Washington State Department of Natural Resources
Land Management Division

Unstable Slopes
Implementation and Effectiveness Monitoring
Pilot Project for State Lands

2003 Report
Covering Activities
From Spring 2001 – Spring 2003

by
Casey Hanell

Buzzard Timber Sale DNR Photo

Donkey Tracts Timber Sale DNR Photo

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Introduction

In September of 1997, the Department of Natural Resources (DNR) adopted a Habitat Conservation Plan (HCP) that provides guidance and legal obligation to the DNR as a land manager (Washington Department of Natural Resources, 1997). Monitoring the implementation and effectiveness of the HCP conservation strategies is one component of this document. In March of 2000, new regulations for management activities on unstable slopes were implemented with the Forest Practices Emergency Rules (FPR), which have since been finalized (Washington Department of Natural Resources, 2001). With the HCP and FPR in place, the DNR's slope stability protocols have been developing, and are still evolving into a form that will meet the goals and requirements of both documents. This study was conducted to develop a tracking system for the evaluation of slope stability in timber sale planning, and to test the effectiveness of associated mitigation recommendations.

Objectives

- Evaluate the State Lands process for assessing slope stability on timber sales, and the field implementation of both the HCP and the FPR.
- Assess the consistency and accuracy of landform identification by documenting who is assessing timber sales for potential slope instability (forester, geologist, or other) and how unstable landforms are being delineated.
- Track how mitigation recommendations are carried through the sale planning process and whether they are successfully implemented on the ground.
- Document current post-harvest ground conditions for future effectiveness monitoring. To establish a baseline for effectiveness monitoring, determine what mitigation measures were applied (implementation monitoring). Once the implemented mitigation is recorded, continue to monitor over time to determine if the implemented mitigation is successful in preventing slope instability (effectiveness monitoring).

Background

The language in the HCP is not very specific in defining unstable and potentially unstable slopes. It does provide some very general guidance, however this guidance has been subject to different interpretations.

The unstable slopes strategy in the HCP will not exempt the DNR from the current FPR. As a result, protocol for managing forest practice activities on unstable slopes has defaulted to the FPR. The FPR and Forest Practices Board Manual (Washington Department of Natural Resources, 2000) provide definitions of potentially unstable landforms. If these landforms have the potential to deliver to a public resource or threaten public safety, the Forest Practice Application is classified as IV-special (defined by WAC 222-16-050).

Since the FPR were implemented, the DNR State Lands has had different protocols for who identifies potentially unstable slopes, how potentially unstable slopes are defined, and what management activities can be conducted on, and in the area of influence of, potentially unstable slopes. The results of a carefully planned monitoring program will guide the development of a consistent and reliable slope stability assessment process.

Scope and Methods

This project focused on the DNR's five western Washington regions. The study area did not include eastern Washington because it does not currently have an HCP strategy with regards to unstable slopes, and the slope stability issues are very different east and west of the Cascade Mountain crest. This study reviewed all west-side State Lands timber sales with Forest Practice Applications (FPA) submitted after March 20, 2000 (effective date of FPR), and through their final financial audit in Olympia at the time of review during the spring of 2003.

All sales were reviewed in the office. The review included examination of the State Environmental Policy Act (SEPA) documentation, the Management Activity Summary (MAS), the FPA, any sort of documentation by a slope stability specialist, and an aerial photo review. All of this information was compiled on the tracking form developed for this project (Appendix A). The tracking form is set up to document the evaluation of a timber sale with respect to potentially unstable slopes from the presale planning to the implementation and effectiveness of recommendations and strategies post-harvest. Effectiveness of mitigation beyond operational techniques was not evaluated for this study due to the short time period between timber harvest and the review.

In all, 98 sales were reviewed for this project. Table 1 shows the distribution of sales among the five regions.

Table 1. Region breakdown of the 98 sales reviewed for the pilot project.

Olympic Region	8
Central Region	37
Northwest Region	25
Southwest Region	14
South Puget Sound Region	14
Total	98

Fifteen percent of the timber sales were field reviewed. Field sites were specifically (not randomly) selected. The criteria for field site selection included the following:

1) Representation of the broad range of landforms identified on aerial photos.
2) Representation of the different slope stability issues that exist in the five western Washington regions.
3) Logistical considerations such as access to the sales and proximity of the sales to each other in order to minimize travel and overnight expenses.

Summary Data

Based on the data collected for this study, of the 98 sales reviewed in the five western Washington regions, 88% had potentially unstable landforms identified during aerial photo review either within the sale boundaries or within the area of influence of the sale. Of the 88%, 52% had potentially unstable landforms defined by the FPR as class IV-special triggers. Forty-six percent of all sales reviewed had potential class IV-special triggers, and 53% of all sales had some form of documentation by a slope stability specialist (Table 2).

Table 2. Summary data for all five western Washington regions (98 sales).	
Percent of total sales with potentially unstable landforms	88%
Percent of these with landforms that are potential class IV-Special triggers	52%
Percent of total sales reviewed with potential class IV-Special triggers	46%
Percent of total sales with documentation by a slope stability specialist	53%

Each of the 98 sales reviewed for this study are listed individually with associated data in Appendix B (Tables 1-5).

Discussion

The timber sale evaluation process varies somewhat from region to region. This variation is due to differences in staffing structure, levels of experience, interpretation of the HCP, and classification criteria applied by Forest Practices region staff. Presale slope stability review documentation ranges from a slope stability checklist to a full geotechnical report.

In regions where a geologist is not available to review every sale, the consistency and accuracy of identification of potentially unstable landforms during presale review depends primarily on the experience level and training of the forester. The availability of screening tools places additional limitations on this process. The Slpstab data is a screening tool that predicts the potential for shallow-rapid landslides (Vaugeois, 2000), but there currently are no screening tools for deep-seated landslides with the exception of some localized mapping.

The implementation of mitigation recommendations was difficult to track for the 98 sales reviewed. Most of the mitigation addressing potentially unstable slopes was to exclude identified problem areas from the sale or to leave clumps of trees on them. Boundary adjustments or justification for ‘leave tree’ placement was rarely documented specifically enough to track. In some instances, when foresters do not comply the sales they plan/layout, trees left for slope stability purposes without documentation have been cut to accommodate operational concerns.

To the extent possible, the current ground conditions have been documented to set a baseline for future effectiveness monitoring for the sales reviewed. The slope stability issues and mitigation recommendations for each sale have been recorded on the tracking/monitoring form developed for this project. This form also establishes a system for tracking and monitoring the effectiveness of documented mitigation in the future.

When discussing unstable slopes implementation and effectiveness monitoring with the DNR State Lands division and region staff, many expressed concern over the increased workload for region geologists and foresters. Suggestions to reduce the increase in workload include:

1) Select only a percentage of sales to be monitored. Sales to be monitored should be selected by geologists in collaboration with foresters and monitoring coordinators.
2) Assure division and region commitment to follow through with monitoring to avoid wasting presale efforts.
3) Assure easy access to presale documentation for future monitoring and adaptive management efforts.
4) Provide clear documentation requirements at onset of sale planning.
5) Consolidate presale forms to avoid duplication of efforts.

Discussions are ongoing on how best to establish a continuing program for monitoring of unstable slopes and how to integrate this program with the HCP monitoring process.

Conclusions

The results of this pilot study suggest that more training for DNR State Lands foresters is needed to assure consistent identification of potentially unstable landforms. The lack of consistent identification may be due to inadequate definitions of unstable landforms provided by the HCP. The identification of an unstable landform needs to be followed by a risk assessment in order to determine what management activities could occur on that landform. Review by a geologist of proposed harvest areas early in the sale planning process would address these concerns.

Additionally, the sales reviewed for this pilot study indicate that DNR State Lands records are lacking documentation of implemented slope stability mitigation measures. This information is essential to future effectiveness monitoring. If mitigation is not documented, it will be impossible to evaluate the effectiveness of our operational techniques in preventing erosion, mass-wasting, and sediment delivery to streams; and thereby difficult to defend any proposals to mitigate for these hazards on ground currently considered ‘off-base’ to harvest.

Next Steps

- Provide a consistent interpretation of HCP commitments.

- Provide a standard geologic definition of unstable landforms.
- Address increase in workload for region geologists and foresters.
- Determine appropriate number of sales to be monitored during presale planning.
- Determine appropriate detail, scale, and documentation for unstable landform data.
- Determine appropriate method for unstable landform data storage.
- Determine field staff needs for slope stability training by Forest Practices Division.
- Determine the need for both office and field presale review by geologist of all timber sales.
- Recognize the need for both presale and post-harvest office and field review by geologist of timber sales to be monitored.
- Establish criteria for risk assessment of landforms identified as potentially unstable.
- Research and determine the effects of timber harvest on groundwater recharge to deep-seated landslides.

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This report presents a review of the process for evaluating unstable slopes on State Lands and is based on the information contained in the Olympia copy of timber sale jackets, the DNR Planning and Tracking system, ArcView GIS, air photo interpretation, limited field verification, and previously-published landslide and geologic data. Landslides and other unstable landforms are often hidden under forest cover, and new landslides may have occurred since the air photos were taken.

The information generated by this study is not an audit, but is intended to be used in developing a monitoring program. It suggests ways to improve on the current slope assessment process, but is in no way a formal guidance document. The recommendations contained within the document are not requirements of the unstable slopes program, but ideas on how to improve the process in order to facilitate monitoring and the continual improvement of management practices.

Appendix A

This appendix contains the most recent version of the monitoring form used to compile data for the Unstable Slopes Implementation and Effectiveness Monitoring Pilot Project for State Lands. The monitoring form was revised several times throughout the project to best represent and record the data being collected.

PILOT PROJECT DATES
Harvest Date_____
Post Harvest Office/Photo Review_____
Presale Activity Review_____
Post Harvest Field Review_____

Unstable Slopes
Implementation and Effectiveness Monitoring
Pilot Project for Timber Sale Activity

Name of timber sale: _____

Section(s) _____ Township(s)_____ Range(s) _____

Presale Office Review by: _____ Date: _____
Presale Field Review by: _____ Date: _____

Note: This form is to be submitted with the activity packet to be cross-referenced as documentation for the SEPA Environmental Checklist, Forest Practices Application, and the Management Activity Summary.

Implementation (presale)

[ ] Yes [ ] No
[ ] Do Not Know
(1) Was the initial air photo review completed by the geologist and submitted to the forester responsible for laying out sale unit boundaries? If no, proceed to question 3.

[ ] Yes [ ] No
[ ] Do Not Know
(2) Did the forester responsible for laying out the sale field check the areas identified by the geologist as potentially unstable?

[ ] Yes [ ] No
(3) Does a slope morphology model show any areas of medium or high potential for debris flows or other shallow slope failures?

[ ] Yes [ ] No
[ ] Do Not Know
(4) Was there any evidence of past or potential future debris flows or other shallow slope failures observed in the field?

[ ] Yes [ ] No
[ ] Do Not Know
(5) Does a geologic map or landslide inventory show any areas mapped as landslides (deep-seated or shallow slope) or other areas of potential instability?

[ ] Yes [ ] No
[ ] Do Not Know

(6) Was there any evidence observed in the field of dormant or active deep-seated landsliding or other types of potential instability?

[ ] Yes [ ] No

(7) Has a watershed analysis or landscape plan been done for this area? If no, proceed to question 10.
Name of WAU/basin_____
Date approved _____ Site-specific prescriptions? (Yes/No)

[ ] Yes [ ] No
[ ] Do Not Know

(8) Does the proposed activity include areas of resource sensitivity (as defined in watershed analysis) specific to unstable or potentially unstable slopes?

[ ] Yes [ ] No

(9) If there are prescriptions in the watershed analysis, are they specific enough to address the proposed activity?

The following criteria are to be used for defining and delineating unstable slopes for the purposes of making management decisions on state lands and to implement DNR's HCP. Definitions from forest practices emergency rules (WAC 222-16-010 and WAC 222-16-050*(1)(d)) for unstable landforms are listed below, with additional criteria shown in brackets. (Not all criteria listed below necessarily trigger IVs classification.)

(10) Does the timber sale activity area and associated area of influence contain any of the following features? ****Note:** The timber sale activity area is the actual unit proposed for harvest, including right-of-way for any new road construction. The area of influence includes any area protected with a buffer (for any reason) which is surrounded by or adjacent to the unit, any resource adjacent to the unit proposed for harvest, and any resource that could be impacted by harvest of the unit.

[ ] Yes [ ] No (a) Inner gorges, convergent headwalls, or bedrock [colluvial-filled] hollows with slopes steeper than 35 degrees (70 percent).

[ ] Yes [ ] No (b) Toes, [flanks and headscarps] of deep-seated landslides, with slopes steeper than 33 degrees (65 percent), [and the bodies of glacial and non-glacial deep-seated landslides.]

[ ] Yes [ ] No (c) Groundwater recharge areas for glacial [and non-glacial] deep-seated landslides.

[ ] Yes [ ] No (d) Outer edges of meander bends along valley walls, or along high terraces of an unconfined meandering stream.

[ ] Yes [ ] No (e) Any areas [with] features...[suggesting unstable or potentially unstable slopes].

Summary (presale) (Check only one of the following statements)

[ ] (11) No unstable/potentially unstable landforms were identified within the proposed timber sale activity area or its associated area of influence.

[ ] (12) Unstable/potentially unstable landforms were identified, delineated, and deleted from the proposed timber sale activity area.

[ ] (13) Unstable/potentially unstable landforms were identified within the proposed timber sale activity area or its associated area of influence, and require a geologic assessment with mitigation recommendations.

[ ] Yes [ ] No (a) Memo or Geologic/Geotechnical report requested.
[ ] Do Not Know

[ ] Yes [ ] No (b) Memo or Geologic/Geotechnical report completed.

Completion Date _____ Author _____

Implementation/Compliance (post harvest)

Post Harvest Office Review by: _____Date: _____
Post Harvest Field Review by: _____Date: _____

[ ] Yes [ ] No (14) Is there a geologic report outlining mitigation of timber sale activity on unstable/potentially unstable slopes?

[ ] Yes [ ] No (15) Were timber sale activities conducted on or within the area of influence of landforms identified as potentially unstable? If no, proceed to question 19.

(16) What mitigation was recommended in the geologic report addressing timber sale activities on or within the area of influence of landforms identified as potentially unstable? Explain by addressing the list below.

[ ] Yes [ ] No (a) Unit boundary layout _____
_____

[ ] Yes [ ] No (b) Buffering _____
_____

[ ] Yes [ ] No (c) Harvest density _____
_____

[ ] Yes [ ] No (d) Harvest methods _____
_____

[ ] Yes [ ] No (e) Silvicultural prescriptions _____

_____

[ ] Yes [ ] No (f) Road layout, design and construction _____

_____

[ ] Yes [ ] No (g) Other _____

_____

[ ] Yes [ ] No
[ ] Not Applicable (17) Were the mitigation recommendations defined clearly in the sale contract?

[ ] Yes [ ] No (18) Was the proposed mitigation implemented?

[ ] Not Applicable

[ ] Yes [ ] No (19) Were timber sale activities conducted within the groundwater recharge area of glacial [or non-glacial] deep-seated landslides? If no, proceed to question 23.

(20) What mitigation was recommended in the geologic report addressing timber sale activity within the groundwater recharge area of glacial [or non-glacial] deep-seated landslides? Explain by addressing the list below.

[ ] Yes [ ] No (a) Unit boundary layout _____

_____

[ ] Yes [ ] No (b) Buffering _____

_____

[ ] Yes [ ] No (c) Harvest density _____

_____

[ ] Yes [ ] No (d) Harvest methods _____

_____

[ ] Yes [ ] No (e) Silvicultural prescriptions _____

_____

[ ] Yes [ ] No (f) Road layout, design and construction _____

_____

[ ] Yes [ ] No (g) Other _____

_____

[ ] Yes [ ] No
[ ] Not Applicable (21) Were the mitigation recommendations defined clearly in the contract?

[ ] Yes [ ] No (22) Was the proposed mitigation carried out?

[ ] Not Applicable

Effectiveness (post harvest)

[ ] Yes [ ] No (23) Post harvest office/aerial photo review.

Photo Coverage _____

[ ] Yes [ ] No (24) Post harvest field review.

Harvest Date _____ Field Review Date _____

[ ] Yes [ ] No
[ ] Do Not Know (25) Is there evidence of post-harvest mass-wasting, surface erosion, or reactivation of deep-seated landsliding? Explain.

_____
_____
_____
_____
_____
_____

[ ] Yes [ ] No
[ ] Not Applicable (26) Have the recommended mitigation measures been successful to date? If no, explain. Describe any ground disturbance and whether it was observed on aerial photos or in the field.

_____
_____
_____
_____
_____
_____

[ ] Yes [ ] No
[ ] Not Applicable (27) If there were adverse effects, could they have been avoided by other mitigation measures or better compliance? Explain.

_____
_____
_____
_____
_____
_____

Appendix B

Following are tables (Tables 1-5) for each of the five western Washington regions that contain the sale name, location, if there is a completed watershed analysis, the harvest completion date, if the sale contains potentially unstable landforms, if the sale contains potential class IV-special triggers, if there was documentation by a slope stability specialist, and the forest practice class for all 98 sales reviewed. This project was mainly an office review with minimal field review. The date of the final audit request from the region was used as the harvest completion date in cases where a more specific date was not provided in the timber sale documentation.

Table 1. Unstable Slopes Implementation and Effectiveness Monitoring Pilot Project for State Lands summary table for the Olympic Region.

Sale name	Location (legal description)	Is there a completed watershed analysis?	Harvest completion date	Potentially unstable landforms	Potential class IV - special triggers	Documentation by slope stability specialist	Forest practice class*
CHEPALIS THINNING	T20R11W SEC 16	No	07/08/01	Yes	No	No	III-14
MURDOCK ALDER	T31R09W SEC 30, 31	No	11/30/01	Yes	No	No	III-30
BOLTON RIDGE	T27R01W SEC 8, 17	No	08/??/02	Yes	Yes	No	III-30
SNIDER AERIAL	T30R11W SEC 26, 27	Yes	10/17/01	Yes	Yes	Yes, Wendy Gerstel	III-30
CLARK GRADE B.D.	T30R12W SEC 32	Yes	10/??/01	No	No	No	III-30
LOOPED RS	T29R13W SEC 3	Yes	11/04/01	No	No	No	III-14
NE BREEZE	T19R12W SEC 15, 16	No	03/26/02	Yes	No	No	III-30
DONKEY TRACTS	T21R09W SEC 16	In Progress	07/30/02	Yes	Yes	No, but Wendy Gerstel consulted	III-30

* As defined by the Forest Practices Rules (WAC 222-12-030 and WAC 222-16-050).

Table 2. Unstable Slopes Implementation and Effectiveness Monitoring Pilot Project for State Lands summary table for the Central Region.

Sale name	Location (legal description)	Is there a completed watershed analysis?	Harvest completion date	Potentially unstable landforms	Potential class IV - special triggers	Documentation by slope stability specialist	Forest practice class
FRODO'S FIR	T14R03W SEC 9, 10	No	6/29/01	Yes	Yes	Yes, Stephanie Zurenko	III-30
STARVING DOG	T16R04W SEC 3, 4; T17R04W SEC 34	No	10/31/01	Yes	Yes	No	III-30
RAIN CHASER	T17R04W SEC 7, 18; T17R05W SEC 23, 24, 25	No	5/30/02	No	No	No	III-30
WIMP	T16R03W SEC 7, 8, 18	No	9/27/01	No	No	No	III-30
SMITH RANCH EARLY TH	T15R02W SEC 5, 6; T16R02W SEC 32	No	9/13/01	Yes	No	No	III-30
BLOW ME DOWN	T13R08W SEC 21	No	11/2/02	Yes	No	No	III-30
FURTHER OUT BLOWDOWN	T13R07W SEC 1; T14R07W SEC 36	No	10/2/01	Yes	Yes	No	III-30
WHISTLER	T17R03W SEC 30, 31	No	5/29/01	Yes	No	No	III-30
SHOE STRING	T18R04W SEC 19, 30; T18R05W SEC 18, 24	No	9/5/01	Yes	No	No	III-30
LAST TRIP	T16R04W SEC 3; T17R04W SEC 26, 27, 34	No	7/8/02	Yes	Yes	Yes, Stephanie Zurenko	III-30
OLIVER'S TWIST	T16R01E SEC 30	No	12/??/02	Yes	Yes	Yes, Wendy Gerstel	III-30
HAPPY HERRING	T13R08W SEC 20	No	3/5/01	Yes	No	No	III-30
TOM POLE	T18R03W SEC 9	Yes	10/31/02	No	No	No	III-30
THE PHARMACY	T17R04W SEC 5, 6	No	5/21/02	Yes	yes	No	III-30
BUCKSKIN	T18R03W SEC 27	No	4/18/02	Yes	No	No	III-30
LILLY 36	T13R07W SEC 18	No	12/31/01	Yes	Yes	No	III-30

Table 2 (continued). Unstable Slopes Implementation and Effectiveness Monitoring Pilot Project for State Lands summary table for the Central Region.

Sale name	Location (legal description)	Is there a completed watershed analysis?	Harvest completion date	Potentially unstable landforms	Potential class IV - special triggers	Documentation by slope stability specialist	Forest practice class
MATTSON ROAD	T14R03W SEC 4	No	11/8/01	Yes	Yes	Yes, Stephanie Zurenko	III-30
TRACTOR TRAIL	T14R05W SEC 33	No	5/30/02	Yes	Yes	No	III-30
U - JOINT	T17R05W SEC 26, 27, 35	No	8/26/02	No	No	No	III-30
LIBERTY PC	T13R06W SEC 21	No	6/18/02	Yes	No	No	III-30
EXCEDRIN PARTIAL CUT	T16R05W SEC 5, 6, 7, 8	No	8/29/02	No	No	No	III-30
TWO HARTS	T17R04W SEC 31	No	11/1/02	Yes	Yes	No	III-30
MCRUE	T13R08W SEC 16, 21	No	5/30/02	Yes	Yes	No	III-30
FALL 7	T13R08W SEC 7, 18	No	5/30/02	Yes	Yes	No	III-30
CHUMLEY SALVAGE	T18R03W SEC 4, 5, 9	Yes	4/23/02	Yes	No	No	III-30
MYSTERY EARLY THIN	T11R03E SEC 18	No	11/29/01	Yes	Yes	No	III-30
MISSION PC	T17R04W SEC 29, 32	No	11/25/02	Yes	Yes	No	III-30
SKILL PC	T18R03W SEC 8, 10, 11, 17	Yes	11/25/02	Yes	No	No	III-30
PINKERTON EARLY THIN	T12R01E SEC 16	No	6/14/02	No	No	No	III-30
JEM	T11R09W SEC 28, 29	No	12/19/02	Yes	Yes	No	III-30
JASPER	T11R08W SEC 27, 28	No	11/1/02	Yes	Yes	No	III-30
PORKY	T16R04W SEC 3, 4	No	11/1/02	Yes	No	No	III-30
TRAILS END	T17R04W SEC 30	No	10/21/02	Yes	No	No	III-30
LOWER SAWMILL	T12R08W SEC 2, 3	No	9/27/02	Yes	Yes	No	III-30
MATTSON AGAIN	T14R03W SEC 4	No	9/20/02	Yes	No	Yes, Stephanie Zurenko	III-30
LAKE CREEK HWD	T12R03W SEC 26	No	7/26/02	Yes	No	No	III-30
DOWNEASTER BLOW	T13R08W SEC 28	No	9/16/02	Yes	Yes	No	III-30

Table 3. Unstable Slopes Implementation and Effectiveness Monitoring Pilot Project for State Lands summary table for the Northwest Region.

Sale name	Location (legal description)	Is there a completed watershed analysis?	Harvest completion date	Potentially unstable landforms	Potential class IV - special triggers	Documentation by slope stability specialist	Forest Practice Class
DOVETAIL	T36R06E SEC 34, 35	No	1/11/02	Yes	No	Yes, Noel Wolff	III-30
SINGLE TREE	T39R06E SEC 5, 6; T40R06E SEC 31, 32	Yes	8/27/02	Yes	No	No	III-30
COUNTRY CLUB THIN	T28R07E SEC 13	Yes, Woods Creek	4/23/02	No	No	No	III-30
MILLENNIUM	T35R06E SEC 1, 2	No	4/25/02	No	No	No	III-30
RAM'S HORN	T37R05E SEC 15, 16, 21, 22	Yes, Hutchinson Creek	6/24/02	Yes	No	Yes, Noel Wolff	III-30
CHIP OFF	T29R07E SEC 3, 4, 9, 10	No	3/26/02	Yes	Yes	Yes, Noel Wolff	III-30
AMPERAGE	T28R08E SEC 8, 17, 20	No	2/27/03	Yes	Yes	Yes, Noel Wolff	III-30
EAST MERO AERIAL	T28R07E SEC 8, 9, 17	Yes	1/24/02	Yes	Yes	Yes, Noel Wolff	III-30
GUAVA	T38R05E SEC 15, 16, 21, 22	Yes, Hutchinson Creek; Acme	7/31/01	Yes	No	Yes, Noel Wolff	III-30
BLUE DUN FY01	T37R04E SEC 13	Yes, Acme; Lake Whatcom	11/4/01	Yes	No	Yes, Noel Wolff	III-30
RED STAG	T34R05E SEC 27, 28, 33, 34	No	1/18/02	Yes	No	Yes, Noel Wolff	III-30
CLUB CHRISTIE	T37R05E SEC 27, 34	No	6/29/01	No	No	Yes, Noel Wolff	III-30
4 CORNERS	T33R05E SEC 13; T33R06E SEC 18	No	6/26/02	Yes	No	Yes, Noel Wolff	III-30
EAST BOULDER	T40R06E SEC 22, 27	No	10/1/01	Yes	No	Yes, Noel Wolff	III-30
REITER PC	T27R09E SEC 12, 13; T27R10E SEC 7, 18	No	10/29/01	Yes	No	Yes, Noel Wolff	III-30

Table 3 (continued). Unstable Slopes Implementation and Effectiveness Monitoring Pilot Project for State Lands summary table for the Northwest Region.

Sale name	Location (legal description)	Is there a completed watershed analysis?	Harvest completion date	Potentially unstable landforms	Potential class IV - special triggers	Documentation by slope stability specialist	Forest practice class
WAGONWHEEL PC	T33R10E SEC 8, 9, 16, 17	No	10/24/02	Yes	No	Yes, Noel Wolff	III-30
ROUGH RIDER	T33R05E SEC 1, 12	No	5/30/02	Yes	No	Yes, Noel Wolff	III-30
CAN-A-DO	T40R05E SEC 12	No	8/2/02	Yes	No	Yes, Noel Wolff	III-30
REECHO PC	T29R07E SEC 12, 13; T29R08E SEC 7, 18	Yes, Woods Creek	1/2/03	Yes	No	Yes, Noel Wolff, not in TS jacket	III-30
PROCIRCUIT THIN/HDWD	T32R09E SEC 15, 16, 21, 22	No	9/26/02	Yes	No	Yes, Noel Wolff	III-30
THIN AIR	T36R05E SEC 33, 34	Yes	10/8/02	Yes	Yes	Yes, Noel Wolff	III-30
RIBBIT	T33R06E SEC 19, 20	No	9/26/02	Yes	Yes	Yes, Noel Wolff	III-30
WHITS END	T32R07E SEC 3	Yes, Hazel	10/29/02	Yes	Yes	Yes, Noel Wolff	III-30
X-GENE	T40R05E SEC 30	No	9/25/02	Yes	Yes	Yes, Noel Wolff	III-30
BEYOND PORTER	T38R05E SEC 13; T38R06E SEC 18, 19	No	1/17/03	Yes	Yes	Yes, Noel Wolff	IVS-30

Table 4. Unstable Slopes Implementation and Effectiveness Monitoring Pilot Project for State Lands summary table for the Southwest Region.

Sale name	Location (legal description)	Is there a completed watershed analysis?	Harvest completion date	Potentially unstable landforms	Potential class IV - special triggers	Documentation by slope stability specialist	Forest practice class
OVERTHERE	T06R04E SEC 5; T07R04E SEC 32	No	10/30/01	Yes	Yes	Yes, Venice Goetz	III-30
BUZZARD	T06R02E SEC 17, 18, 20	No	6/27/02	Yes	Yes	Yes, Venice Goetz	III-30
COLUMBO	T05R03E SEC 6; T06R02E SEC 36; T06R03E SEC 31	No	2/13/02	Yes	No	No	III-30
PINTAIL	T05R03E SEC 4, 5, 8	No	7/16/02	Yes	Yes	Yes, Wendy Gerstel	III-30
PEPPER MILL	T09R04W SEC 31; T09R05W SEC 36	No	9/11/02	Yes	Yes	No	III-30
BROOKIE	T06R03E SEC 10, 11, 12, 14, 15	No	6/18/02	Yes	No	Yes, Wendy Gerstel and Christi Fisher	III-30
GINGER	T03R04E SEC 28, 29, 32	No	10/??/2002	Yes	Yes	Yes, Karl Wegmann	III-30
SOUTH AX APART	T10R02W SEC 7; T10R03W SEC1	No	9/3/02	Yes	Yes	Yes, Karl Wegmann	III-30
ROCKING CHAIR	T10R06W SEC 35, 36	No	6/18/02	Yes	Yes	Yes, Matt Brunengo	III-30
MIXED BERRY	T04R03E SEC 13, 36	No	6/12/02	Yes	Yes	Yes, Sammantha Magsino	III-30
ULURU	T03R04E SEC 32	No	8/6/02	Yes	No	Yes, Sammantha Magsino	III-30
JAVA	T10R02W SEC 15, 22	No	12/11/02	Yes	Yes	Yes, Sammantha Magsino	III-30
ONE HORN	T06R03E SEC 15, 22	No	9/24/02	Yes	No	No	III-30
THALWAG	T09R04W SEC 30, 31	No	12/18/02	Yes	Yes	No	III-30

Table 5. Unstable Slopes Implementation and Effectiveness Monitoring Pilot Project for State Lands summary table for the South Puget Sound Region.

Sale name	Location (legal description)	Is there a completed watershed analysis?	Harvest completion date	Potentially unstable landforms	Potential class IV - special triggers	Documentation by slope stability specialist	Forest practice class
GRADE	T15R05E SEC 17, 18	Yes, Mashel	3/14/02	Yes	No	Yes, John Fisher	III-30
LB POLE	T27R02E SEC 16	No	7/31/02	Yes	No	Yes, John Fisher	III-30
DEM BONES	T21R07E SEC 17, 20	No	7/18/02	Yes	Yes	Yes, John Fisher	III-30
PEWTER	T26R07E SEC 1; T26R08E SEC 6, 7	Yes, Tolt	3/5/03	Yes	No	Yes, John Fisher	II
HOLE IN THE WALL	T20R02W SEC 36	No	10/27/01	Yes	No	Yes, John Fisher	III-30
PULL UP	T24R03W SEC 32	No	7/12/01	Yes	Yes	Yes, Wendy Gerstel	III-30
MOTH	T23R04W SEC 25, 26	No	12/26/02	Yes	Yes	Yes, John Fisher	III-30
COLONY	T23R03W SEC 9	No	10/18/02	Yes	Yes	Yes, John Fisher	III-30
TWO GRAND	T15R05E SEC 2; T16R05E SEC 34, 35	Yes, Mashel	11/7/02	Yes	No	Yes, John Fisher	III-30
REPEAT	T23R01W SEC 7, 8, 18	No	8/27/02	Yes	No	Yes, John Fisher	III-30
TWO FINGERS	T21R02W SEC 1, 2; T22R02W SEC 35, 36	No	9/25/02	No	No	Yes, John Fisher	III-30
MAX HAUL	T15R05E SEC 16, 17	Yes, Mashel	1/8/03	Yes	Yes	Yes, John Fisher	III-30
HUYU	T24R01W SEC 18	No	11/4/01	Yes	No	Yes, John Fisher	III-30
MOSSY GROW	T26R07E SEC 1	Yes, Tolt	10/1/02	Yes	Yes	Yes, Wendy Gerstel	III-30