of mean annual increment and capture anticipated mortality. The stands would be thinned from below; i.e., trees selected for harvest would be the suppressed, intermediate, and co-dominant conifer trees, leaving the larger trees. Cut trees would be Douglas-fir and western hemlock. This silvicultural prescription would result in a stand with variable spacing between the Douglas-fir and hemlock. There would be unthinned patches around rock outcrops, shallow soils, and wet areas. Leaving the hardwoods, Western red cedar, incense cedar and Pacific yew trees would provide structural diversity by retaining the understory of the stand. All Incense cedar, western red-cedar, Pacific yew, and hardwood trees would be retained, except where necessary to accommodate logging systems and for safety.

Thinning would be accomplished with a combination of Helicopter, cable and ground-based yarding systems (see maps in Appendix A).

Riparian Reserve Management

Silvicultural treatments would occur in the outer edges of the Riparian Reserve and would be treated the same as upland. Depending on the effective shade zone needed and channel stability, the no harvest areas adjacent to the streams would vary between 75 to 200 feet. Western red cedar would be planted in Drury Butte 25, Mohawk River and Hells Hill riparian zones.

Table 1: Harvest Area Acreages

	Mohawk Riv	Drury Butte 19	Drury Butte 25	Bunker Hil	Hell's H	Upper Bu	*Total Acres*
Tractor	57	0	13	53	0	0	*123*
Cable	90	0	59	109	77	43	*378*
Helicopter	0	109	11	56	68	0	*244*
Total Acres	*147*	*109*	*83*	*218*	*145*	*43*	**745**

Snag and Down Log Creation

Snags and down logs would be created within riparian reserves of the project area, except within the no harvest riparian buffer areas. Three to four snags per acre and three down logs per acre would be created after harvest. Live trees selected for snag and down log creation would vary in size and tree species.

Instream Restoration

Placement of large wood and/or boulder structures would be positioned within steam 8 of the Mohawk River Harvest Area. Also within this Harvest Area, fill would be removed from 3 streams sites.

Roads

Improvements and Construction

Approximately 25 miles of existing BLM controlled roads, would be utilized as part of the project. Of that, an estimated 20 miles of road would need maintenance including approximately 9 miles of added crushed rock surfacing (Table 2). There would be approximately 0.8 mile of proposed new temporary road construction with one associated stream crossing, which would be removed.

Culvert Replacements

Under this alternative, 2 fish passage culverts, 11 stream culverts and 8 cross drains would be replaced or added to existing permanent roads. Not all culverts would be replaced under the timber sale action. The fish passage culverts would be designed and replaced in a separate action. All culverts would meet the BLM design criteria for a 100 year flood event.

Road Decommisioning

Existing roads 15-1-24.1 and 15-1-27.2 and new temporary roads to be constructed would be decommissioned. The decommissioning may include the removal of rock surfacing, stream culverts and cross drains; the stream channels or excavated slopes would be shaped for stability; the road beds would be tilled where practical and drain dips and lead off ditches would be spaced as needed to facilitate adequate drainage from the road surface; and the roads would be blocked and slash and brush added to the tilled surface to discourage access or unauthorized future use. Mulching and planting of native species would occur where practical to reduce sedimentation.

Table 2: Proposed Road Improvements, Construction and Decommissioning

Temporary Road Construction		
Mohawk River	*Estimated Length*	*Proposed surfacing and/or maintenanc*
Spur 13A	700 ft.	Temp Rock
Spur 13B (decomm w/o removing rock)	1200 ft.	Rock
Spur B Temp rock	300 ft.	Temp Rock
Spur 13D Spur 13 E	900 ft. 400 ft.	Native Native
Upper Bunk		
Spur 27A ext (Upper Bunk)	400 ft.	Temp Rock
Spur 27B	600 ft.	Temp Rock
Spur 27C	300 ft	Native
Hells Hill		
27 Ext	500 ft.	Native
Total Temp Rock **Total Native**	**2300 ft.** **2100 ft. ≈ 0.8 miles**	
Permanent New Road Construction		
Bunker Hill Rd. 15 -1-34.5	2000 ft.	Rock
Upper Bunk 15-1-27	1000 ft.	Rock
Total of Permanent New Rock	**3100 ft. ≈ 0. 6 miles**	
Maintenance by Road Number		
Rd 15-1-13	0.3 miles	4" lift
Rd 15-1-24	0.47	4" lift
Rd 15-1-24	0.73	8" lift
Rd 15-1-34	0.25 Miles	4" lift
Rd 15-1-34.4	1.17 miles	Spot Rock
Rd 16-1-3	1.54	Spot Rock
16-1-5.3	0..66 miles	4" lift
16-1-5.3	From 0.67 to 2.78	Spot Rock

Rd 15-1-27	Seg B	Spot Rock
Rd 15-1-34	Seg C	Spot Rock
Rd 16-1-12	0.38 Miles	8" lift
Rd 16-1-27 Swing Rd	0.06	4" lift
Rd 16-1-21 Cartwright	Where needed	Spot Rock & landi
Rd 16-1-19	At landing sites	Landing repair
Rd 15-1-25.1	0.27	4" lift
Timber Sale Road Decommissioning		
Spur 13A	700 ft.	Temp Rock
Spur 13B (decomm w/o removing rock)	1200 ft. 300	Rock Temp Rock
Spur 13D	900 ft.	Native
Spur 13E	400 ft.	Native
Spur 27A ext (Upper Bunk)	400 ft.	Temp Rock
Spur 27B (Upper Bunk)	600 ft	Temp Rock
Spur 27C (Upper Bunk)	300	Native
Spur 27A (Hells Hill)	500	Native
Rd 15-1-24.1 Rd 15-1-27.2	2100 1742	Rock Rock
Total Decommissioning	**9142 ft. ≈ 1.7 miles**	

Table 3: Culvert Replacements – Non-Fish Bearing Stream Culverts and Cross Drains

Road Numbers	Improvements
Spur 13 B	Stream culvert install and remove
Rd 15-1-24	Add one cross drain
Rd 15-1-24	Replace 3 stream culverts and add one cross drain
15-1-27	Add 1 cross drain
Spur 27B	Stream culvert install and remove
Spur 27C	Add and remove one cross drain
Rd 16-1-5.3	Replace 7 cross drains and replace 2 stream culverts
Rd 16-1-3.2	Add cross drain
Rd 16-2-35	Add 2 cross drains
Rd 16-1-21	Install 2 cross drains

Table 4: Culvert Replacements – Fish Bearing Stream Culverts

Road Numbers	Location	Improvements
15-1-34.4	15-1-27 SW of SE	Replace fish passage culvert
16-2-35	17-1-25 SW1/4	Replace fish passage culvert

2.3 DESIGN FEATURES

Harvesting for all action alternatives:

1. Northern Spotted Owl seasonal restriction. There will be no timber harvest or related activities in the Bunker Hill Harvest Area from March 1 to September 30 except in the Special Yarding Area (Appendix A-refers to map). This Special Yarding Area will have a seasonal restriction from March 1 to July 15. These restrictions may be waived if this area is determined by protocol surveys to be unoccupied by spotted owls.
2. Guyline trees may be utilized within the Mill Wolf Unmapped Late Successional Reserve (ULSR) area adjacent to the Bunker Hill Harvest Area as long as no trees within this ULSR are felled, directly killed or injured to such a degree that morality results.
3. Northern Spotted Owl seasonal restriction. There will be no timber harvest or related activities in the Upper Bunk Harvest Area from March 1 to July 15.

4. Place cable corridors on the landscape so as to minimize disturbance to down logs. Retain on site and minimize damage to existing down logs, snags, existing rootwads and large diameter stumps. Down logs and root wads that present a hazard to logging operations or that are needed to close roads may be relocated within the project area.
5. Log lengths would be limited to 40 feet in length where necessary to minimize damage to residual trees, snags and coarse woody debris during yarding.
6. Directional falling and yarding would be utilized for the protection of retention trees, existing coarse woody debris, snags, and reserve areas.
7. Require one-end suspension of logs where appropriate, while skidding and cable yarding. Intermediate supports may be required to accomplish this objective.
8. Place cable corridors on the landscape to avoid felling large remnant trees.
9. Treat cable corridors with the potential for accelerated erosion with logging slash and/or waterbars as needed.
10. Ground-based yarding operations would occur where designated **(**see Appendix A for map). The following requirements would be applied to ground base yarding areas:
    - Require felling of trees to lead to the skid trails and maximize winching distances.
    - Placement of skid trails would be avoided within 100 feet of streams.
    - All skidding equipment would remain on the designated skid trail and would winch logs a minimum of 75 feet on either side to the skid trail.
    - Average distance between skid trails would be 150 feet or greater when feasible.
    - Use existing skid trails, where possible.
    - Avoid placing skid trails on rocky soils.
    - Preplan and designate skid trails to occupy less than 10% of the Harvest Area.
    - Restrict yarding to seasonally dry periods when soil moisture content provides the most resistance to compaction. This is usually July 1st through October 1st.
    - Till all compacted skid trails, with an excavator to a depth of 18 inches, when soil moisture is appropriate. Minimize damage to residual tree roots adjacent to trails. To reduce erosion and restore soil productivity, pull slash, logging debris and brush from the adjacent forest floor onto the skid trails.
    - If tillage cannot be accomplished the same operating season, all skid trails and temporary native surface roads would be left in an erosion resistant condition and blocked prior to the onset of wet weather. This would include construction of drainage dips, water bars, lead off ditches, and barriers (rootwads or brush piles) to prevent vehicle access until final blockage and/or tilling.
11. Falling with a cut to length harvester system may be approved when:
    - Capable of directionally falling trees
    - Cutting trees to length
    - Completely delimbing trees
    - Depositing the slash in windrows
    - Traveling on the cushion of slash created by the harvesting process.
    - Where slopes are less than 40%
    - Soil moistures are low (typically July 1 – Oct 1)
12. Helicopter yarding:
    - Yarding would be done with a helicopter capable of suspending logs free and clear of the ground and treetops.
    - All helicopter landings would have prior approval to construct and or use
    - Helicopter landings would not be hydrologically connected to nearby streams.
13. Plant approximately 25 -50 western red cedar trees within 200 feet of the selected streams in Hells Hill, Mohawk River and Drury Butte 25.

<u>Harvest Design Features for Alternatives</u>

1. The contractor would have a Spill Contamination Kit (SCK) on-site during any operation within the project area; prior to starting work each day, all machinery shall be checked for leaks and make all

necessary repairs.
2. In the event of any diesel, hydraulic fluid, or other petroleum product release into soil and/or water, notification, removal, transport, and disposal would be accomplished in accordance with U.S. Environmental Protection Agency and Oregon Department of Environmental Quality Laws, and regulations.

Road Construction, Road Improvements, Aquatic Habitat Restoration, Road Decommissioning and Hauling:

1. Oregon Department of Fish and Wildlife (ODFW) in-water guidelines would apply to all in- stream activities. This includes stream crossing replacements. Work would be done between the dates of July 1-October 15.
2. Perennial stream crossings may require some of the following: 1) sediment containment structure placed across the channel below the work section (i.e. straw bales), 2) the work site pumped free of standing water, and 3) the disturbed section planted with native seed and/or mulched with certified weed free straw.
3. Temporary flow diversion structures would be used as needed for fish bearing stream crossings.
4. Rock surfacing on temporary roads would be removed prior to ripping and closure.
5. Three inch or larger rock would be used as temporary surfacing to enhance the removal and separation from the subgrade where practical. Rock removal would be done in dry weather with minimal contamination from subgrade.
6. The following requirements would be applied to road decommissioning:
   - Remove existing stream crossings and recycle old culverts.
   - Fill or waste material would be positioned in a location that would avoid direct or indirect sediment discharges to streams or wetlands.
   - Stream banks at removed road crossings would have the slope pulled back to an angle of natural repose.
   - Depending on site conditions, road drainage features (drain dips or waterbars) may be constructed on either side of restored stream channels to reduce road sediment delivery.
   - Restored stream banks would be vegetated with native plants, mulched with certified weed free straw, and planted with western red cedar where appropriate.
   - Where road subgrade conditions warrant, compacted road surface may be tilled. If tillage is not possible then waterbars and lead-off ditches would be constructed to reduce sedimentation to streams and wetlands.
   - Earthen barricades with brush and slash additions would be constructed to block vehicle access.
7. During winter hauling, especially during heavy rainfall, utilize combinations of the following methods to minimize sedimentation from the graveled roads reaching the active stream flow:
   - Keep the road crowned to direct the water off the running surface into the ditch line
   - Keep the ditch line and leadoff ditches clean and free to flow
   - The addition of a shallow diagonal trench across the running surface to direct surface flow off the road surface onto the forest floor away for a stream
   - Additional surfacing if considered necessary by the Authorized Officer at sites causing sedimentation problems.

Fuels Treatment

1. Landing piles along permanent roads would be covered and burned.
2. Slash, less than 6" in diameter and greater than 3 feet in length, within 25 feet of either side of the permanent roads within harvest areas would be piled, covered and burned.
3. Landing piles along temporary roads would be scattered on top of the road surface to remove the fuel concentrations, slow erosion and deter OHV use. Resulting fuel bed should not be deep and continuous. Piles along temporary roads not scattered on the road surface would be covered and burned.
4. All piles to be burned will be covered with plastic.

For All Activities:

1. In order to prevent the spread of noxious weeds from other locations, the Purchaser shall be required to clean logging, road construction, and tilling equipment prior to entry on BLM lands. The purpose of the cleaning is to remove dirt and plant debris that may contain noxious weed seeds from the undercarriage, tracks and tire treads of the equipment

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

This environmental assessment incorporates the analysis of current condition and environmental effects, including cumulative effects, in *the Eugene District Proposed RMP/EIS, November, 1994* (Chapter 4), as amended by the *Record of Decision (ROD) for Amendments to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (January 2001),* and the *Record of Decision to Clarify Provisions Relating to the Aquatic Conservation Strategy (March 2004).* The following analysis of effects supplements those analyzed in the above EISs, and provides site-specific information and analysis particular to the alternatives considered.

3.1 VEGETATION

3.1.1 AFFECTED ENVIRONMENT

The forests in the project are 55-75 year-old stands that regenerated naturally after clearcut harvest, and salvage logging following large human caused fires. The stands consist primarily of Douglas-fir, with scattered western hemlock, grand fir, western red-cedar, Pacific yew, madrone, chinquapin and red alder. Stand understories consist of salal, bigleaf maple, vine maple, cascara buckthorn, and oceanspray. The stands are currently in a stem exclusion phase, and the high overstory density is suppressing the growth of smaller trees and understory vegetation. Stand conditions in the outer portion of the Riparian Reserves are largely similar to the uplands. The immediate riparian zone of many of the streams in the project area are dominated by deciduous trees, mostly red alder, bigleaf maple and scattered cottonwood trees.

Mohawk River was harvested in 1952. Current conifer stand density is approximately 115 TPA, with a minor component of big leaf maple, western hemlock and red alder.

Bunker Hill NE portion was harvested in approximately 1946. The land allocation for this section is connectivity. Current conifer stand density is approximately 85 TPA. This is a Douglas-fir stand with a minor component of Chinquapin and madrone. SW portion was harvested in approximately 1945. Current conifer stand density is approximately 125 TPA. This is a Douglas-fir stand with minor component of grand fir and western hemlock.

Drury Butte 19 was harvested in 1932. Current conifer stand density is approximately 125 TPA, with a minor component of western hemlock and incense cedar.

Drury Butte 25 was harvested in 1946. Current conifer stand density is approximately 110 TPA, with a minor component of big leaf maple, chinquapin, and red alder.

Hells Hill was harvested in 1937. Current conifer stand density is approximately 105 TPA, with a minor component of big leaf maple, grand fir, Pacific madrone, western hemlock, western red cedar and red alder.

Upper Bunk was harvested in 1942. Current conifer stand density is approximately 120 TPA, with a minor component of big leaf maple, grand fir and western hemlock.

3.1.2 ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE 1: NO ACTION

Under the no action alternative, mortality and suppression would continue to occur from tree to tree competition, resulting in a stagnant forest with slow growth in the dominant and codominant trees. The stagnant forest conditions create a dense closed canopy that reduces the understory vegetative growth and species diversity.

ALTERNATIVE 2: PROPOSED ACTION
The proposed thinning treatment would reduce the canopy from 90% to 65%, decreasing stand competition, thus accelerating tree growth and resulting in larger trees over time. The reduction in canopy density would also increase species diversity, while providing enough shade to prevent weedy early seral species from invading. Conversely, with the thinning there is typically an increase in road and skid trail density, which provide openings for weeds to invade. This may occur anytime there is a disturbance (natural or human caused). Roads also allow the spread of weeds to new areas by being a transport corridor.

3.2 HYDROLOGY

3.2.1 AFFECTED ENVIRONMENT

The project area is located in the Mohawk River 5th Field Watershed. Two streams adjacent to several proposed Harvest Areas exceed state water quality standards. The Mohawk River is listed on the 2002 Department of Environmental Quality 303(d) Water Quality Limited List for elevated summer temperatures and low dissolved oxygen during the fall, winter, and spring months; and the lower 2.7 miles of Mill Creek are listed for elevated summer temperatures. No temperature data is available for any of the streams within the proposed harvest Areas. The Bunker Hill Harvest Area drains to Wolf Creek, tributary to Mill Creek mentioned above. Wolf Creek may be contributing to elevated temperatures in Mill Creek, but this is speculative since no water quality sampling has been conducted.

Elevations range from about 600 to 2100 feet, so the proposed Harvest Area is predominately in the rain dominated zone. Only about 80 acres, or 11% of the harvest area, are above the 2100 foot elevation where conditions could be more susceptible to rain-on-snow events. Precipitation in this region is between 45 to 60 inches annually and the majority occurs in the form of rainfall between October and April.

Approximately 115 streams exist within or adjacent to the project area, totaling about 15 miles of streams. Most of these are perennial and non-fish bearing. Wetlands were identified in Drury 25, Upper Bunk and Hells Hill and are described in the Soils section. Seven seeps have been discovered within or adjacent to the project area.

Roads have impacted water quality and the stream network in the project area. Past ground-based harvesting has changed some of the hydrology in the Mohawk River, Drury 19, and the Upper Bunk Harvest Areas. In certain situations, streams have been diverted out of natural channels by roads. At a few locations, compaction resulting from equipment use in the riparian zone has created new side channels for streams. Roads have also diverted stream flow where culverts were not located properly (Upper Bunk, Drury 25). Existing roads, including the proposed haul routes have some failing culverts, a lack of adequate cross drains, and in one situation recent road grading that has directed turbid runoff directly to streams (e.g. Road 15-1-24.1 adjacent to Mohawk River Harvest Area). Several stream crossings associated with this project are not functioning properly due to rust, mechanical damage, being undersized, or otherwise having a moderate to high risk of failure. As a result, road related runoff and sediment delivery directly to streams persists.

Past timber harvesting has probably removed conifer density (Drury 25, Mohawk River, Hells Hill) along certain streams as compared to historical conditions. Whether this has had a notable impact on stream temperature can not be determined. Clearcut harvesting on adjacent private lands also may have had an effect on stream flows such as in Drury 25 where bank erosion appears to have been accelerated in recent years.

Stream-side slope stability
Segments of streams in Bunker Hill show signs of instability with landslide headwalls near several

tributary initiation points. Many streams at Bunker Hill have visible natural background turbidity due to suspended clay sediments. At Hells Hill in early 1996, a large debris torrent began at the headwaters of a stream channel, blocking Road 16-1-21. The stream channel was scoured to bedrock all the way to the confluence with Cartwright Creek, well over a mile from where the landslide started. The event occurred during an unusual rain-on-snow storm and erosion continues even 10 years later on the head scarp and side scarps because they are oversteepened. The hydrology at Hells Hill has also been impacted by rotational landslides, when they occurred in conjunction with earthquakes roughly a million years ago. These large bench landforms are considered to be in equilibrium now. Typical in rotational landslide topography, stream segments sometimes end on flat topographic benches forming small wetlands commonly referred to as 'sagponds.' Certain stream headwalls in that Harvest Area show indications of active instability, often recognizable by the accumulation of colluvium and distorted vegetation. In the Mohawk River Harvest Area, steep streamside sideslopes on several streams could potentially become unstable if ground disturbing activities were to occur.

3.2.2 ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE 1: NO ACTION

Water quality would continue to be impaired by road related sedimentation where culverts are not being replaced, or where lead-off ditches or relief culverts are not installed or properly maintained. The opportunity to decommission roads would be postponed until a later date, possibly resulting in mass wasting at failing stream crossings or direct sediment delivery to streams via the ditchline of the road. As a result, turbidity in streams adjacent the project area could increase because road improvements and/or decommissioning would not take place.

Restoration work involving conifer planting near streams would be delayed indefinitely. This would result in a longer timeframe to establish conifers along some of these hardwood dominated areas, particularly in Drury 25 and Mohawk River timber stands. Although stream temperatures probably would not under this alternative, planting conifers in hardwood dominated riparian areas would be deferred until later to reduce existing solar impacts.

Cumulative Effects: The existing road infrastructure would continue to erode. Water quality may be degraded as road stream crossings further deteriorate and possibly fail due to the lack of maintenance. Without additional aggregate surfacing and relief drainage, future road maintenance work could accelerate sediment delivery to streams. The primary shade zone would be maintained along streams on BLM land, but timber harvesting on private lands may be conducted using different standards, possibly increasing solar radiation to streams.

ALTERNATIVE 2: PROPOSED ACTION

Timber harvesting in the Riparian Reserve is not expected to impact water quality parameters of temperature or turbidity since a no-harvest buffer ranging from 25 feet (seeps and springs) to 75 - 200 feet (streams) would be implemented. The primary shade zone along all streams would be maintained by these no-harvest buffers.

Most of the proposed temporary road construction is not expected to impact water quality. Those road segments are predominately in ridgetop locations or in areas with little or no connection to the stream network. One temporary spur road would be constructed with a stream crossing in the Mohawk River Harvest Area and short-term sedimentation to the stream at that location would be expected. Design features such as 1) construction during the dry season and 2) use of river gravel for fill, are expected to minimize the amount of fine sediment reaching the waterway.

Replacing stream crossing culverts and cross drains on the permanent road system, and the placement of additional crushed rock aggregate would improve long term water quality at nearby streams. Small

amounts of sediment could enter these streams during the culvert installation/replacement, but this is expected to be a short term impact. Typically, fine sediments disturbed by the equipment are flushed out by seasonal fall rains, and some erosion occurs until disturbed soils on the inlets/outlets are stabilized by vegetation, mulch, or rip-rap. Replacement culverts sized to accommodate 100-year storm events would reduce the risk of catastrophic failure during major flood events.

Decommissioning roads that cross streams would eliminate artificial barriers to sediment transport as well as reduce the potential for future road/culvert failures. Sediment, bedload materials, woody debris stored above those culverts may mobilize after the stream crossing culverts are removed and the natural sediment regime would be restored. Tilling (where feasible) would help restore water infiltration to the soil and reduce the potential of surface runoff reaching nearby streams. For these reasons, road decommissioning would have long-term beneficial effects to the riparian areas despite the short-term sedimentation from stream crossing restoration.

Cumulative Effects: Implementation of Alternative 2, combined with on-going and planned road renovation (both on BLM and private lands) would result in a long term reduction of road related sediment delivery to streams. Maintaining primary shade zones along streams in these 6th Field Watersheds would protect water temperatures on BLM land. Such standards are not consistently used on private lands and temperature increases could result in the future.

3.3 FISHERIES

3.3.1 AFFECTED ENVIRONMENT

Mohawk River is a 5th field watershed within the McKenzie River Basin. Table 5 displays which 6th field watersheds the stands are located in.

Table 5: Stands within 6th field watersheds

6th Field Watershed	Proposed Stand
Upper Mohawk	Mohawk River and Upper Bunk
Mill Creek	Bunker Hill
Mohawk River-Parson Creek	Hells Hill and Drury 19
Lower Mohawk River	Drury 25

Native coastal cutthroat trout are the most abundant and widely distributed salmonid species. They occupy all fish bearing streams. In addition, Chinook, rainbow trout, steelhead, and non-salmonid species such as sculpin, dace, redside shiners, lamprey, and other species may be found throughout these drainages.

Spring Chinook (ESA Threatened) are native to the Mohawk River Watershed. Historical spawning habitat is believed to have been the mainstem Mohawk and a large portion of mainstem Mill Creek. Due to habitat degradation and other factors, this run-spring Chinook is reported to have become extinct by 1910 (Parkhurst et al. 1950; Willis et al. 1960). Currently, no sustainable population is known to exist in the Mohawk watershed. Spawning may occur throughout the mainstem Mohawk, but according to 2006 Streamnet data (http://www.streamnet.org) the primary spawning and rearing habitat is located in the mainstem Mohawk River from the confluence with Mill Creek (River Mile [RM]13) to just upstream from the confluence of Log Creek (RM 21). Migration and rearing habitat for juveniles can be found in the larger low gradient tributaries, such as Mill Creek, Cartwright Creek and Kelly Creek, where they can rear for a year or more. In an effort to re-establish the population, ODFW has recently outplanted adult spring Chinook from the McKenzie Hatchery into the upper portions of the Mohawk River. Spawning surveys conducted November 2005 found fish spawning in the upper mainstem of the Mohawk just above and below RM 21.

Steelhead are not believed to be native to the McKenzie Basin. Summer Steelhead were introduced to the watershed in the mid 1950's. Streamnet lists the lower 5 miles of the Mohawk River as rearing and migration, and then spawning and rearing habitat throughout the rest of the upper mainstem Mohawk River and all the larger tributaries. Streamnet does not list Winter Steelhead to be present within the Mohawk Watershed.

An assessment of the Mohawk watershed (Huntington 2000), noted that the limiting factors for cutthroat and other aquatic species include: warm water temperatures, simplified channels that have limited woody debris and few complex pools (cover), locally high levels of fine sediment that affect spawning success, and migration barriers at road crossings.

Road-Stream Crossings

Culvert inventories were conducted along the haul routes, and within and adjacent to the stands. Two culverts have been identified as undersized pipes and potential barriers to the movement of aquatic dependent species;

- Bette Creek: 15-1-34.4 road, mile post 1.4
- Kelly Creek: 16-2-35 road, mile post 1.25

The Bette Creek culvert is also causing the streambanks to actively erode.

Roads of Concern within Riparian Reserves

Roads, specifically mid slope and valley bottom roads can increase fine sedimentation to stream channels. Ditches along the roads intercept runoff, which flows directly into stream channels. The ditches can transport fine sediments picked up from the road surfaces (Everest et. al., 1987). Streams with good quality fish habitat have gravel and cobble substrate free of fine sediment. This allows oxygen to percolate through the coarse substrate and provides habitat for macroinvertebrates (insects fish feed on) and areas for salmon and trout to spawn in. Fine sedimentation can embed the gravels and cobbles resulting in a loss of macroinvertebrate habitat and the suffocation of spawned eggs (Castro, 1995). Several roads within the planning area cross or are adjacent to streams and within riparian reserves.

The 15-1-24.1 road within the Mohawk River stand is of particular concern. This road is adjacent to a fish bearing stream with naturally reproducing cutthroat trout. The BLM portion of this road has numerous stream crossings with barely functioning, or non-functioning old log culverts. There is evidence of fine sediments flowing directly into the fish bearing stream.

There are several old skid roads throughout the Mohawk River stand that cross stream channels. Some of these roads still have the fill and/or log culverts within the channels. These fills and old culverts have created barriers, disrupting the stream flow and resulting in erosion problems.

The 15-1-27.2 road is just east of the Upper Bunk stand that crosses and follows the riparian reserve of Bette Creek. Bette Creek is a fish bearing stream with naturally reproducing cutthroat trout. This road was built by a private industrial forest management company to access section 26. There is an old log crossing within Bette Creek that currently blocks the stream channel and has caused erosion upstream.

Harvest Area

Estimated upper limits of fish use were determined based on presence/absence surveys by BLM (1997) and Oregon Department of Forestry (2000-2006). Table 6 displays miles of fish bearing and non-fish bearing streams within each stand.

Table 6: Miles of fish bearing and non-fish bearing streams for each stand.

Stand	Fish Bearing Stream (miles)	Non-Fish Bearing Streams (miles)
Mohawk River	0.6	1.7
Upper Bunk	0	0.5
Bunker Hill	0	3.3
Hells Hill	0	3.1
Drury 19	0.5	2.3
Drury 25	0	3.2
Total	**1.1**	**14.1**

3.3.2 ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE 1: NO ACTION

Under this alternative, no harvest related actions, road restoration, or aquatic habitat restoration would occur. This alternative would result in no direct or indirect effects to water temperature or turbidity. No riparian trees would be cut along any perennial streams that could affect stream temperature and no ground disturbing activities would occur that would cause sediment delivery and elevate stream turbidity.

The no action alternative would not enhance aquatic habitat within the un-named fish bearing stream in the Mohawk River stand. The amount of large woody debris would remain low, consequently hiding cover and pool habitat for resident trout and other aquatic species would continue to be limited. Over time (50-100 years) riparian trees would begin to fall into the stream channel and help improve channel complexity. This effect would have direct and indirect effects to the aquatic habitat within this un-named stream. No direct or indirect effects would be detected at the 5th field watershed scale.

The culverts of concern, noted above would continue to be partial or complete passage barriers to adult and juvenile fish. Both these culverts would stay undersized and continue to be at a higher risk for failure. The Bette Creek culvert would continue to actively erode the channel. This alternative would maintain the current conditions within Bette and Kelly Creeks. No direct or indirect effects would be detected at the 5th field watershed scale.

Cumulative Effects

Cumulative effects from a variety of sources can increase fine sediment into the stream channels and negatively effect downstream fish habitat. Many activities associated with the uses (forestry, agriculture and rural residential) within the Mohawk Watershed contribute to the cumulative effect of fine sedimentation to aquatic habitats. It is difficult to measure the amount of fine sediment currently being delivered to fish habitat. This alternative is expected to maintain the current conditions. However, the potential to decrease effects through road decommissioning, removal of fills within stream channels, upgrading undersized culverts currently causing erosion and the improvements to drainage structures on roads would not occur.

ALTERNATIVE 2: PROPOSED ACTION

Timber harvest and landing

Untreated stream buffers would maintain the effective shade zone on all streams thus maintaining the current stream temperature conditions. They would also provide protection to over-steepened and/or unstable stream banks and headwalls. No yarding is proposed across any streams. The large sections of retained trees (untreated buffer) and the moderate to dense understory around all streams would greatly minimize the risk of sedimentation due to yarding activities by filtering out any sediment from the harvest section. The thinned upland Riparian Reserves and untreated buffers would retain adequate supplies of future large woody debris material. No direct and indirect effects are expected.

Spur road and landing design features are expected to minimize the risk of sedimentation to project section streams and downstream listed fish habitat (i.e. spring Chinook habitat). See the hydrology section of this document for potential effects from temporary and permanent road construction. Fine sediment and turbidity are not expected to reach listed fish habitat in Mohawk River or be detectable at the 5th field watershed.

Log haul operation

All portions of the haul routes adjacent to listed fish habitat are on the paved Mohawk River Road. Due to its hardened surface, erosion over a paved road surface is minimal. Direct or indirect effects of log haul operations are expected to be insignificant to listed fish habitat.

Road Decommissioning

This alternative proposes two roads to be decommissioned. The 15-1-24.1 road, adjacent to an un-named fish bearing stream within the Mohawk River stand and the 15-1-27.2 road that crosses Bette Creek adjacent to the Upper Bunk stand. Decommissioning these roads would have long term beneficial effects to the riparian reserve and the adjacent streams. Decommissioning these roads would remove chronic sources of fine sedimentation currently being delivered directly into fish habitat. Project implementation is expected to produce a small amount of fine sediment to the adjacent stream. Turbidity impacts would be highest while removing this structure and are expected to dissipate within a day. The un-named fish bearing stream in the Mohawk River stand and the 15-1-27.2 road crossing Bette Creek are both upstream from listed fish habitat in the Mohawk River (approximately 2,800' and 3,800', respectfully). Due to the low channel gradient and meandering pattern in both these streams, the fine sedimentation and turbidity generated from this project is expected to be deposited within the adjacent stream and is not expected to have an adverse impact on listed fish habitat in the Mohawk River.

Winter flows and large storm events would eventually move this sediment downstream. However the amount of stored fines from project implementation is not expected to be notably higher than from what is currently delivered from the existing conditions. Project design features, such as implementing during low flows, would also help minimize sedimentation and turbidity. Indirect and direct effects from fine sedimentation to the un-named fish bearing stream in the Mohawk River Stand and to Bette Creek are expected to be low and short-term (<1 year). Fine sediment and turbidity are not expected to reach listed fish habitat in the Mohawk River or be detectable at the 5th field watershed scale.

Culvert Replacements and Road Improvements

Existing stream-crossings and road surface condition are a chronic source of fine sediment delivery to nearby fish bearing habitat. Replacing rusted, damaged, undersized culverts and improving road surface conditions throughout these drainages would reduce this chronic source of fine sediment and subsequent degradation of resident and listed fish habitat. Replacement culverts would be sized to accommodate 100-year storm events, which would reduce the risk of catastrophic failure during major flood events. The hydrology section of this document discusses effects from most proposed road improvement projects.

Kelly Creek is a listed fish habitat stream for migration and rearing spring Chinook. The upper most reach of this listing is downstream from the culvert proposed for replacement. The amount of fine sediment stored in Kelly Creek above and at the culvert is low. There is also very little fill at the culvert. Replacement of this culvert is expected to result in the short-term effect (< 1 year) of a low to moderate amount of fine sediment to the immediate downstream reach (approximately 300-1,000 feet). Project design features, such as diverting the water flow and implementing during low flows would help reduce effects. Fine sediment is not expected to be detectable at the 5th field watershed. The long term benefit would be improving fish passage to access 1 mile of upstream habitat.

The Bette Creek culvert is approximately 3,200 feet upstream from listed fish habitat in the Mohawk River. Bette Creek is a low gradient stream with naturally reproducing cutthroat trout. There is currently fine sediment stored above the culvert proposed for replacement. In addition the water flowing out of the outlet is actively eroding the channel below. Replacement of this culvert is expected to result in a high

amount of fine sediment to the immediate downstream reach (<1,000 feet). This may limit spawning and macroinvertebrate habitat for a short term (1-3 years). Project design features, such as diverting the water flow and implementing during low flows will help reduce effects.

In the long term (> 3 years) the stream is expected to stabilize, eliminating the fine sediment concerns currently associated with this road/stream crossing. The low gradient channel and meander pattern of Bette Creek will help keep the fine sediment from reaching listed fish habitat or from being detectable at the 5th field watershed. The fines would eventually move downstream during large winter high flows. However, because of the low gradient and meander pattern the stored fines are expected to slowly move downstream over approximately 3 years. The fine sedimentation released from this project is not expected to be notably higher than what is currently delivered from the existing conditions. The long term benefit would be improving fish passage to access 2 miles of upstream habitat.

Aquatic Habitat Restoration

This alternative proposes an instream restoration project in an un-named fish bearing stream within the Mohawk River Harvest Area. This project would immediately increase the volume of large woody debris within the stream channel, floodplain, and streambanks. This increase of large wood would directly improve habitat complexity and cover available for resident fish and other aquatic-dependent species. Impacts to soils, riparian vegetation, the channel and streambank would occur with the use of heavy equipment in the channel and pulling logs through the riparian area. Short-term increases in sedimentation and turbidity levels would be experienced within and downstream (up to 1,000 feet) of the project site. These impacts are expected to occur during project implementation (approximately 1 week). Implementation of design features would lessen the short-term and long-term impacts to aquatic and terrestrial species within and downstream from the project area. This habitat restoration project is located approximately 3,000 feet upstream from listed fish habitat in the Mohawk River. Negative impacts to listed fish habitat are not expected to be detectable.

Logs to be used for this project are expected to stabilize at, or near their location for a long period. These large "key" logs or trees would trap and retain organic debris and spawning substrates within the system. In addition, a reduction in water velocity, creation of pools, and an increase in aquatic habitat complexity is expected to occur over time. Populations of aquatic species would benefit from the changes in the channel complexity and available habitat, and thus increase the productive capacity of these stream systems.

Other aquatic habitat restoration projects proposed under this alternative include the removal of old skid road fills within three different non-fish bearing streams in the Mohawk River stand. Refer to the hydrology section of this document for potential effects.

Cumulative Effects

This alternative is expected to reduce cumulative effect concerns within the 6th field watersheds. Replacing damaged or undersized stream crossing culverts and/or adding cross-drainage structures can help reduce the amount of road sediment delivery. Removing old fills left in stream channels along with decommissioning roads will also reduce or eliminate current erosion and sources of fine sedimentation. The delivery of fine sedimentation entering the stream channel would decrease over time. This is expected to result in an improvement of resident spawning and macroinvertebrate habitat. In addition, upgrading fish passage would improve the spatial and temporal connectivity within the watershed for fish and other aquatic-dependent species. Effects are not expected to be measurable at the larger 5th field watershed scale.

3.4 WILDLIFE

3.4.1 AFFECTED ENVIRONMENT

Down logs (key habitat)
Down logs are important to an array of special status wildlife, their prey and other wildlife species. They provide cover, breeding habitat and travel corridors. They are especially important to low mobility species with small home ranges, such as invertebrates, reptiles, amphibians and small mammals. Large down logs (>20" diameter) and logs with some degree of decay typically have more habitat function than small or intact down logs. Stand exam data indicate that project Harvest Areas range from 183 to 630 linear feet of large down logs per acre, most of which are higher decay classes (3-5). Very little of the existing large down logs are lower decay classes (1-2) that will become more decayed over time and eventually replace current higher decay class logs.

Snags (key habitat)
Snags are important to a variety of wildlife species, including special status species and their prey, primary and secondary cavity nesters (such as woodpeckers, owls and small mammals) and bats. Large snags (>15" dbh) with some degree of decay are typically most important to wildlife both as snags and, eventually, as down logs. Stand exam data recorded less than 0.5 larger snags per acre for all except the Upper Bunk Harvest Area, which had 1.4 larger snags per acre.

Bald eagle (Threatened)
Suitable nesting habitat for bald eagles is typically mature conifer forest within one to one and a half miles of a lake, river, major tributary or other water body that is large enough to support nesting eagles. The associated water body is typically visible from the nest site. There is currently no suitable roosting or nesting habitat for bald eagles within or adjacent to the project area.

Northern spotted owl (Threatened)
Habitat: Suitable nesting habitat for this species is mature forest (generally greater than 80 years old) with high canopy cover, an open understory, large down logs and large snags. There is no suitable nesting habitat within the proposed project area, although there is suitable habitat adjacent to portions of the project area. Dispersal habitat for spotted owls is generally defined as stands ranging from 40 to 79 years of age. Juvenile spotted owls use dispersal habitat to roost and forage in as they disperse from their natal areas. Adults forage in dispersal habitat that is in proximity to suitable nesting habitat in order to support themselves and their young. There are approximately 750 acres of dispersal habitat within the proposed project area.

Site Histories: There are six known spotted owl sites within a mile of the proposed project Harvest Areas. Monitoring has been conducted on all six sites, but has only been consistent and recent for four of them. The Mill Wolf and South Marcola sites had not been monitored since 1996 and 1994, respectively, prior to the 2006 field season. This lack of monitoring data means that monitoring data cannot be used to draw conclusions about current nesting potential for these sites. Because the other four sites have had relatively recent, consistent monitoring, this data can be used to help draw conclusions regarding the current potential for nesting. Bunker Hill, Drury Butte and Windy point have had documented nests, the most recent in 1990, 1998 and 2001 respectively. Cartwright Creek has never had a documented nest, but a pair was recorded there in 2001. All of six of these sites except South Marcola have had barred owls documented during monitoring efforts.

Provincial Home Range (PHR) Habitat and Individual Sites: The USFWS established provincial home ranges (PHRs) of 1.2 miles around spotted owl sites in the Cascade Ranges as a consistent area to measure the habitat condition of a site and potential effects from actions that could affect habitat or reproduction. When PHRs contain less than 40% suitable habitat, they are considered "at risk" for successful reproduction. In certain situations, younger habitat in proximity to suitable habitat may provide sufficient foraging habitat for resident pairs to successfully reproduce even when suitable habitat is below the 40% threshold. There are no established standards for determining the likelihood of nesting or occupancy when PHR nesting habitat is less than 40%. When available, recent monitoring data often provide the best assessment of site occupation or reproduction.

All of these sites have greater acreage of private lands than BLM land within the PHR. There have been clear cuts on private lands within the last 5-15 years in all six PHRs that have diminished amounts of available dispersal habitat. All six known owl PHRs adjacent to the proposed Harvest Areas are well below the 40% threshold. Approximately 470 acres of the proposed project area is within spotted owl PHRs. Based on current quality, amounts and distribution of suitable and dispersal habitat, coupled with existing monitoring data, five of these owl sites are unlikely to have sufficient habitat to support nesting. The sixth site, Mill Wolf, has only 183 acres of suitable habitat in the PHR (6% of PHR total), but it has other habitat components that increase the likelihood of a nesting attempt at this site. There is an additional 270 acres of habitat that is 70-79 years old within the PHR that would provide high quality foraging habitat and relatively short term suitable nesting habitat. In addition, the dispersal habitat adjacent to this owl site has patches of large trees and down logs that also increase the quality of this habitat. The quality, amount and distribution of this habitat increase the likelihood of reproduction at this site.

Red tree vole (Survey and Manage)
The project was evaluated for the need to survey according to the Survey Protocol, v. 2.1. Sections having sufficient structure to "trigger" surveys were withdrawn from harvest consideration and remaining proposed harvest sections do not meet minimum habitat requirements for surveys. This species will not be analyzed in this document.

Crater lake tightcoil (Survey and Manage)
The Hells Hill Harvest Area has wetlands and streams above 2000 feet elevation that provide suitable habitat for this small snail. The action alternative would include thinning no closer than 75 feet from suitable habitat. This would adequately protect suitable habitat so that no surveys are necessary. This species will not be analyzed in this document.

Great gray owl (Survey and Manage)
Suitable nesting habitat for this species is typically mature or remnant old-growth mixed-conifer forest that is within 200 meters of openings which provide sufficient prey numbers (Protocol 3.0). There is no suitable nesting habitat within or adjacent to the proposed project area. No surveys are required for this species and this species will not be analyzed in this document.

Northern goshawk (Special Status Species)*
Goshawks typically nest in stands with high basal area, high canopy closure, open understory with a component of snags, down logs, and larger trees (≥18" dbh). The vast majority of documented goshawk nests in western conifer stands are in mature stands, although all four nest sites that have been documented on the Eugene District have been in mid-seral conifer forests. Goshawks forage in suitable nesting habitat and in stands with smaller trees, less canopy closure and less basal area than is found in typical nest stands. The project area has approximately 750 acres of mid-seral habitat that provides low to moderate quality nesting habitat and moderate to high quality foraging habitat for goshawks. The presence of mature stands that are adjacent to some of the project Harvest Areas increases the likelihood of goshawks utilizing this habitat as foraging habitat because these mature stands provide higher quality nest habitat than that found within the project area.

Slender salamander (Special Status Species)*
Key habitat indicators for this species are moist, cool, high canopy conditions, large diameter (>20") well decayed conifer down logs, uncompacted soil and undisturbed stand conditions. Individuals are primarily associated with large down logs, although they are also found in piles of bark at the base of snags and in moist talus areas. The proposed project Harvest Areas have moderate to high numbers of large, well decayed down logs, typically distributed in patches across the landscape.

Cascade torrent salamander (Special Status Species)*
Cascade torrent salamanders prefer springs, seeps, and cold, small moderate to high gradient headwater streams with pebble to cobble size substrates, and low amounts of silt and embedded fines. Individuals use terrestrial areas near streams, especially above headwalls. Harvest Areas of the proposed project provide mostly low quality aquatic and terrestrial habitat for this species due to the presence of silt. Some streams or portions of streams and associated uplands do provide moderate quality habitat where there is less silt present. *

Fringed myotis (Special Status Species)*
This bat species roosts in a variety of substrates in coniferous forests, including the bark of large trees and snags, rock crevices and tall stumps. There are very few large snags or green trees that would be suitable for roosting within the proposed project area. There are large snags and green trees adjacent to the proposed project area that likely provide suitable roosting habitat for these bats. Two females were captured in 1995 during a bat study just south of the Drury 19 Harvest Area. It is unknown to what extent, if any, these individuals used habitat in the proposed project area.

Red-legged frog (BLM Tracking Species)
An adult red-legged frog was observed in the Bunker Hill Harvest Area in 1992. There is habitat for this species in many of the streams within the project area. The 75-200 ft no cut buffer and other aquatic design features would provide protection for red-legged frog habitat. This species will not be analyzed in this document.

3.4.2 ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE 1: NO ACTION
Snags and down logs would not be damaged by harvest activities and would remain on site in their current condition. The numbers and condition of current and future snags and down logs, and their value to wildlife, would continue on the current trajectory. No new snags or down logs would be created within the riparian reserves of the project area. It would be expected that these stands would continue to have low numbers of large snags and class 1 and 2 down logs for several decades.

Northern spotted owl (Threatened)
No dispersal habitat would be degraded short-term and habitat within the proposed project area, including live trees, snags and down logs, would continue on the current trajectory. Development of suitable habitat in these stands would be slower than under the action alternative.

Other Special Status Species
Habitat for these species would not be degraded in the short-term. Habitat for these species would continue on the current trajectory. No direct negative effects to individuals that might be present in the stands would occur. Increased tree size and structural complexity of these stands would occur at a slower rate than in the action alternative.

* There is habitat within the proposed project area for these four other BLM Special Status Species. Pre-project surveys are not required for these species and none were conducted. Existing BLM data shows no known sites of these species within or adjacent to the project area.

ALTERNATIVE 2: PROPOSED ACTION

Down logs and Snags (key habitat)

Timber harvest could damage or destroy some existing down logs and snags, especially the more fragile higher decay classes. Harvest activities would be designed to minimize loss and damage to existing down logs and snags. Snags and down log numbers would increase due to creation under this alternative. This would increase the number of class 1 and 2 snags and down logs decades sooner than the no action alternative.

Northern spotted owl (Threatened)

No suitable habitat would be modified by the proposed project. Approximately 220 acres of the proposed project area is within the Mill Wolf PHR. This habitat is directly adjacent to the known owl site and could be used to support nesting owls at the site. Degrading this habitat would be likely to adversely affect reproductive attempts at this site for 10-15 years until the canopy closes in and vegetation recovers from harvest activity. Long-term the proposed thinning, as well as snag and down log creation, could increase suitability of this habitat for this site. Harvest activities would not negatively affect attempted reproduction as seasonal restrictions would be in effect in this habitat.

Overall approximately 750 acres of dispersal habitat would be degraded by the proposed project for an estimated 10-15 years. Because the other five known spotted owl sites in the area are unlikely to have sufficient habitat to support nesting, it is unlikely that the proposed project would adversely affect these owls. Long-term, the proposed thinning could benefit spotted owls by accelerating the structural development of these stands, creating suitable habitat more quickly than the no action alternative. Snag and down log creation in the riparian reserves would also enhance habitat suitability long-term.

Northern goshawk (Special Status Species)

Approximately 750 acres of potential nesting and foraging habitat would be degraded under this alternative. This alternative would reduce suitability of this habitat immediately after harvest. It may take 10-15 years for this habitat to return to current levels of suitability. In the long term, the proposed thinning could benefit goshawks by accelerating development of high quality suitable habitat. The creation of snags and down logs would also be expected to increase habitat suitability for this species. If any goshawks are utilizing this habitat, this project has the potential to preclude or disturb nesting behavior.

Slender salamander (Special Status Species)

Harvest activities would be designed to minimize damage to down logs and snags, although some of these habitat components could be removed or damaged. This could result in short-term adverse effects to individuals if they are present. The reduction in canopy closure could negatively affect the suitability of down logs and other habitat features by raising temperature and lowering moisture until canopy closure returns to high levels (10-15 years). Creation of down logs and snags could benefit this species long-term, but it would be decades before these benefits are realized.

Cascade torrent salamander (Special Status Species)

There would be 75-200 ft “no touch” buffers on streams that would protect water quality and all stream habitats for this species. Headwall terrestrial habitats beyond these buffers would experience localized short-term changes in canopy and microclimate. Such effects would diminish as canopy conditions recover within 10-15 years.

Fringed myotis (Special Status Species)

Retention and protection given to existing snags and large remnant trees should protect much of the roosting habitat for this species, although some snags may be damaged or lost due to harvest activities. Creation of snags could benefit this species long-term as these snags become suitable for roosting. Project actions could disturb existing roosts within or adjacent to the project area throughout the year. The amount and result of such effects are unknown.

Cumulative effects (All Wildlife Species):
Reasonably foreseeable actions on BLM lands in this area are expected to be thinning prescriptions that would have similar effects to these species. Overall, long-term effects to Special Status Species are unknown since the status of these species on the District are unknown. Private land may contribute some habitat for these species through time. It is expected that these lands would be harvested at the mid-seral stage and not provide long-term habitat for any species analyzed in this document.

3.5 SOILS

3.5.1 AFFECTED ENVIRONMENT

Treatment is only proposed on sites with soils that are classified as having either intermediate or high soil resiliency. These soil types can undergo manipulation and maintain nutrient capital, inherent physical and chemical capabilities, hydrologic function and natural rates of erosion.

Most harvest areas proposed occur on low foothills that receive from 40 to 60 inches of rainfall annually (Bunker Hill, Upper Bunk, Drury 25 and Drury 19). Soils contained are moderately deep and well drained. Topography is gently sloping to steep. Textures are silty clay loam and cobbly silty clay loam. The dominant upland soil series that occur are Bellpine, Nekia and Ritner.

The low lying nearly level area in Upper Bunk contains the McAlpin series, a deep soil with a seasonal high water table that typically occurs on floodplains and formed in recent alluvial deposits. The drainages in 16-1W-19 contain the Dupee series, a deep, somewhat poorly drained soil with a high water table at a depth of 2 to 3 feet from December to March that typically occurs on alluvial fans of foothills.

One harvest area, Mohawk River, occurs on broad, stable ridges of mountains that receive more than 60 inches of rainfall per year. Soils are moderately deep to deep and well drained. Topography is gently sloping to very steep. Textures are silty clay loam and clay loam. The dominant soil series are Peavine and Honeygrove. Areas adjacent to the major streams contain the Cumley series. These soils are deep and clayey with a high water table at depth from November to April.

Harvest area, Hells Hill, occupies more rugged, hilly uplands with narrow ridges that receive more than 60 inches of rain per year. Topography is moderately steep to very steep. The dominant soil series is Klickitat stony loam. These soils are moderately deep and well drained. Klickitat soils are skeletal with greater than 55 percent stone and cobble content throughout the soil profile.

All sections exhibit some level of impact from past harvest, but the current extent of detrimental soil conditions varies in response to different treatment history and soil sensitivity. Residual effects are evident in Mohawk River Harvest Area where variable topography, including moderately steep slopes up to 50%, was harvested with ground based machines. A network of deeply excavated skid roads and trails are still evident, including multiple stream crossings. As much as 5 percent of this Harvest Area shows some level of soil impairment.

In Upper Bunk, skid trails on poorly drained soils have altered drainage patterns and water budget due to deep persistent compaction. Residual compaction in this small Harvest Area may be as high 3 percent.

In Bunker Hill, gullies have developed in the steeper segments of mid-slope skid roads. Elsewhere in this section, soils are recovering from recent ground based harvest on gentle topography. The spatial extent of severe compaction is minor in Drury 19 and Drury 25 where machine impacts seem to be confined to the drainageways. Soil quality is largely intact in Hells Hill. However, hydric soils occur in portions that are currently dominated by vine maple. The areal extent of severe compaction and displacement in Harvest Areas other than the two noted above is estimated to be below the District's RMP standard (RMP, p. 37).

Soil Restrictions

Areas that contain McAlpin silty clay loam, Dupee silt loam, and Cumley silty clay loam are not available for ground based harvest systems due to the seasonal high water table. Areas that contain Honeygrove silty clay loam are not recommended for ground based harvest systems. The high clay content and moderately slow permeability make these soils slow to dry and very susceptible to deep compaction. Areas that contain Klickitat stony loam are not recommended for ground based logging systems or temporary road construction. Compaction on these sites cannot be satisfactorily mitigated with standard tillage techniques because of the excessive stone content.

Harvest Area Boundaries have been adjusted to exclude sites with sensitive, low resiliency soils from all harvest and/or road building activities. These sites are avoided because there are minimal opportunities for manipulating vegetation without impairing inherent properties and function and/or accelerating erosion.

3.5.2 ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE 1: NO ACTION

No additional soil compaction or displacement would occur beyond what currently exists since there would be no harvest or road construction. Legacy compaction would persist into the future along existing skid trails that are targeted for use and subsequent tillage, primarily in the Mohawk River Harvest Area.

ALTERNATIVE 2: PROPOSED ACTION

Natural rates of erosion would be maintained under the proposed action. Project design features would minimize the potential for accelerated erosion. No harvest, or road building is proposed in areas identified as having a high potential for slope failure.

Cable Yarding

Approximately 378 acres, or 51% of the total project area, would be yarded with cable systems. Direct effects of cable yarding would be displacement of surface soil and organic matter, and discontinuous localized compaction within yarding corridors. These effects tend to be confined to a narrow strip less than four feet wide. Compaction would be deeper and more continuous for areas harvested in the winter when soils are wet. Compaction reduces porosity which is an essential component of site productivity. It is instrumental for water infiltration, water storage, and gas exchange. Soils with good porosity create favorable conditions for root growth, water movement, nutrient uptake by roots, and mychorrizal growth (Amaranthus and others, 1996). Design features would limit the spatial extent of these impacts and the potential for prolonged erosion. After operations, bare soil exposure and compaction would occupy about 3% of the cabled portions, or 11 acres. Full vegetative recovery within corridors is expected within five years for the highly resilient soils (Bellpine, Nekia, Peavine, and Cumley series). Vegetative cover on the coarse textured, intermediate resiliency soils is expected in less than 10 years (Klickitat, Ritner, and McAlpin series).

Helicopter Yarding

Approximately 244 acres, or 33% of the project area, would be yarded with helicopters. This logging system results in negligible displacement of surface soils or compaction (Long-term Productivity Studies, Siskiyou National Forest, 1997). Approximately 5 acres would be occupied by landings to facilitate harvest, where soil productivity would be irretrievably lost.

Ground based Yarding

Ground based yarding is only planned where suitable soils occur and slopes are less than 35 percent, approximately 123 acres, or 16% of the total project area. These systems have the potential for greater displacement and more severe compaction than cable systems because trails are wider and compaction extends deeper. A suite of Best Management Practices and other design features would be employed to reduce the spatial extent and duration of these effects. The residual effects of un-treated historic

compaction) can persist for 50 years or longer. After harvest, about 10% of the ground based portions, or 12 acres, would be occupied by skid trails and/or landings. All skid trails used in this entry with severe compaction would be tilled. Tillage with an excavator would restore infiltration and hasten vegetative recovery. Utilizing existing skid trails reduces new adverse impacts and provides the opportunity to mitigate residual effects in some areas. Unfortunately, many acres in this proposal that were harvested with ground based systems in the past, are no longer considered appropriate for this equipment now that other methods are available. Residual compaction in certain areas would not be treated, and effects may persist into the next rotation (Mohawk River, Drury 19, and Upper Bunk).

Road Construction
Construction of approximately 3200 feet of road would be surfaced with crushed rock and added to the District's permanent road system. Another 3,232 feet of existing road would be maintained or renovated and would remain on the road system indefinitely as well. Soil productivity associated with the road construction would be irreversibly lost on approximately 3.5 acres. The roads in the Hells Hill and Upper Bunk units had some rock additions prior to this proposal; therefore the soil productivity loss is not associated with this action.

Construction of approximately 2,100 feet of temporary native surface road and associated landings would result in the loss of topsoil and severe, deep compaction on one acre of productive forested land. In general, these temporary roads are planned on gradual grades and tillable soils. Tillage would improve infiltration and mitigate the potential for prolonged erosion. Root growth in the loosened soil areas would be better distributed and more vigorous, resulting in an accelerated improvement of soil structure and recovery back to a forested condition as compared to leaving untreated compacted surfaces. However, soil function and long-term productivity would still be impaired for 50 years or longer due to the loss of topsoil.

Construction of approximately 2300 feet of temporary rocked road is expected to result in greater direct and indirect impacts to soil function than the native surface temporary roads. The spatial extent of topsoil removal would be 22 feet wide as compared to 14 feet for the native surface roads, resulting in impaired long-term productivity on about 1.5 acres. Rock removal would cause deeper excavation than what is needed for construction. Soil aggregates and texture would be altered when rock removal is incomplete affecting infiltration and water storage characteristics. Though difficult to quantify the effects of these influences, it is reasonable to expect that soil productivity could be impaired for as long as a century.

3.6 FUELS

3.6.1 AFFECTED ENVIRONMENT

Currently the stands are best represented by fuel model 8 (light timber litter) and model 5 (moderate brush) with some small isolated pockets of fuel model 10 (heavy timber litter and understory). Fires carried by surface fuels made up of litter and grasses characterize fuel model 5. Under fuel model 8, fires are slow burning ground fires with low flame lengths. Fuel model 10 fires burn in surface and ground fuels with greater intensity due to higher fuel loadings. Crowning, spotting and tree torching is frequent within this fuel type.

Wildland/Urban Interface is present on three of the six proposed harvest areas; Upper Bunk, Drury Butte 19, and Drury Butte 25. Private industrial forest lands are present adjacent to all six areas.

3.6.2 Environmental Consequences

No Action Alternative
Under the no action alternative, the project areas would remain Fuel Model 5 or 8 in the short term if no

outside disturbance occurs and eventually transition to a Fuel Model 10 as tree mortality occurs in the long term.

Alternative 2

After thinning operations the fuel bed would not be uniform or continuous slash throughout the harvest unit, resulting in a Fuel Model (FM) 11 condition. Fuel Model 11 under the site conditions of this project yields low to moderate fire behavior except under severe weather conditions. However, Model 11 fuels will behave like Model 12 fuels, if a fire occurs while the slash is in a 'red slash' condition, usually 1 and no more than 2 years after harvest. Crown spacing after all treatments will make the occurrence of a crown fire under even severe weather conditions unlikely. The residual slash will be moved and compacted by the yarding operations resulting in openings in the fuel bed, buried slash, slash concentrations and a portion of the slash will be brought to and sorted on landings as cull material. Skid trails and yarding corridors often have light fuels with large sections of bare soil creating fire breaks within the unit but also tend to have concentrations of fuel directly adjacent to them which would burn at higher intensities.

Roads within the project areas may be utilized for multiple small landings normally associated with commercial thinning operations. Fuel concentrations associated with these landings will occur adjacent to these roadways. Landing piles will vary in size depending on site-specific operational factors resulting in varying quantities of unmerchantable material reaching each landing. As the slash breaks down the live fuels will begin to dominate with the site becoming a Fuel Model 5 within 7-10 years.

Roadside piling and pile burning would reduce the roadside fuels and eliminate point sources for intense fire behavior and long range spotting that could occur within the project area in event a wildfire starts or moves into the project area. This would also increase public and firefighter safety. Slash concentrations along roads and near landings would be piled for burning during the rainy season.

Smoke emissions from the burning of piles would be of short duration and in compliance with ODF through daily Smoke Management Instructions. The burning of piles would likely occur between November 1 and January 1, when the most favorable emission dispersion conditions are possible. Burning of piles may occur over a several day period. It is not anticipated that the burning of the piles would exceed National Ambient Air Quality Standards (NAAQS) or State Implementation Plan (SIP) for air quality. Additional fuels treatment information is available in the Fuels Treatment Project Plan in the project file.

Within the helicopter logging areas, the fuels would be deeper and more uniform than sections harvested by cable or ground based equipment. This occurs because there is less movement and compaction of the slash bed when helicopter yarding is used. This would result in a fuel bed that would burn like a Fuel Model 12. However, fuel loadings would be less and should only persist for 2-3 years after which decomposition of the needles and fine fuels would cause a transition to a Fuel Model 11. As the slash breaks down the live fuels would begin to dominate the site, transitioning to a Fuel Model 5 within 7-10 years.

3.7 UNAFFECTED RESOURCES

The following are either not present or would not be affected by any of the alternatives: Areas of Critical Environmental Concern, prime or unique farm lands, solid or hazardous wastes, Wild and Scenic Rivers, or Wilderness.

3.8 ENVIRONMENTAL JUSTICE

To comply with Executive Order 12898 of February 11, 1994, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, the Bureau of Land Management, Eugene District, will ensure that the public, including minority communities and low income communities, have adequate access to public information relating to human health or environmental planning, regulations,

and enforcement as required by law. The District has not identified any environmental effects, including human health, economic and social effects of Federal actions, including effects on minority populations, low-income populations, and Native American tribes, in this analysis.

3.9 CULTURAL RESOURCES

Surveys will be conducted in the spring of 2006. If sites are found the appropriate mitigations would be taken to preserve sites.

3.10 BOTANY

Surveys would be conducted prior to implementation. If sites are found for special status or T&E species, appropriate mitigations would be taken as necessary.

4.0 LIST OF AGENCIES AND PERSONS CONSULTED

This environmental assessment is being mailed to the following members of the public or organizations that have requested to be on the mailing list:

John Bianco	Peter Saraceno
Oregon DEQ	Sierra Club - Many Rivers Group
Jim Goodpasture	Swanson Group
Pam Hewitt	Craig Tupper
Charles & Reida Kimmel	Jan Wroncy
Lane County Land Management	Kris and John Ward
Carol Logan, Kalapooya Sacred Circle Alliance	Robert P Davison
Oregon Dept of Fish & Wildlife	Tom Stave, U of O Library
Oregon Dept of Forestry	John Muir Project
Oregon Natural Resources Council	James Johnston
The Pacific Rivers Council	Molly Widmer
John Poynter	David Simone
Leroy Pruitt	Bart Pratt
Neal Miller	Rich Wright
Roseburg Forest Products Co.	Roger Wilson
	Rudy Wiedenbeck

A summary was sent to those receiving the "Eugene BLM Planning and Project Focus, June 2006 (approximately 250 mailings; a complete listing is available at the Eugene District Office).

5.0 CONSULTATION

ESA Affects Determination/Rationale

Northern Spotted Owl/Bald Eagle Habitat

Consultation for terrestrial Threatened and Endangered species is included in the "Programmatic Biological Assessment for Projects with the Potential to Modify the Habitats of Northern Spotted Owls and/or Bald Eagles or Modify Critical Habitat of the Northern Spotted Owl, Willamette Province-FY2007-2008" and "Biological Assessment of Activities with the Potential to Disturb Northern Spotted Owls or Bald Eagles Willamette Planning Province – FY 2006-2007".

BLM will consult with the National Oceanic and Atmospheric Administration (NOAA) fisheries on the effect of the proposed action on listed fish species (i.e. spring Chinook).

5.1 ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) requires Federal agencies to consult with the Secretary of Commerce regarding any action or proposed action authorized, funded, or undertaken by the agency that may adversely affect Essential Fish Habitat (EFH) under the Act. The action alternatives, as described and analyzed in this environmental assessment (EA) would have "No Effect" on waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

6.0 LIST OF PREPARERS

THE INTERDISCIPLINARY TEAM

Name	Title	Resource/Discipline
Paula Larson	Wildlife Biologist	Wildlife
Rudy Wiedenbeck	Soil Scientist	Soils
Fred Kallien	Fuels Specialist	Fuels
David Mattson	Engineer	Engineering
Laurie Bernstein	Fisheries Biologist	Fisheries
Kris Ward	Hydrologist	Hydrology
Lori Miller	Forester	Logging Design
Jill Williams	Forester	Silviculture
Christie Hardenbrook	Environmental Specialist	Team Lead/NEPA

7.0 REFERENCES

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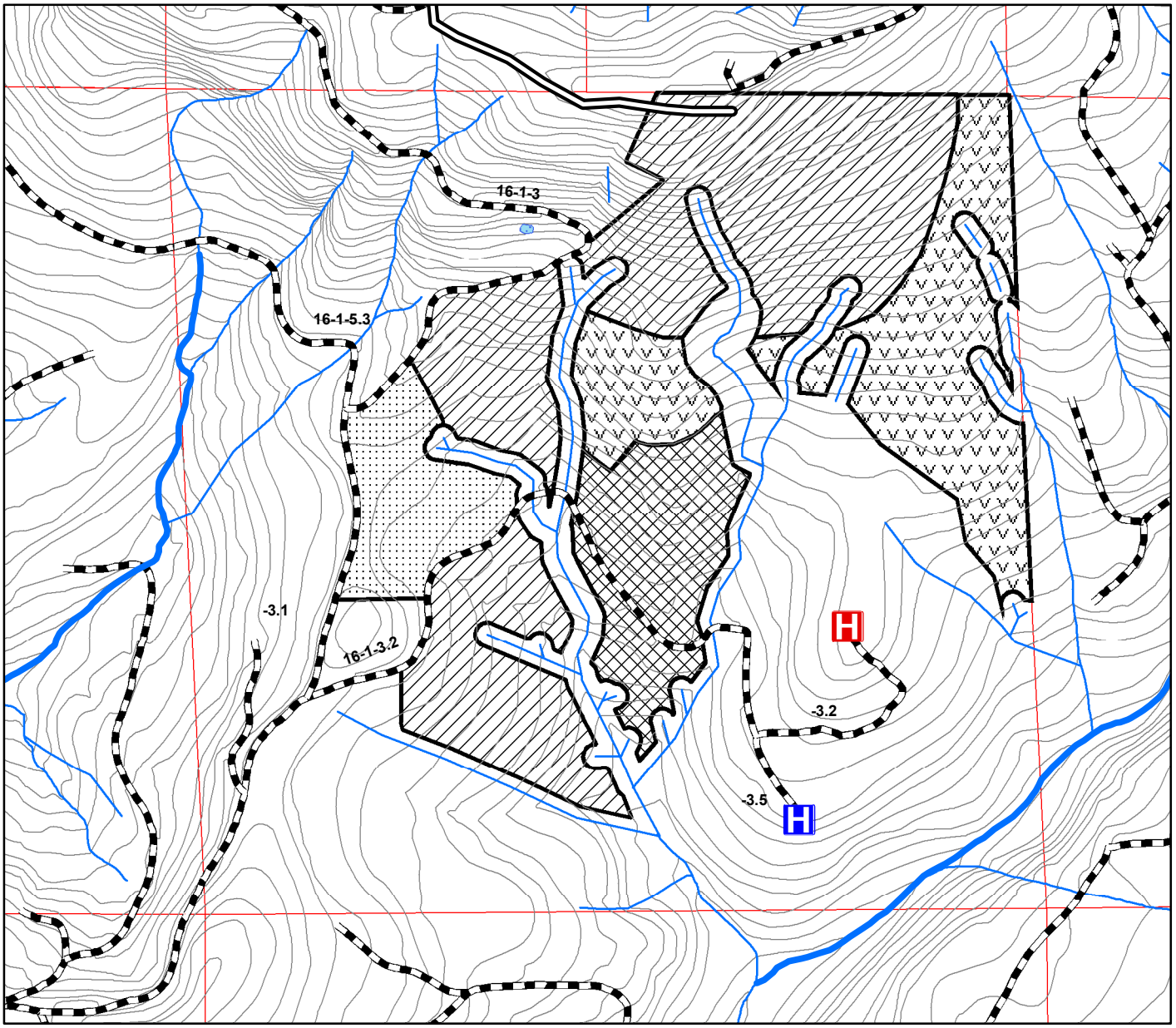
UNITED STATES DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT
EUGENE DISTRICT OFFICE
Finding of No Significant Impact
For the Mohawk East Project
Environmental Assessment No. OR-090-06-05

Determination:

On the basis of the information contained in the Environmental Assessment (OR-090-EA-06-05), and all other information available to me, it is my determination that implementation of the proposed action or alternatives will not have significant environmental impacts not already addressed in the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (April 1994) and the Eugene District Record of Decision and Resource Management Plan (June 1995), as amended by the Record of Decision for Amendments to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines, January 2001, and the Record of Decision to Clarify Provisions Relating to the Aquatic Conservation Strategy (March 2004), with which this EA is in conformance, and does not, in and of itself, constitute a major federal action having a significant effect on the human environment. Therefore, an environmental impact statement or a supplement to the existing environmental impact statement is not necessary and will not be prepared.

_____ _____

Field Manager, Upper Willamette Resource Area Date



Legend

- CABLE
- HELO
- TRACTOR
- SPECIAL YARDING AREA
- PROPERTY LINES
- 20' CONTOURS
- EXISTING ROADS
- PERMANENT ROCKED ROAD
- FISH BEARING STREAM
- STREAMS
- WETLANDS
- SEEPS
- POND
- HELO LANDING
- SERVICE LANDING

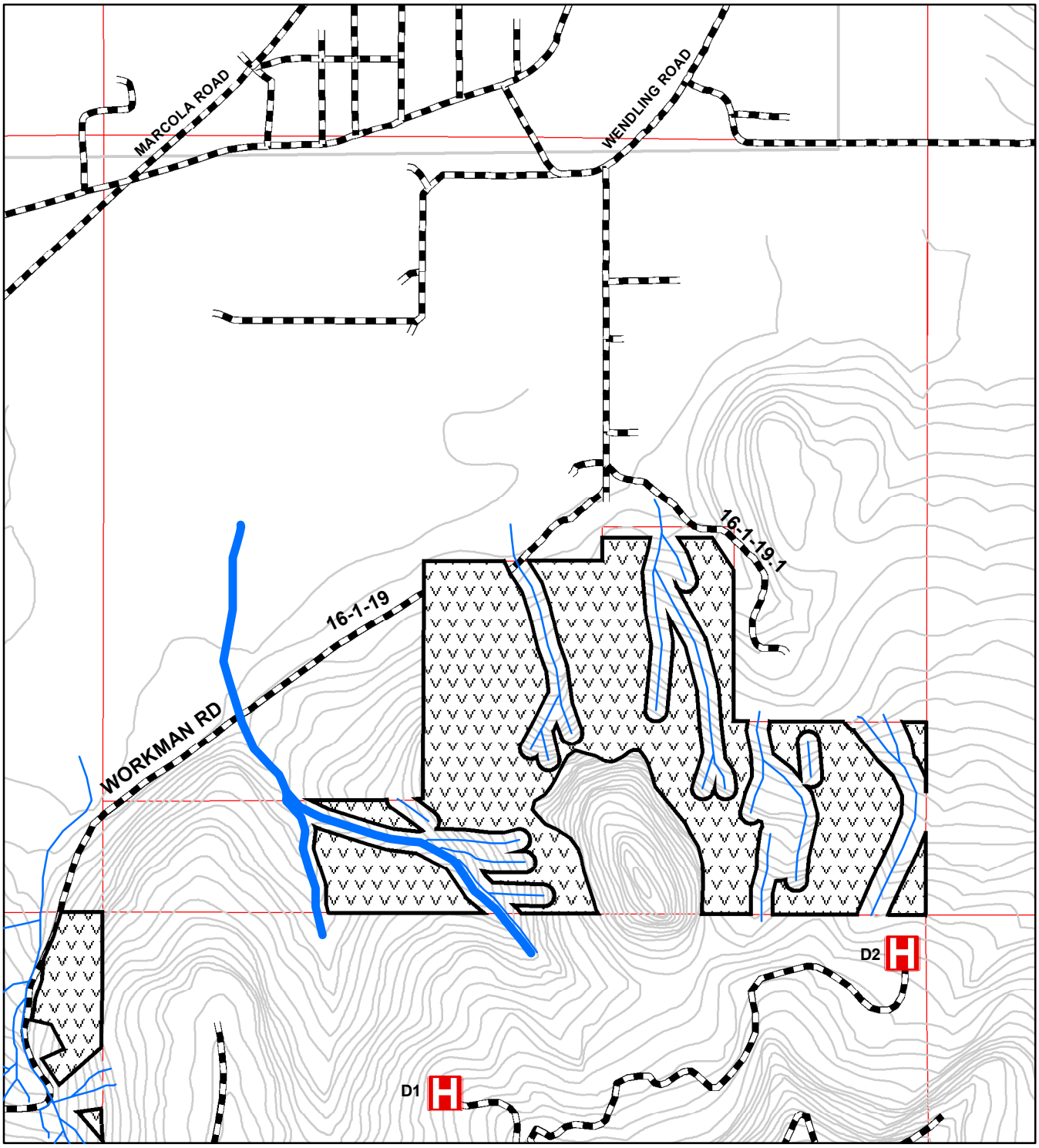
Bunker Hill
16-1W-3

Cable	**= 109 ac**
Helo	**= 56 ac**
Tractor	**= 22 ac**
Special Yarding Area	**= 31 ac**
Total	**= 218 ac**

0 500 1,000 Feet

N

7/01/06



Legend

- HELO
- PROPERTY LINES
- 20' CONTOURS
- EXISTING ROADS
- STREAMS
- FISH BEARING STREAM
- SEEPS
- HELO LANDING

Drury Butte
16-1W-19

0 500 1,000 Feet

HELO = 109 ac

N

7/01/06

Legend

- CABLE
- HELO
- TRACTOR
- EXISTING ROADS
- PROPERTY LINES
- STREAMS
- FISH BEARING STREAM
- WETLANDS

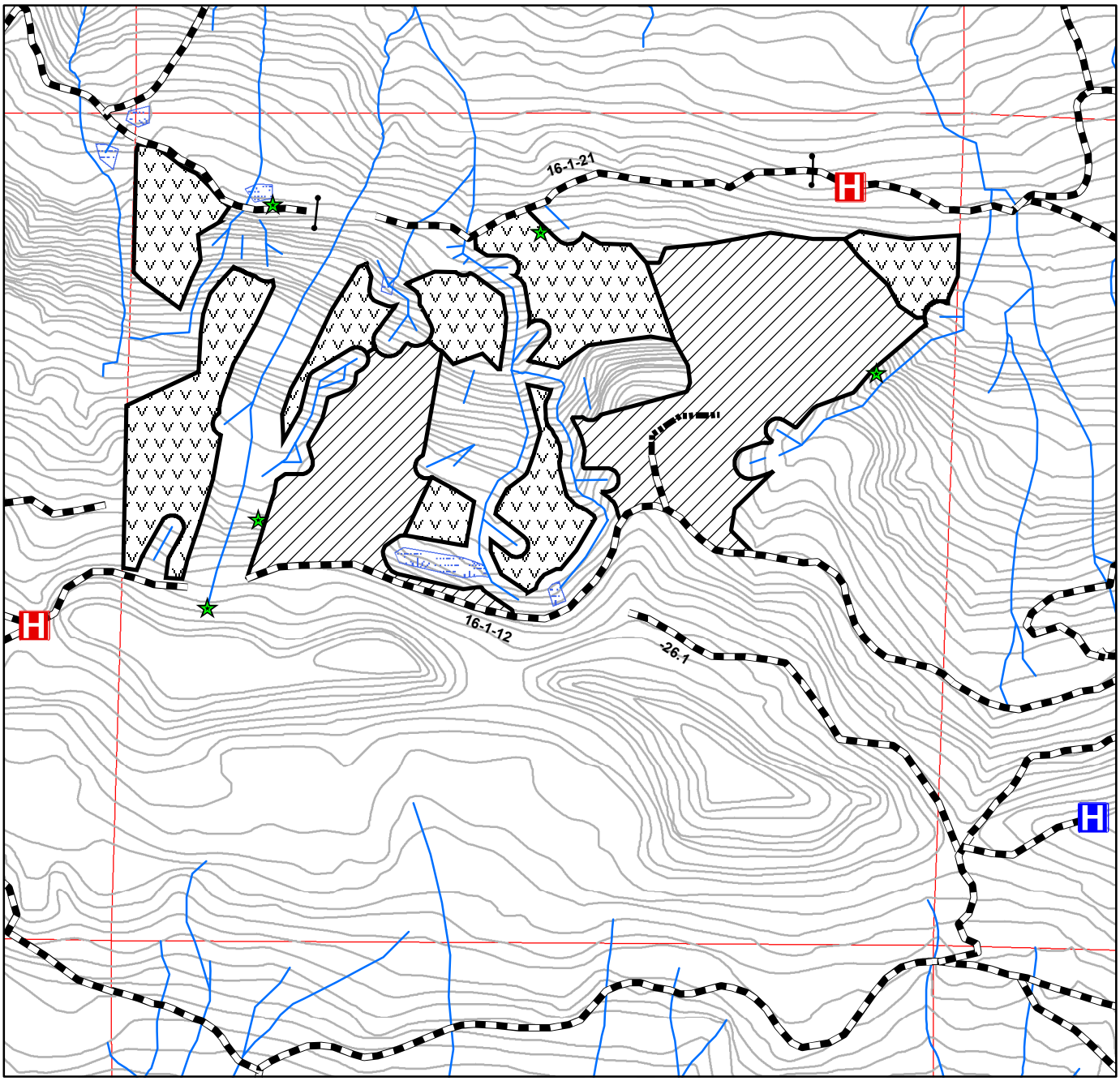
Drury Butte
16-2W-25

0 500 1,000 Feet

Cable	= 59 ac
Tractor	= 13 ac
Helo	= 11 ac
Total	= 83 ac

N

7/01/06



Legend

- CABLE
- HELO
- EXISTING ROADS
- TEMPORARY DIRT SPUR
- STREAMS
- SEEPS
- WETLANDS
- HELO LANDING
- SERVICE LANDING
- BLOCKED

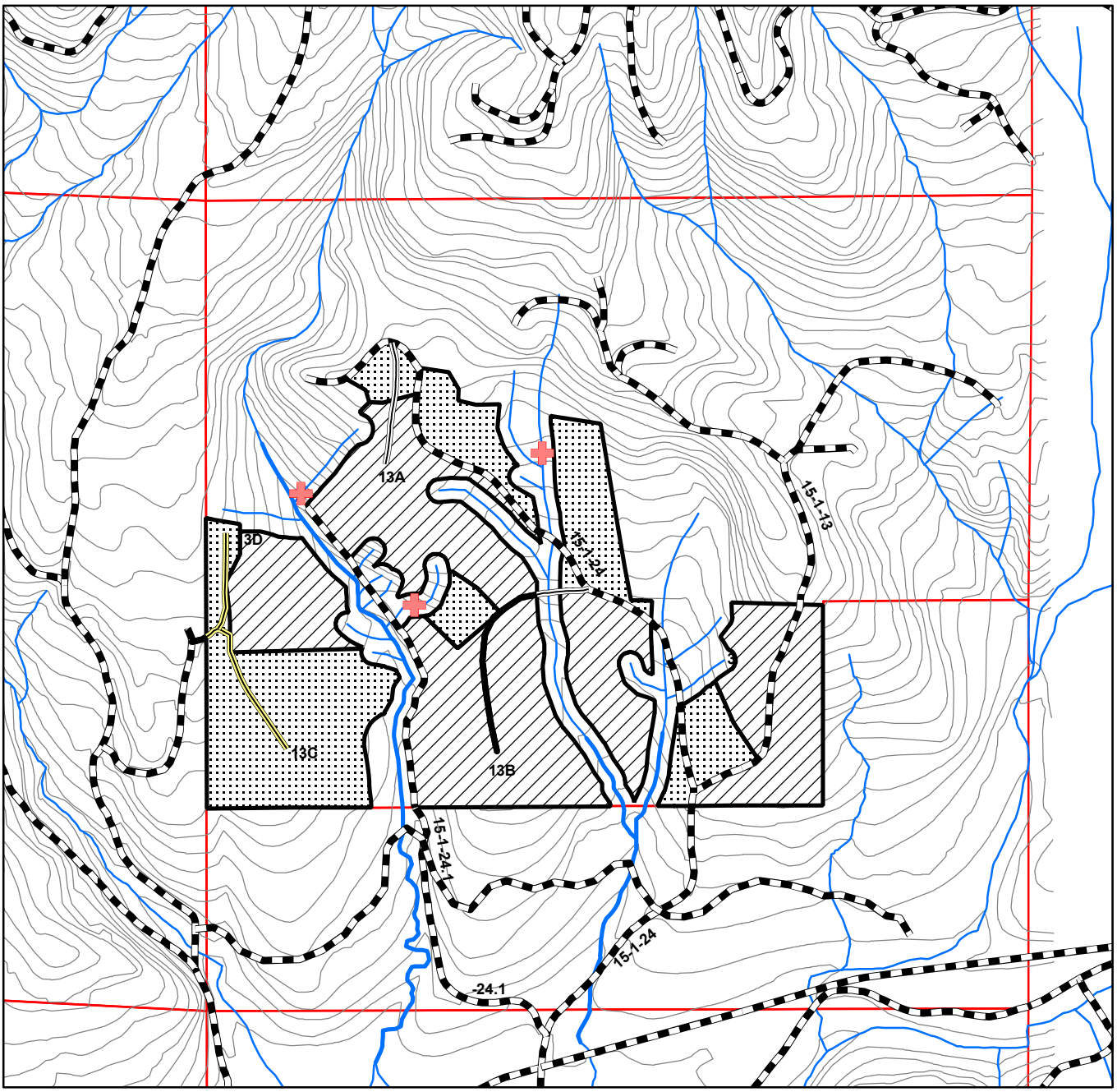
Hells Hill
16-1W-27

0 500 1,000 Feet

N

Cable	=	77 ac
Helo	=	68 ac
Total	=	145 ac

7/01/06



Legend

- CABLE
- TRACTOR
- PROPERTY LINES
- 20' CONTOURS
- EXISTING ROADS
- SPUR ROAD
- STREAMS
- FISH BEARING STREAM
- REHAB SITE
- PERMANENT ROCKED ROAD
- TEMPORARY ROCKED ROAD
- TEMPORARY DIRT SPUR

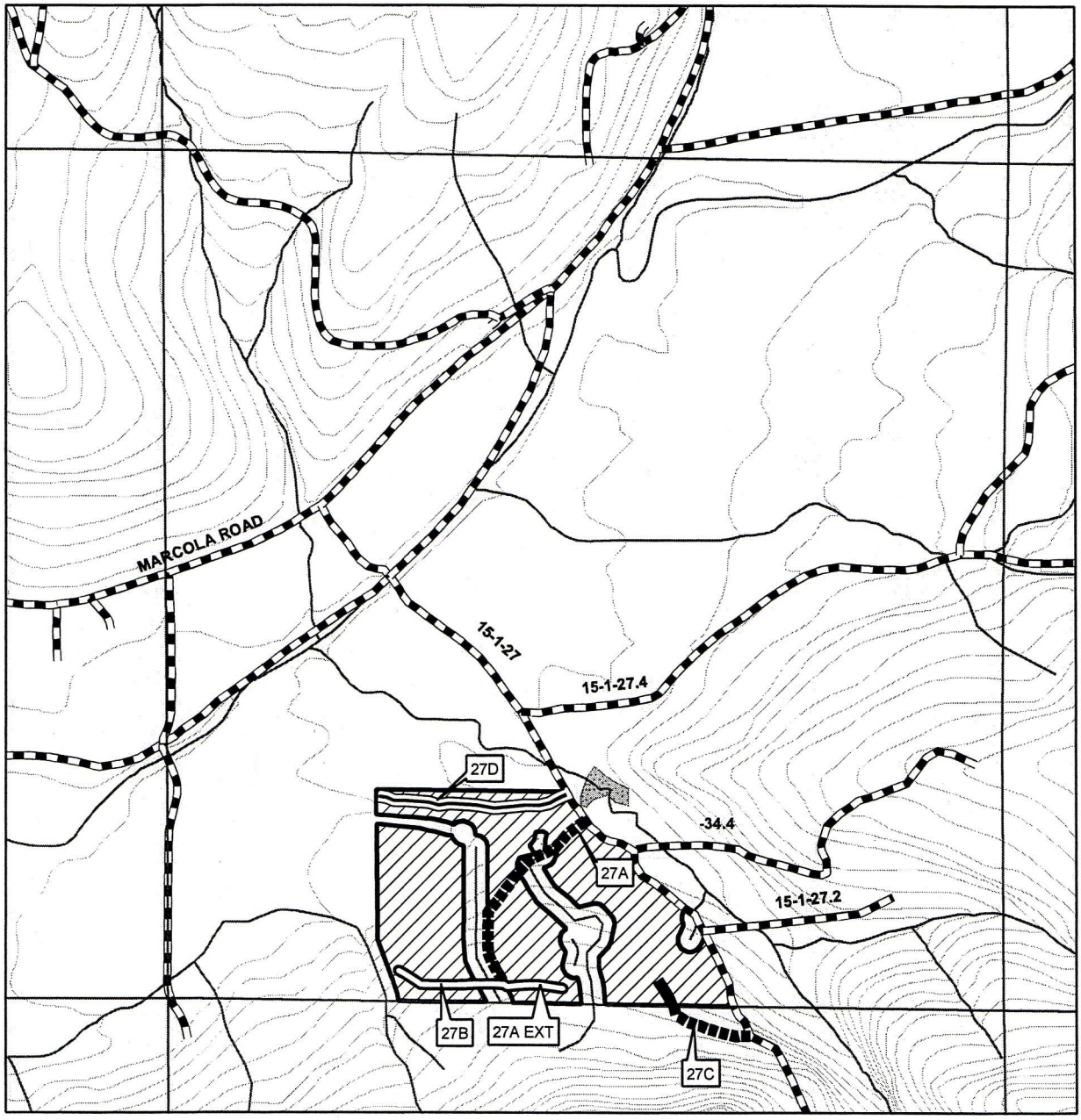
Mohawk River
15-1W-1

Cable	= 90 a
Tractor	= 57 a
Total	= 147 ac

0 500 1,000 Feet

N

7/01/06



Upper Bunk
15-1W-27

Cable = 43 ac

0 500 1,000 Feet

N

7/01/06

Legend

- CABLE
- PROPERTY LINES
- 20' CONTOURS
- EXISTING ROADS
- EXISTING DIRT SPUR
- PERMANENT ROCKED ROAD
- TEMPORARY ROCKED ROAD
- TEMPORARY DIRT SPUR
- STREAMS
- WETLANDS
- POND