



United States
Department of
Agriculture

Forest
Service

2004



Draft Supplemental Environmental Assessment

Solo

Clackamas River Ranger District, Mt. Hood National Forest
Clackamas County, Oregon

The project is located in T.6 S., R.7 E.; T.6 S., R.8 E.; Willamette Meridian.

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Introduction

The Forest Service has prepared 5 supplemental Environmental Assessments (EAs) pursuant to an opinion and order signed November 21, 2003, in a lawsuit in the U.S. District Court for the District of Oregon, *Oregon Natural Resources Council Action, Oregon Natural Resources Council Fund, and American Lands Alliance v. U.S. Forest Service*, Civil No. 03-613-KI. These 5 supplemental EAs are for the Borg and Solo Timber Sales on the Mt. Hood National Forest, and the Clark, Pryor, and Straw Devil Timber Sales on the Willamette National Forest.

Pursuant to the Court's opinion and order, the Forest Service is to submit these supplemental EAs for public comment from February 17, 2004, to March 18, 2004. After reviewing comments submitted, the Forest Service is to prepare final supplemental EAs by April 16, 2004. Plaintiffs in this lawsuit must submit any objections to the final supplemental EAs with the court by May 17, 2004. If any such objections are filed, the court will establish a briefing schedule and hold a hearing on the objections.

This supplemental EA discusses management of Survey and Manage species for the Solo Timber Sale. This sale has been sold but logging has not yet begun. The Solo Timber Sale is located within the Peavine Creek subwatershed that is tributary to the Oak Grove Fork of the Clackamas River on the Mt. Hood National Forest. See Map 1.

Time Line

The Solo Environmental Assessment (EA) was published for a 30-day comment period on June 24, 1998. The Decision Notice for the Solo EA was signed on September 21, 1998.

At one point, the Forest Service was planning to split the units from this EA into two separate timber sales: Solo and Lone. Since then, the units have been recombined to form one timber sale called Solo Timber Sale.

In 1998 litigation was initiated in the Federal District Court for the Western District of Washington in Seattle, challenging in part the Agencies' interpretation of the Northwest Forest Plan's (NWFP) requirement to phase in certain pre-disturbance survey requirements (ONRC Action et al v. USFS et al, CV 98-942 (WD Wash.)).

On August 2, 1999, the Seattle court ruled the agencies' application of the Survey and Manage requirements was deficient in two ways. The Seattle court found that the agencies' memo defining "project implementation" as the date of the NEPA decision or decision document, and the agencies' decision to exempt some habitat conditions from red tree vole surveys, were not consistent with requirements in the NWFP.

On December 17, 1999, the Seattle court approved a stipulation dismissing the lawsuit. The stipulation provided procedures for conducting certain pre-disturbance surveys and documenting

the results in Supplemental Information Reports. The Solo Timber Sale was subject to the terms of this stipulation and surveys were initiated in 2000. The stipulation provided that it would expire once the agencies adopted a set of amendments for survey and manage species through a Supplemental Environmental Impact Statement (EIS).

The Record of Decision for the Final Supplemental Environmental Impact Statement For Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (S&M ROD) was signed on January 12, 2001. That document amended the Northwest Forest Plan and changed categories for some species and removed some from Survey and Manage. It also clarified the agencies intent as to the timing of surveys and surveys for the red tree vole.

The results of surveys and changes to the Solo Timber Sale under the direction in the 2001 S&M ROD were documented in a SIR dated August 23, 2001. Four units were deleted (Units 4, 7, 10 and 12) and portions of three others were modified (Units 3, 11 and 14) due to the presence of several known sites of the Malone jumping slug.

In early 2002, the group BARK informed the agency that it had found a lichen (*Pseudocyphellaria rainierensis*) in unit 14. The site was verified and unit 14 was modified to surround the site with a green-tree retention area to provide for the management of the lichen species.

In June of 2002, the 2001 Annual Species Review was released. It made changes to categories for some species and removed some from the Survey and Manage standards and guidelines. It removed the Malone jumping slug for this area.

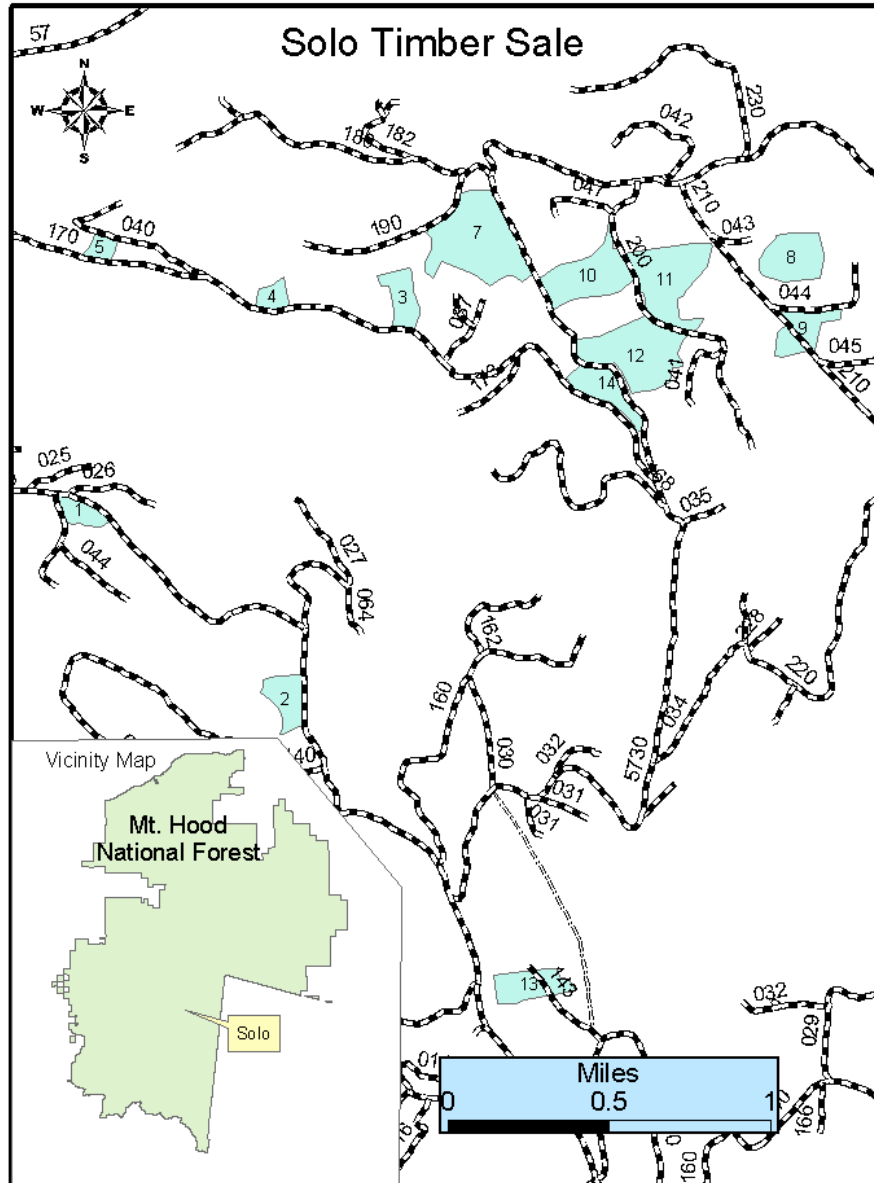
Since management areas for the Malone jumping slug were no longer needed, the Solo Timber Sale was again modified. Units 4, 7, 10 and 12 were added back. For administrative reasons the units that had boundary changes were not changed back to their original size and shape.

A revised SIR was issued on June 24, 2002. This SIR addressed the lichen *Pseudocyphellaria rainierensis*, which was not known at the time of the original SIR, and it also discussed the removal of the Malone jumping slug management areas.

The Solo Timber Sale was auctioned on February 7, 2003 and the timber sale contract was awarded to Freres Lumber Co. on March 4, 2003. No logging has yet occurred.

In 2003 litigation was initiated in U.S. District Court for the District of Oregon in Portland, challenging this and other timber sales alleging in part that the SIRS that were completed for these sales violated NEPA (*Oregon Natural Resources Council Action, Oregon Natural Resources Council Fund, and American Lands Alliance v. U.S. Forest Service*, Civil No. 03-613-KI). On October 9, 2003 the Portland court ruled the Forest Service violated NEPA by authorizing the sales without preparing NEPA analyses regarding the agencies survey and manage duties under the Northwest Forest Plan.

On November 21, 2003 the Portland court signed an Opinion and Order that directed the Forest Service to prepare additional NEPA analyses before proceeding with logging of any of these sales. The purpose of this analysis is to disclose and analyze the agency's survey and manage duties for these sales. The Portland court stated the analysis should discuss the methodologies used for the surveys, the results of the surveys, a range of alternatives and the management decisions being made.



Map 1.

Survey and manage duties based on current direction

Current direction is found in the Record of Decision for the Final Supplemental Environmental Impact Statement For Amendment to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (S&M ROD). The S&M ROD also provides direction for Decision Notices signed prior to the date the S&M ROD was signed. The following paragraphs come directly from page 18 of the S&M ROD (USDA USDI 2001).

For management activities with signed NEPA decisions or decision documents before the effective date of this Decision:

b. If activities are not under an awarded contract or signed permit, or actual habitat disturbance by agency crews has not begun, no Survey and Manage requirements in this Decision are applicable to these activities except:

- 1) If the NEPA decision or decision document was signed after September 30, 1996, and red tree vole pre-disturbance surveys were not conducted, conduct red tree vole surveys in accordance with the protocol in effect at the time the surveys are initiated, and manage resultant sites according to the Management Recommendation in effect at the time surveys are concluded; and,
- 2) Previously managed known sites of species removed from Survey and Manage or assigned to Category F by this Decision are released for other resource activities as described in the attached standards and guidelines; and,
- 3) Sites of species requiring management of known sites under the attached standards and guidelines will be managed as described under *Application of Manage Known Sites Direction* under the Timing Requirements for Surveys section in the attached standards and guidelines.

The following paragraph comes from page 24 of the S&M Standards and Guidelines (USDA USDI 2001).

Application of Manage Known Sites Direction: Even though pre-disturbance surveys are completed prior to the NEPA decision or decision document, manage known site direction will typically be applied to additional sites of rare species (Categories A, B and E) incidentally discovered during other field work after the decision date but prior to sale dates (or for non-contract activities, actual on-the-ground application of work). Manage known site direction may also be applied to additional sites for uncommon species (Categories C and D), depending upon factors such as the level of concern for persistence of the species and its habitat in and adjacent to the activity area.

The above direction applies to the Solo Timber Sale because the Decision Notice for Solo was signed in 1998 but the contract was not awarded until 2003.

Methodology of surveys

For some categories of species, site-specific pre-disturbance surveys must be conducted prior to signing decision documents for habitat-disturbing activities. These are “clearance” surveys that focus on the project unit with the objective of reducing the inadvertent loss of undiscovered sites by searching specified potential habitats prior to making decisions about habitat-disturbing activities. The surveys are not designed to find all individuals. Sometimes surveys are conducted outside the actual project area if the project might affect adjacent habitat. Surveys are done according to the Survey Protocols that are designed by taxa experts. Survey protocols can be found at the following web site: <http://www.or.blm.gov/surveyandmanage/sp.htm>. Species in Categories A and C require pre-disturbance surveys where the species ranges overlap a project (USDA USDI 2001, p 21-25). Data is entered into the Interagency Species Management System (ISMS) database.

Red tree vole surveys were completed according to the survey protocols. A line transect was used to achieve approximately 300 lineal feet per acre. Surveyors searched for nest sites along these transects.

The following surveys were conducted in 2000 before current management direction determined that they were not necessary.

Terrestrial mollusk surveys have been completed and no mollusks that currently require the management of known sites were found. Surveys were conducted for a group of terrestrial mollusks with particular emphasis in searching for the species with home ranges overlapping the project area. All mollusk species encountered were identified including some that no longer require surveys. The following species are thought to have ranges that overlap the project area: *Cryptomastix devia*, *Cryptomastix hendersoni*, *Deroceras hesperium*, *Hemphillia glandulosa*, *Hemphillia malonei*, *Hemphillia pantherina*, *Megomphix hemphilli*, *Monadenia fidelis minor*, *Prophysaon coeruleum*, *Prophysaon dubium*, and *Pristoloma articum crateri*. The surveys for terrestrial mollusks involved two visits to the project during the spring and fall when species were likely to be visible. Sample plots were intensively examined for 20 minutes and mollusks were identified and recorded on field forms.

Aquatic mollusk surveys were completed and one species was found that requires the management of known sites. Surveys were conducted in suitable habitat, which included cold, well-oxygenated springs and spring outflows and streams. Only one unnamed species has a range that overlaps the project area: *Lyogyrus* n. sp. 1. This mollusk has been found in many areas across the Forest. A series of grids, ranging from a minimum of eight to as many as 16 were surveyed to produce a total area sampled equal to about

0.5-1 square meter. Each grid was a square of 25 centimeters on a side. Surveyors examined the bottom of the water body and collected specimens for identification.

Surveys for botanical species were completed and several species were found that require the management of known sites. Surveys were conducted by botanists for several taxa groups including vascular plants, lichens, bryophytes and one fungus. The following species are thought to have ranges that overlap the project area: *Bridgeoporus nobilissimus*, *Ptilidium californicum*, *Schistostega pennata*, *Tetraphis geniculata*, *Bryoria pseudocapillaris*, *Dendrisocaulon intricatum*, *Hypogymnia duplicata*, *Leptogium cyanescens*, *Lobaria linita*, *Nephroma occultum*, *Pseudocyphellaria rainierensis*, *Ramalina throusta*, *Botrychium minganense*, *Botrychium montanum*, *Coptis trifolia*, *Corydalis aquae-gelidae*, *Cypripedium fasciculatum* and *Cypripedium montanum*. Other species that do not require surveys may have ranges that overlap the project area. The surveys for botanical species involved walking through likely habitat areas during the time of year suited for species identification.

Surveys were not conducted for salamanders or great gray owls because habitat for these species is not present in the Solo project area.

Results of surveys/Management of known sites

Some species locations were known and evaluated at the time of the EA in 1998 (EA p. 24). This section documents the results of surveys conducted in 2000 and the verification of a site found in 2002.

Current direction gives the decisionmaker some latitude for incorporating management of known sites found after the decision date (USDA USDI 2001, page 24). The standards and guidelines indicate that manage known site direction will typically be applied to additional sites of rare species (Categories A, B and E) and manage known site direction may also be applied to additional sites for uncommon species (Categories C and D), depending upon factors such as the level of concern for persistence of the species and its habitat in and adjacent to the activity area.

Known sites are recorded in the Interagency Species Management System (ISMS) database. Management Recommendations can be found at the following web site:
<http://www.or.blm.gov/surveyandmanage/mr.htm>

There is one known site of the aquatic mollusk *Lyogyrus* (Category A). It is located in a stream west of unit 13 and is outside of all units. Riparian reserves would provide for the habitat requirements of this species. Road decommissioning and meadow restoration are connected projects that are near this known site.

There is one known site of the lichen *Pseudocyphellaria rainierensis* (Category A). It is located in unit 14. Management Recommendations for this species (Version 2) lists considerations such as maintaining the current level of shade, maintaining the understory

component of the Pacific yew that the lichen is using as a substrate, maintaining the microclimate and preventing fire. The following recommendation has been derived following consultations with botanists as well as reviewing literature (Appendix A). A management area extends from the known site south to the unit boundary, a distance of approximately 150 feet; it extends to the east and west approximately 140 feet from the site tree and 100 feet to the north. It is recommended that no activities take place within this area including tree harvest, site preparation or entry by heavy equipment. The site should be monitored for a minimum of two years following implementation.

The EA contains a discussion of known sites of several botanical species that were to be managed by avoidance and by placement of green tree retention patches. All of the species listed (EA page 23-24) have been removed from the Survey and Manage standards and guidelines.

Fourteen sites of the terrestrial mollusk *Hemphillia malonei* (Malone jumping slug) were found within the harvest units. This species was in Category C but has since been found to be quite common and was removed from the Survey and Manage standards and guidelines for this area in the 2001 Annual Species Review which was released on June 14, 2002. Four units were deleted (Units 4, 7, 10 and 12) and portions of three others were modified (Units 3, 11 and 14) due to the presence of this species. After the species was removed from Survey and Manage for this area, Units 4, 7, 10 and 12 were added back. For administrative reasons the units that had boundary changes were not changed back to their original size and shape.

The following table displays the results of surveys conducted in 2000 and the verification of a site found in 2002:

Unit	S&M Presence	Acres	Remarks
1	No	5	
2	No	9	
3	Yes	7	One location of Malone jumping slug was found outside the unit. Less than 0.5 acre of the management area was in Unit 3. This area was not added back in after this species was removed from the list. See Map 2.
4	Yes	3	Two locations of Malone jumping slug were found. The entire unit was affected but was added back into the sale when the species was removed from the list. See Map 3.
5	No	3	
7	Yes	31	Three locations of Malone jumping slug were found. The entire unit was affected but was added back into the sale when the species was removed from the list. See Map 4.

Unit	S&M Presence	Acres	Remarks
8	No	14	
9	No	12	
10	Yes	20	Two locations of Malone jumping slug were found. The entire unit was affected but was added back into the sale when the species was removed from the list. See Map 5.
11	Yes	15	Two locations of Malone jumping slug were found. Approximately seven acres were deleted from this unit but were not added back in after this species was removed from the list. See Map 6.
12	Yes	28	Four locations of Malone jumping slug were found. The entire unit was affected but was added back into the sale when the species was removed from the list. See Map 8.
13	No	9	The road right-of-way near Unit 13 was also surveyed and no sites were found.
14	Yes	8	Unit modified two ways prior to selling timber sale by deleting two portions. 1) The management area for a Malone jumping slug found in Unit 12 extended into Unit 14. Approximately two acres of Unit 14 were deleted but were not added back in after this species was removed from the list. 2) One location of the lichen (<i>Pseudocyphellaria rainierensis</i> (Category A) is in Unit 14. A buffer was established around the site that extends to the south 150 feet, to the east and west 140 feet and to the north 100 feet. Some of the buffer crosses out of Unit 14. See Map 9.

Alternatives

Alternatives are described in the EA on page 11 and Alternative 2 was selected. Alternative 2 involved four actions including the harvest of 216 acres of regeneration harvest. The 216 acres in the EA includes green tree retention patches. The unit sizes listed in this supplement are the actual acres proposed for harvest after the green tree retention areas were subtracted. These GTR areas equal approximately 22 acres total.

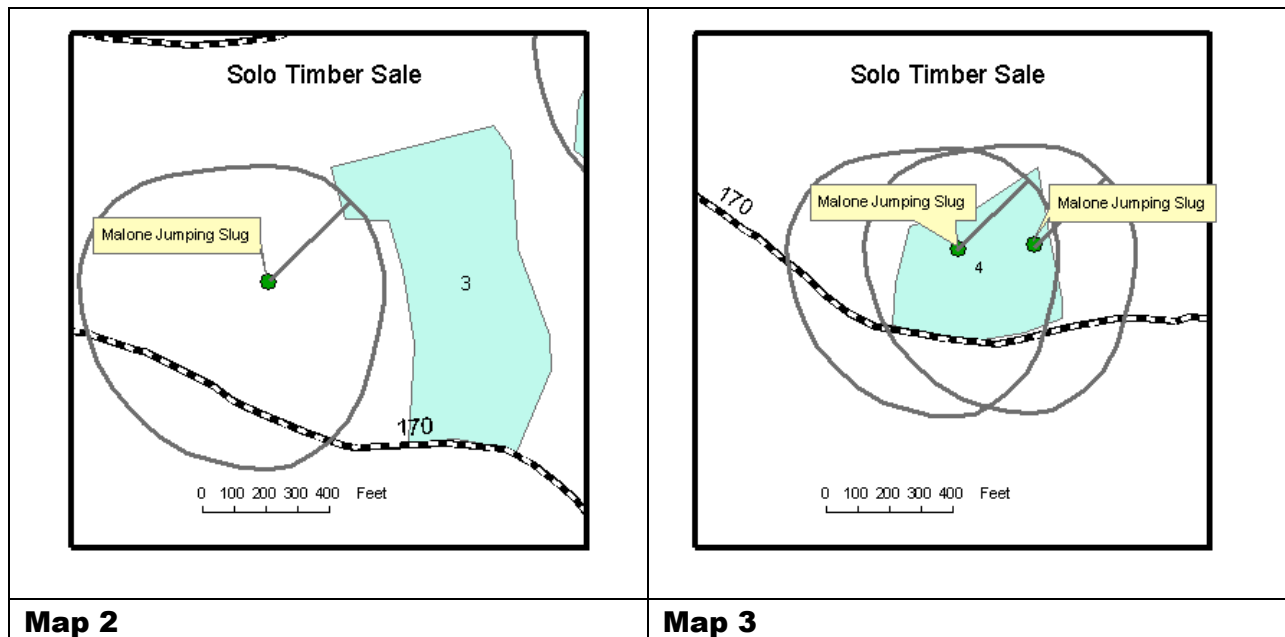
This supplemental EA will evaluate alternative ways of applying management recommendations to the survey and manage species found in the Solo area.

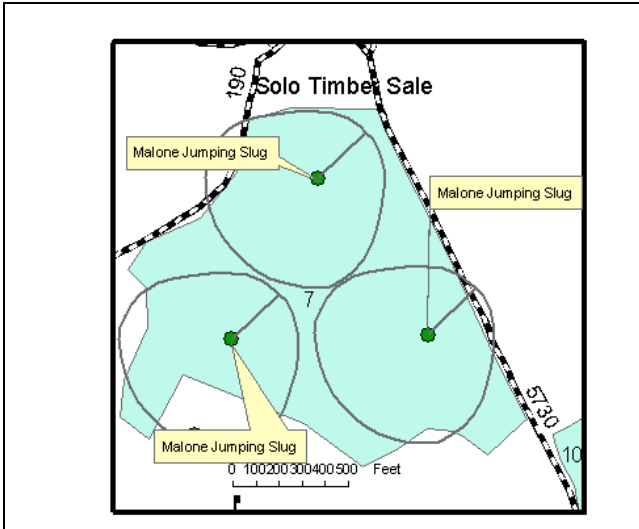
Alternative A – Apply management recommendations to the species found in the Solo area that were in place when the timber sale was offered and as presently provided for in the current timber sale contract (no change to current awarded timber sale).

The current timber sale contract eliminated approximately 10 acres for known sites. Most of the acreage was originally removed due to presence of known sites of Malone jumping slug. This species has since been removed from the Survey and Manage standards and guidelines for this area. This alternative would not make any changes to the current Solo Timber Sale Contract and would not require any additional administrative costs. This is consistent with current direction since the 2001 S&M ROD does not require further implementation of survey and manage requirements once a timber sale contract is awarded.

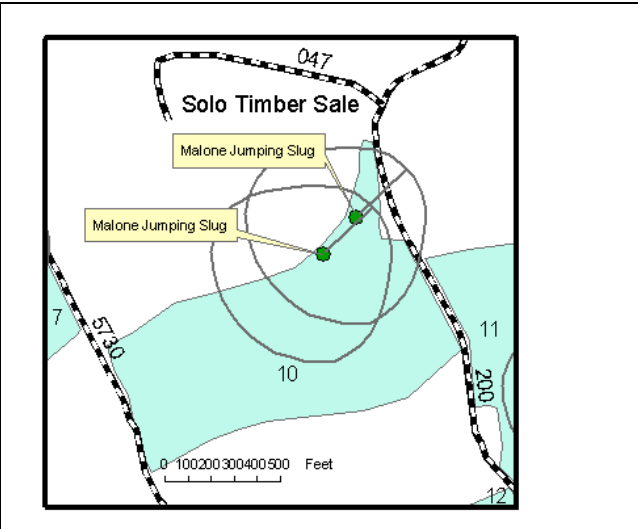
Alternative B – Apply management recommendations according to the most recent adaptive management changes in the S&M Standards and Guidelines as a result of the annual species reviews.

This alternative would harvest most of the acres that are no longer needed for the management of the Malone jumping slug. Some of those acres are needed for green tree retention patches. In Unit 3, the green tree retention patch does not overlap the portion that was deleted; therefore less than 0.5 acre would be harvested with this alternative (see map 2). In Unit 11, approximately 2.5 of the 7 acres would be needed for a green tree retention patch; therefore 4.5 acres would be harvested with this alternative (see map 7). In Unit 14, the management area for lichen would meet the green tree retention needs and the 2 acres that were deleted for the Malone jumping slug would be harvested with this alternative (see map 9). This alternative would require additional contract preparation and administrative costs to deal with the 7 acres that would be harvested.

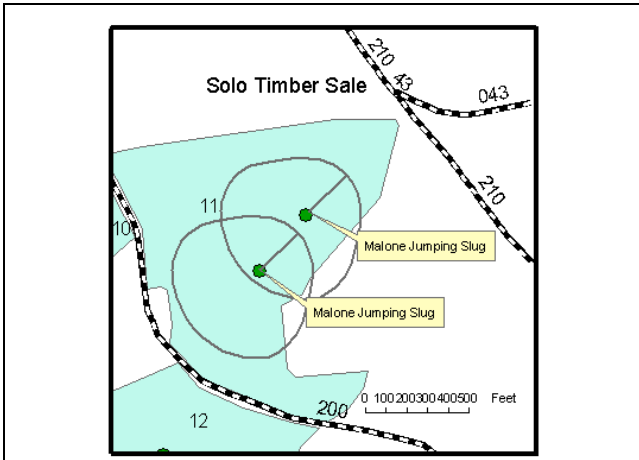




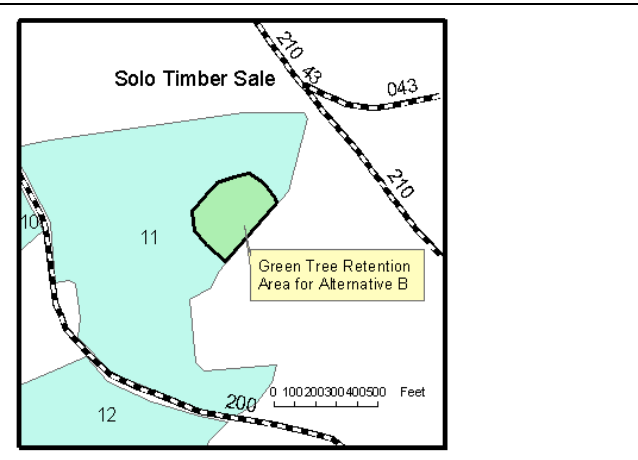
Map 4



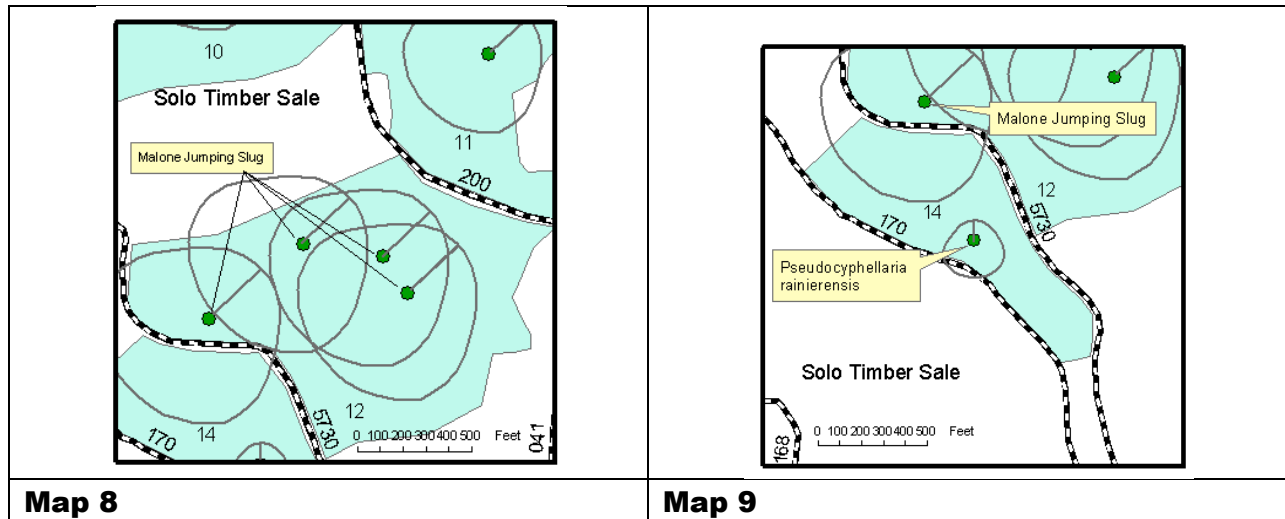
Map 5



Map 6



Map 7



Environmental consequences

The following table contains a summary of the Environmental Consequences that are relevant to the changes made for Survey and Manage species:

Resource Topic	Alternative A – (no change to current awarded timber sale)	Alternative B – Minimum size of management areas
Red tree vole	No Effect	No Effect
Mollusk <i>Lyogyrus</i>	No Effect	No Effect
Lichen <i>Pseudocyphellaria rainierensis</i>	No Effect	No Effect
Mollusk <i>Hemphillia malonei</i>	Species is common. No Effect	Species is common. Impact to 14 sites due to drying effect of sunlight penetration and wind.
Water Quality	Slightly less impact - 10 acres less logging. Slightly less sediment.	Slightly less impact – 3 acres less logging. Slightly less sediment.
Soils	Slightly less impact - 10 acres less ground based logging. Slightly less compaction.	Slightly less impact – 3 acres less ground based logging. Slightly less compaction.
Fisheries	No change	No change
Wildlife	Slightly less impact - 10 acres less owl habitat removed.	Slightly less impact – 3 acres less owl habitat removed.
Economics	Sale sold – slightly less revenue returned compared	Slightly more revenue but Additional administrative costs to

Resource Topic	Alternative A – (no change to current awarded timber sale)	Alternative B – Minimum size of management areas
	to original decision.	prepare and sell 7 acres.
Timber	10 acres less, reduction of approximately 410 CCF.	3 acres less, reduction of approximately 120 CCF.

Explanation of decisions being made

Alternative A is the recommended management action. It deletes 10 acres from the Solo EA and does not require any changes to the current Solo Timber Sale Contract. This is the recommended action because it applies management recommendations for the survey and manage species found consistent with current direction and would not result in any additional administrative costs.

Alternative B is not the recommended management action because additional administrative costs would be encountered in preparing and offering the acreage that no longer requires protection.

Draft finding of no significant change in actions, circumstances, or information

No new environmental assessment or environmental impact statement will be prepared.

No significant new information was learned as a result of the S&M surveys conducted for the Solo Timber Sale. Surveys for S&M species were conducted in 2000, as described above. Several sites of the Malone jumping slug, and one site of a lichen were found, as described above. Following S&M protocols, the Forest eliminated 10 acres for these species. This is not significant new information because it is no different from what was established in the Northwest Forest Plan, as modified by the 2001 S&M ROD — both of which were adopted pursuant to an Environmental Impact Statement.

The changes made to the Solo Timber Sale in order to manage known sites of the slugs and lichen are not significant because they result in no adverse environmental effects. Dropping 10 acres diminished the size of the Solo Timber Sale but dropping these acres result in less impact to the environment. Therefore the original Finding of No Significant Impact (FONSI) is not undermined or changed as a result of the surveys conducted for the Solo Timber Sale because the changes resulted in a reduction of environmental impacts.

Because there is no significant change to the actions, circumstances, or information that was presented in the Solo EA, as a result of the surveys that were done for the Solo project, no new Environmental Assessment or Environmental Impact Statement is required.

There is an additional reason why the Forest need not prepare an Environmental Impact Statement or a new Environmental Assessment for the Solo Timber Sale. The changes that were made to the Solo project as a consequence of discovery of the slugs and lichen were operational in nature, *i.e.*, they are part of the normal administrative actions taken in implementing a decision. Actions taken to implement a decision made pursuant to NEPA are not subject to NEPA, as long as those actions are within the scope of the original decision. These actions are within the scope of the original decision to proceed with the Solo project, and are consistent with the management direction that was in place at the time.

No new decision

The Forest is not making a new decision about the Solo project at this time. The information learned by the Forest in the S&M surveys, as recorded in this supplemental EA, provides no compelling reason to make a new decision about the Solo project. The information learned by the Forest has been acted upon in the operational changes that were made to the Solo Timber Sale, which was to drop 10 acres. Because no new decision is being made at this time, no new Decision Notice will be prepared.

References

USDA Forest Service and USDI Bureau of Land Management. 1994a. Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl (Northwest Forest Plan). Portland, Oregon.

USDA Forest Service and USDI Bureau of Land Management. 1994b. Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl; Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest related Species within the Range of the Northern Spotted Owl (Northwest Forest Plan). Portland, Oregon.

USDA Forest Service and USDI Bureau of Land Management. 2001. Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines. (Survey and Manage Plan)

USDA Forest Service and USDI Bureau of Land Management. 2002. Memorandum on implementation of 2001 Survey and Manage Annual Species Review, Dated June 14, 2002.

USDA Forest Service and USDI Bureau of Land Management. 2003. Memorandum on implementation of 2002 Survey and Manage Annual Species Review, Dated March 14, 2003.

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Date: May 24, 2002

RE: *Pseudocyphellaria rainierensis* in Solo Unit 14

Background

A population of *Pseudocyphellaria rainierensis*, a Category A lichen species, was reported by non-agency surveyors in Unit 14 of the Solo Project. The Northwest Forest Plan requires that all known sites of Category A species be managed. The information reported to the Forest Service included a photo of the host tree and a general location but did not include a voucher specimen, documentation of the species' identification by a knowledgeable individual, a map showing a specific location within the unit or any habitat information. To manage the population, it is necessary to locate the site, confirm the species' identification and then, based on habitat conditions, determine what specific mitigations are needed for management.

Results

A search for the lichen site was made within Solo Unit 14 on May 24, 2002. Two trees were found marked with green flagging denoted "lichen tree A" and "lichen tree B". Lichen tree A was a Pacific yew (*Taxus brevifolia*) with a population of *Lobaria oregana*, a similar-looking species, but no *P. rainierensis*. Lichen tree B had a population of both *Lobaria oregana* and *Pseudocyphellaria rainierensis*. A search in the immediate vicinity of the two flagged trees did not locate additional sites of *P. rainierensis*.

The site is in forested habitat dominated by an overstory of large, old growth Douglas-fir (*Pseudotsuga menziesii*), a mid-canopy of western hemlock (*Tsuga heterophylla*) with scattered Pacific silver fir (*Abies amabilis*) and western white pine (*Pinus monticola*) and an understory of western hemlock and Pacific yew. Canopy shade is approximately 60 percent. The site is on a 15 percent slope with a south aspect. The silviculture prescription for the unit is regeneration harvest. This would result in a reduction of the stocking density of the mid and understory canopy trees while retaining approximately 15 trees per acre of the over story old growth. Treatment of slash would then be completed to prepare the site for tree planting.

Discussion

The Management Recommendations for *Pseudocyphellaria rainierensis* (Version 2.0) list the following considerations when determining mitigations.



Determine the extent of the local population and habitat area with a field visit.

At all locations, current habitat conditions should be maintained, and allowed to develop naturally. The size of the area necessary to maintain populations and interior forest conditions should be determined by a field visit.

Maintain occupied substrate and manage a habitat area large enough to provide for a distribution of appropriate substrate within the habitat area.

Restrict thinning or other stand treatments that will alter stand microclimate.

Prevent fire in habitat areas with emphasis on fire suppression.

Mitigations to maintain the persistence of *P. rainierensis* at the site should maintain the current level of shading, an understory component of the Pacific yew that the lichen is using as a substrate, maintain microclimate and prevent fire. The silviculture prescription for the unit reduces canopy cover and would result in changes to microclimate, particularly air temperature and relative humidity. These changes would be greatest if canopy cover were reduced south of the site, allowing for maximum penetration of solar radiation.

Recommendations

To limit changes to microclimate, shading and host tree availability, it is recommended that a buffer be established from the site tree south to the boundary of the Unit, a distance of approximately 150 feet. The buffer should extend 140 feet from the site tree to the east and west and 100 feet to the north, where the influence from solar radiation is the least. No activity should take place within the buffer, including tree harvest, site preparation or entry with heavy equipment. Establishing the buffer will maintain the current level of canopy closure, a component of Pacific yew and should maintain the microclimate at the site to allow for *P. rainierensis* persistence. To assure that the mitigations are effective, the site should be monitored for a minimum of two years following implementation.

/s/ Marty Stein

Marty Stein

Botanist