

**A Biological Assessment of Impacts to
Terrestrial Threatened and Endangered Species
from Lost Man Creek Erosion Control and Disturbed Land Restoration Plan
in
Redwood National and State Parks (RNSP)**

Prepared by:
Kristin Schmidt, Wildlife Biologist
1 March 2006

I. INTRODUCTION

The purpose of this biological assessment (BA) is to review the proposed Redwood National and State Parks (RNSP or “park”) action, Lost Man Creek Erosion Control and Disturbed Lands Restoration Plan, in sufficient detail to determine if the proposed action may affect any threatened or endangered species and/or their critical habitats. This biological assessment is prepared in accordance with legal requirements set forth under section 7 of the Endangered Species Act (19 U.S.C. 1536 (c), 50 CFR 402), and meets the criteria for formal consultation with the United States Fish and Wildlife Service (FWS).

II. CONSULTATION TO DATE

Redwood National and State Parks obtained a list from the Arcata Fish and Wildlife Service Office (AFWO) identifying the endangered, threatened, and candidate species that may be present or may be affected by park activities, dated February 22, 2006 (Document Number 517497160-163833). This list included 23 species currently listed as threatened or endangered and four species that are candidates for listing in Humboldt and Del Norte Counties.

Critical habitat was designated for nine species on the list, and proposed for one. Critical habitats for coho salmon, steelhead, chinook salmon, and the marbled murrelet occur within the park. Marbled murrelet critical habitat occurs in two units; unit CA-02-a includes Jedediah Smith Redwoods and Del Norte Coast Redwoods State Parks and unit CA-02-b includes Prairie Creek Redwoods State Park. Critical habitat for the marbled murrelet does not occur on federal parklands. Critical habitats for the tidewater goby, leatherback turtle, northern spotted owl, western snowy plover, and Steller sea lion are not designated within the park.

Informal consultation on this project began during an Interagency Consultation Team (ICT) field trip to South Fork Lost Man Creek on 14 July 2004. The intent of this trip was to view the A130 road, its stream crossings, and the various problems associated with erosion at this site. There were three ICT meetings, on 8 and 16 February 2005 and 9 March 2005. During these meetings the geologists presented information regarding variables such as erosion potential, sediment yield volumes, and delivery potential along various roads and locations within the South Fork. Discussions took place regarding potential impacts to aquatic and terrestrial systems with and without road removal and with different levels of removal. Marbled murrelet survey data and residual habitat also were reviewed and discussed in the context of removal activities. There also was discussion regarding the risks associated with treatment activities, including sediment production and marbled murrelet habitat degradation, versus the long term benefits of treatment.

A second field trip to the A130 with personnel from AFWO took place on 30 March 2005. The purpose of this trip was to view the treatment site in terms of impacts on residual habitat and to assess the condition of the habitat at the very end of the road where mapping indicated residual trees occurred close to the area that could potentially be affected by treatment. A skid road off

the A100, proposed as an access route to the A130 on the west side of South Fork Lost Man Creek also was observed. Part of this road is through the contiguous old growth block, however, this route was preferred over the alternative of rebuilding the South Fork crossing for heavy equipment access. Other issues associated with this site were discussed as well as the need to clearly define where/how access to the far end of the A130 would occur.

III. CURRENT MANAGEMENT DIRECTION

Please refer to *A Conservation Strategy for Managing Threatened and Endangered Species in Redwood National and State Parks* (Sakai 2003 as amended) for a detailed summary of laws and policies that influence management direction in RNSP.

Watershed Restoration

Public Law 95-250 was signed on March 27, 1978 adding 48,000 acres to Redwood National Park. This legislation authorized initiation of "...a program for rehabilitation of areas within...the park contributing significant sedimentation because of past logging disturbances and road conditions and, to the extent feasible, to reduce risk of damage to stream side areas adjacent to Redwood Creek..." In 1978 a watershed rehabilitation program was initiated that concentrates on preventing human-induced erosion and encourages the return of natural vegetation patterns in the watersheds.

A Watershed Restoration Plan was developed in 1981 which guided restoration activity in the park until 1995 when a series of meetings, collectively referred to as a "Road Summit", were held that resulted in an evaluation of the park's road network. During the Road Summit, which ended in 1997, a long-term road access network and road classification were developed based on analyses of resources-at-risk (e.g. salmonids, old-growth redwoods), levels of use, and sediment risk from roads. Road treatment prioritization was developed at the sub-watershed level as this was viewed as the most appropriate scale to evaluate aquatic and riparian resource degradation. The prioritization was based on an approach that would protect the best existing aquatic and riparian habitats that are under the greatest threat of impacts from failing roads.

In 2003 in response to changing conditions and resource management needs, new road and resource information, and advances in technology since 1996, RNSP initiated a process of updating the road classification network and sub-watershed treatment prioritization. This was done by reanalyzing information from the original Road Summit using quantifiable, reproducible methods. The prioritization identified Lost Man Creek as the highest priority sub-watershed for restoration treatments within park lands in Redwood Creek. The document *ROAD STRATEGY: Access and Treatment Priorities for Parkland in the Redwood Creek Watershed* (approved and signed by park superintendents on 4 April 2005) describes in detail the Road Summit and sub-watershed prioritization methods, results, and recommendations.

IV. DESCRIPTION OF THE PROPOSED ACTION

A. Overview

This project would remove failing, abandoned logging roads in ecologically sensitive Lost Man Creek watershed, a tributary to Prairie Creek. Work will include excavating road fill that is currently or has the potential for delivering sediment into sensitive stream channels that support valuable aquatic resources, and re-establish topography and the stream channel network that existed prior to road construction.

The project action area includes 5,804 ac (2,349 ha) in the South Fork (including Manning Creek), Middle Fork, and portions of the North Fork, Larry Damm, and Little Lost Man sub-basins of Lost Man Creek. Dispersed throughout this area are approximately 28 mi of abandoned and failing roads targeted for removal. The extent of the action area was determined by locations of the roads to be removed or used for access and the intervening forested habitat that may or may not be impacted by project activities. The area is bounded by the ridge top above the headwater reaches of the sub-basins to the north, east, and south, and to the west by a 0.25 mi band interior to the boundary of contiguous old growth. North of the contiguous old growth the western project boundary traces roughly along the western-most roads proposed for removal (see Fig. 1). Unlike the action area described for the listed fish species (also the “affected environment” in the Environmental Assessment) it does not include the entire watershed to the confluence of Lost Man Creek with Prairie Creek.

Approximately 443,000 cubic yards of erosion would be prevented by implementing this proposed action. The total area of ground disturbance estimated to result from restoration activities would be 215.8 ac (87.3 ha), or 3.7% of the project area. The extent or amount of treatment, thus, the area of potential ground disturbance associated with each road was determined by air-photo interpretation followed by ground-truthing and mapping in the field.

Twenty-five miles of roads were removed previously within these sub-basins (see Section V. “Existing Environment” section below and *A Biological Assessment of Impacts to Terrestrial Threatened and Endangered Species from the Watershed Restoration Program in portions of Lost Man Creek Watershed in Redwood National and State Parks (RNSP)* (Schmidt et al. 2001)).

This project is proposed for implementation under Line Item funding beginning in 2006 and continuing through 2009 (see Fig.2).

B. Watershed Restoration Treatment Goals

The goal of the watershed restoration program in Redwood National and State Parks is to minimize human-induced erosion and encourage the return of a natural pattern of vegetation. Ultimately the efforts should result in the restoration of natural ecosystems to a condition similar to what would have existed prior to disturbance by humans. A key component of this restoration work is road removal.

Road removal work in the park involves completely excavating stream crossings, restoring natural contours and landforms along road corridors by retrieving sidecast fill, uncovering buried topsoil, spreading woody debris on finished surfaces and replanting with native species (if needed). In areas needing treatment, the goal is to re-create landforms that existed prior to road construction to the maximum extent reasonably and safely feasible, while protecting key aspects of habitat used by federally listed species.

The natural contours of the streambed and forest floor developed and existed in balance with the pre-disturbance natural hydrologic conditions; restoring natural contours helps reduce erosion to pre-disturbance levels. The re-exposed topsoil provides an organic and nutrient-rich base for re-establishment of native species. The woody debris scattered adjacent to the finished stream channels provides immediate surface erosion control, habitat for small terrestrial species and, as it decays, adds additional organic matter to the soil.

All locations along haul roads and most locations along skid roads that have the potential to erode and deliver sediment to the stream system would be fully excavated and restored to their pre-disturbance form and function. Some sections of haul roads and skid roads that have potential to erode, but where the sediment would be unlikely to reach (or be delivered to) the stream system would not be fully excavated. There are a few sites that have the potential to erode and deliver sediment to the stream system that cannot be safely accessed due to erosion that has already occurred and/or excessively steep slopes; these sites would not be treated.

At stream crossing excavations, the pre-disturbance channel bed and banks would be uncovered, and the excavated area would blend smoothly with the channel up- and downstream to the maximum extent feasible. Excavated material would be moved varying distances along the road to stable cut benches and placed against the cutbank to reconstruct the natural topography. Buried topsoil would be uncovered wherever it exists beneath fully excavated areas and would speed re-establishment of native vegetation.

The decision regarding whether to fully or partially excavate and restore a particular road or road segment would be based on weighing the risks and benefits of full restoration on terrestrial and aquatic habitats of concern. For example, those sites where erosion and sediment are likely to damage old growth trees downslope would be fully excavated. Conversely, those sites that have low potential to erode and deliver sediment to the stream system, and where full excavation would result in damage to terrestrial habitat by removing advanced second growth would receive a reduced level of treatment. In those cases failures of remaining unexcavated fill may occur in the future but would not be expected to cause substantial damage to the habitat.

Exposed soil adjacent to stream channels would be protected by mulch according to RNSP Post-Excavation Erosion Control Guidelines, developed in consultation with NOAA Fisheries in 2003. The mulch would be primarily derived from the trees, shrubs, and other organic material that would be removed in order to excavate the road fill, and occasionally supplemented by shredded redwood bark or weed-free rice straw.

C. Watershed Restoration Methods

This work requires the use of heavy equipment (various combinations of bulldozers, excavators, loaders, dump trucks and scrapers) in order to be effective. The normal period of operations is targeted for the dry months, between 1 June and 15 October in each year of operation. If windows of dry weather are predicted beyond 15 October, and there is additional work that can be completed within the predicted window, work may proceed dependent upon consultation with NOAA Fisheries.

Road and Landing Removal (Sidecast Fill Excavations)

Excavation of sidecast fill reduces the amount of road fill that may fail as a mass movement, restores surface runoff patterns, and often uncovers buried topsoil. Many sections of road in RNSP were built on a layer of pioneer logging debris and forest understory vegetation. This layer of organic material is becoming increasingly decayed, and appears to be a contributing factor to many slope failures. The configuration of the road (insloped, outsloped, ditched, rutted, etc.) determines local hillslope runoff patterns.

Excavation begins when a bulldozer dishes down the outside edge of the road, and pushes the fill toward the cutbank. Depending on how steep the slopes are, the bulldozer may be able to complete the excavation and shape the fill to conform with local pre-disturbance landforms or, on steeper ground, an excavator assists in lifting more fill up toward the cutbank. On the steeper slopes, all of the work may be done with the excavator. On extreme slopes where the finished slope would exceed the natural angle of repose, the uppermost portion of the cutbank may remain exposed. Similarly, if there are springs present in the cutbank, they may be left exposed. Ideally, the original buried topsoil is encountered as the sidecast excavation nears completion. If some, or all, of the excavated fill cannot remain at the site due to moisture and/or slope stability problems it would be moved (pushed or loaded into trucks) to nearby stable locations, and shaped to mimic the natural topography. Such sites were identified during the mapping of potential ground disturbance, and were included in the acre figures for the individual disturbance polygons (see Table 1).

Vegetation that is growing in the road prism would be removed and stockpiled for surface erosion control in areas adjacent to streams. As slopes are finished, the vegetative debris would be scattered on the surface. This will help reduce surface erosion, and also provide immediate cover for small terrestrial species. As it decays, the vegetation adds organic matter to the soil, and encourages fungi growth, thus, speeding recovery of native forest vegetation.

Stream Crossing Excavations

Stream crossings may have a functioning culvert, a culvert that is no longer functioning to convey water (by being plugged, crushed, buried, or through leaking), or no culvert at all. Many of the crossings in Lost Man Creek have acted as dams, trapping a large wedge of sediment upstream of the crossing. Sooner or later, all stream crossings will fail. When they fail, either a significant proportion of the road fill placed in the stream valley and the accumulated sediment

will erode, or the stream will divert and run down the road or hillslopes, eroding gullies or initiating landslides. The majority of sediment eroded as a result of stream crossing failure ends up in the stream system.

The area of ground disturbance associated with stream crossing removal would be confined to the original area of disturbance caused by construction of the crossing. These areas were identified on the ground and were included in estimated acres of ground disturbance in the mapped polygons. Out of the 27.9 mi of road proposed for removal approximately 4 mi are in stream crossings.

A bulldozer begins a stream crossing excavation by removing vegetation growing in the crossing fill; this vegetation could consist of herbs, shrubs, and trees that have established themselves in the fill. After vegetation has been removed the bulldozer dishes down the road fill, scooping out as much fill as possible, and pushing it along the road to a stable storage location. The excavation work does not disturb the bottom of the stream channel nor is it near flowing water during this time. Once the bulldozer has removed as much fill as possible without assistance, an excavator is moved onto the downstream portion of the remaining fill, and begins excavating the remaining fill from the channel, beginning at the downstream extent of the fill and moving in the upstream direction. The goal of the stream channel excavation is to uncover, yet not disturb, the buried natural channel armor which is usually a combination of rock and woody debris. The large woody debris that is encountered during the excavation is placed in the channel, augmenting the natural channel armor.

Streams with significant surface flow capable of sediment transport off-site are diverted around excavation areas. Streams with only subsurface seepage through the buried streambed gravels are not diverted because the flow is not disturbed during excavation. Most of the time when a culvert is present water is kept flowing through the culvert as long as possible. When a culvert is near the center of the crossing, it is removed section by section, as the excavator works its way up the channel; thus water is only allowed to flow on the finished stream channel excavation, and not on partially excavated areas. If there is no culvert, the water is generally flowing along the old channel bottom gravels, buried at the base of the fill. The crossing is still excavated from the downstream end up so that water that emerges from the base of the fill is released into the finished channel. When an excavation nears its upstream end, water must flow across a partially excavated area for a brief period while the excavation of the top of the crossing is completed.

Stream channel excavations may experience minor adjustments, mostly during the first winter following excavation. The remaining road fill, wedged in the interstices of the original streambed may be mobilized. Small portions of channel side banks may settle or slide. The original channel bed armor may adjust in response to the logging slash up and downstream of the excavation site. Decaying logging slash or natural organic debris may collapse, causing a small chain reaction up and downstream. Much of the material mobilized during these adjustments is trapped by the large woody debris that is encountered during the excavation and placed back into the channel, augmenting the natural channel armor. Large woody debris will be placed in the streams when completing crossing excavations. This will provide storage locations for trapping sediment that moves through the channel from natural upstream and post-excavation erosion, and

provide immediate cover for aquatic/riparian species. Woody debris also would be placed on the ground adjacent to streams to reduce surface erosion and provide habitat for seedlings, fungi, microorganisms, invertebrates, birds, amphibians, and small mammals. This habitat enhances the recovery of the forest ecosystem across the former road corridor.

D. Interdependent and Inter-related Activities

Access

Currently the main access routes to the project area- Holter Ridge Road and Geneva Road- experience a moderate amount of vehicular travel for administrative purposes. These roads are closed to public motorized vehicles but are used by park staff and contractors for various purposes including wildlife and fish surveys, road maintenance, occasional field reviews, and “show-me’s” for park employees. Some of the secondary ridgetop roads (e.g., the B-Line, A170, A141 “Fire Access” segment) are maintained for fire management, and also are used for spotted owl surveys when necessary. The level of vehicle use of these roads varies seasonally, and depends on such factors as wildlife and fish survey schedules or the need to maintain culverts and perform other road maintenance, and the conditions of the roads after wet weather. There may be days or weeks when no vehicles access these roads, and other days when multiple vehicles make multiple trips along these roads. Figure 3 displays designated access roads of this proposed project.

Prior to the start of actual road removal activities vehicle use along access roads would be variable. During the pre-removal period, besides the administrative uses mentioned above, all access roads would typically be traveled almost exclusively by restoration staff and would require that several vehicles be driven to and from a site each day. Once heavy equipment operations begin, vehicle use on access roads is likely to increase. Each project would require approximately five vehicles for personnel travel in and out of the worksite. Holter Ridge Road for access from the south and the B-Line for access from the north would be used most heavily because these are main access roads to the entire project area. Vehicles would be driven along portions of these roads each day. In some cases access roads traverse through old growth, residual old growth, or mature second-growth forest.

Heavy equipment would be transported to the project area on a low boy and driven as close as possible to a work site. From that point the equipment would be “walked” to the site. Depending on the location of individual projects equipment may need to walk up to four miles to gain access to a work site. Equipment typically walks at a rate of 2-6 mph. Vehicle noise associated with walking equipment could persist for up to 40 minutes at any particular site.

Some access roads in the project area would require upgrading (Fig. 3). Where these roads are in or within 0.25 mi of the contiguous block of old growth forest upgrades would occur after 15 September. Road upgrading would require the removal of vegetation along the existing road surface, brushing along the edges, smoothing the original road surface, and replacing culverts where necessary. The anticipated scale of disturbance would be the width of the bulldozer blade which is about 15 ft (4.6 m) wide. Where stream crossings are in need of reconstruction the area

cleared of vegetation may be slightly larger. Overall, upgrading and rebuilding would be done solely to re-establish access and not to reconstruct the original road. Most of the access roads that are upgraded also would be removed; with the exception of the A100/A130 Connector through the old growth which would be upgraded for access two years before actual treatment, all of the impacts associated with road upgrades are included in analysis of impacts associated with eventual treatment. Within the action area roads that would remain after all associated roads are treated include the main service roads- Geneva, Holter Ridge and the B-Line- along with a small number of ridge-top haul roads previously identified for fire access (see Fig. 1).

Post-Excavation Erosion Control

Effective erosion control measures such as straw bales, silt fences, and check dams would be in place down slope of project sites within riparian areas at all times during restoration activities. Erosion control structures would be maintained throughout, and possibly after, restoration activities. Any disturbed ground would receive appropriate erosion control treatment prior to the beginning of the wet season. Work sites would be winterized at the end of each day when significant rains are forecast that may cause unfinished excavations to erode. Winterization could include the following: smoothing unfinished surfaces to allow water to freely drain across them, compacting unfinished surfaces with an excavator bucket where concentrated runoff may flow, and installation of culverts, silt fences and other erosion control devices where necessary to convey concentrated water across unfinished surfaces and trap eroded sediment before it leaves the work site. Adequate erosion control supplies (gravel, straw bales, shovels, etc.) shall be kept at all restoration sites to ensure excavated material is kept out of water bodies.

Hazardous Materials Treatment

Equipment, both hand tools and heavy equipment, would be inspected daily to check for leaks. Equipment that may leak lubricants or fuels into a drainage would not be used until the leaks are repaired. All equipment would be stored, serviced and fueled outside of riparian areas and away from stream crossings. Heavy equipment would be cleaned (e.g., power washed, steam cleaned) prior to use below the ordinary high water mark.

Petroleum products, chemicals, fresh cement, deleterious materials, or water contaminated by the aforementioned would not be allowed to enter flowing waters. A spill plan and materials for spill containment would be available to onsite personnel and all personnel shall know how to use them. In the event of a spill, work would be stopped immediately, clean up would begin, and the appropriate authorities notified.

E. Measures to Minimize Impacts on Threatened Terrestrial Species

Spotted Owl

Surveys to document occupancy of the project area by northern spotted owls (*Strix occidentalis caurina*) were completed in the South Fork sub-basin in 2003-04. In addition, routine surveys of suitable spotted owl habitat within 0.25 mi of Geneva and Holter Ridge Roads were completed by park staff, and will continue in the future. RNSP staff also monitored known spotted owl

activity centers (ACs) whose 1.3 mi radius home range circles overlap the project area (Fig. 4). Surveys will continue in the South Fork sub-basin as needed to stay current. North of the South Fork (i.e., in the Middle and North Forks) spotted owl surveys will be completed in all suitable habitat that may be impacted directly or indirectly by project activities prior to those activities occurring.

To date, no spotted owl activity centers have been located within the project area. Should surveys detect one or more new activity centers within the project area, and if owls are nesting or reproductive status cannot be determined, a seasonal work restriction between 1 February and 15 September would be applied to all roads occurring within the activity center stand or 70 acre core area surrounding the AC. Similarly, work would be restricted between 1 February and 9 July on all roads outside an AC core area but within 0.25 mi of an AC with nesting or undetermined nesting status.

Marbled Murrelet

Surveys to document presence and occupancy by the marbled murrelet (*Brachyramphus marmoratus*) were done in 1999-2001 and 2003-04 throughout much of the project area; surveys occurred at or near roads proposed for treatment that are in or near residual old growth redwood stands that could provide nesting opportunities (see Fig. 5). Approximately 1,200 ac (490 ha) were within the area surveyed in the Lost Man Creek watershed (Larry Damm, South Fork, Middle Fork, and North Fork sub-basins) in 1999-2001. Approximately 1,075 ac (435 ha) were within the area surveyed in the South Fork sub-basin in 2003-04. In both cases the acres surveyed represent the residual old growth and intervening second growth habitat. Surveys would continue as needed to stay current in the South Fork; resurveys of unoccupied habitat surveyed in 2000 and 2001 would occur in the Middle and North Fork sub-basins in 2006-2007 as well as new surveys in the remaining portions of the project area that were never surveyed.

Work on roads within 0.25 mi of occupied sites would be seasonally restricted between 24 March and 15 September. Work on roads within 0.25 mi of sites where presence was detected may be allowed during the breeding season (depending on the number and the nature of detections), but would be restricted daily to between two hours after sunrise and two hours before sunset. Heavy equipment access of a site would be subject to the same restriction as applied to the road to be removed. There would also be a daily limited operating period from two hours after sunrise to two hours before sunset on heavy equipment access through the contiguous old growth along Geneva Road. There would not be any restrictions imposed on passenger vehicle access to a work site.

Proposed project activities were scheduled to avoid adversely affecting the marbled murrelet by noise-generating activities where possible by strategizing and prioritizing road removal work. Of the 27.9 mi of haul roads, skid roads, and stream crossings scheduled for removal, 7.3 mi of roads in or within 0.25 mi of suitable murrelet habitat would be removed after 15 September. Work on access roads that require upgrading would be restricted to after 15 September in or within 0.25 mi of old growth. There are 1,282 ac (519 ha) of occupied or potentially occupied marbled murrelet habitat (including old growth and residual old growth) within 0.25 mi of these sites. Before 15 September, 0.3 mi of road within 0.25 mi of occupied suitable murrelet habitat

would be removed resulting in two acres of potentially occupied habitat that would be subjected to noise disturbance during the breeding season. Also before 15 September work would begin on the remaining 20.3 mi of road that are greater than 0.25 mi distant from suitable habitat, or where surveys have indicated murrelets are not occupying the adjacent habitat (see Table 1). Two-hundred fifty-four acres (103 ha) of potentially suitable residual habitat occur within 0.25 mi of these roads with earlier start dates. (Note this figure exceeds the total amount of residual habitat acres in the action area due to some of the same acres being impacted in multiple years.)

In areas where heavy equipment will be operating during the breeding season in or within 0.25 mi of sites with murrelet presence, actions will be taken to reduce noise disturbance by implementing a daily limited operating period (DLOP). In these areas the use of heavy equipment and power tools will be restricted to the time period between two hours after sunrise to two hours before sunset. The roads with a DLOP include the A100 South (those segments outside the old-growth or murrelet occupied site buffers), A110, A120 (inside occupied site buffer), A140 (segments near sites with presence), A142, A300, B200, B200/B500 Connector, North Branch North Fork, Shangri La, and Upper B500 (southern half). A number of other roads may get a DLOP if future survey results indicate murrelet presence including the A111, A121, A131, A350, and A400 (see Table 1).

No trees with the potential to provide a nesting opportunity would be removed by project activities.

Contractors and RNSP staff working in the project area would pack out all food scraps and trash, including fruit cores and other uneaten food items, so as to ensure that corvids are not increasingly attracted to the work sites in the vicinity of suitable habitat during the breeding season.

Treatments of roads within 0.25 mi of the contiguous old growth, or high quality residual habitat, would be as minimal as possible in order to avoid to the greatest extent practicable the creation of flight corridors and food sources for avian predators such as Steller's jays and ravens. For both the marbled murrelet and spotted owl, habitat degradation or removal would be minimized by limiting vegetation removal to fill sites, leaving all old growth trees at the toe of the fill slope, and by removing trees $\geq 18''$ (46 cm) in the fill slope only when necessary to realize rehabilitation objectives.

Proposed Schedule of Project Activities

15 June (earliest project start-up date): No actual road removal work is scheduled to occur before 10 July. Brushing and clearing of access roads may occur during this time on roads greater than 0.25 mi away from old growth, marbled murrelet occupied site buffers, and spotted owl activity centers, and only within areas with current spotted owl and marbled murrelet surveys completed.

10 July through 15 October: 10 July is the anticipated start date for actual road removal work on roads that are outside old growth and, with three exceptions, marbled murrelet occupied site

buffers. In two cases, the A120 and A300, the first 0.1- 0.2 mi of road to be removed is within 0.25 mi of an occupied site, and in the third case- the A140 Manning Creek segment (not in an occupied site)- a more restrictive start date is being proposed due to murrelet presence in the area and the extent of habitat degradation that may occur at this site. Roads in areas needing surveys for marbled murrelets and/or spotted owls are included in this category until survey results indicate a more restrictive limited operating period is necessary.

16 September through 15 October: All roads and associated skid roads and stream crossings within old growth, the old growth buffer, or occupied marbled murrelet site buffers with the exceptions of the A120 and A300 mentioned above would be removed during this time period unless an extension was granted for dry conditions by NOAA Fisheries.

Proposed operating periods for each of the roads or road segments are summarized in Table 1.

V. EXISTING ENVIRONMENT

Generally, the project area is underlain by the more coherent sandstones of the Lack's Creek Unit of the Franciscan Assemblage as opposed to the relatively young, poorly consolidated marine and fluvial sediments of the Prairie Creek Formation, found predominantly in Larry Damm and the North Fork sub-basins. The ridge tops of the project area, where less intensive restoration activity would likely occur, are underlain primarily by the Prairie Creek Formation. The geomorphic responses of the landscape are strongly influenced by the relationship and distribution of these distinctly different geologic formations. Characteristics of the Lost Man Creek watershed are summarized in Table 2 below.

Table 2. Characteristics of Lost Man Creek watershed and sub-basins.

<i>Sub-basin</i>	<i>Drainage Area (mi²)</i>	<i>Drainage Area (acres)</i>	<i>Mean Basin Slope (%)</i>	<i>Elevation Range (ft)</i>	<i>Area in Prairie Creek Fm. (acres [%])</i>	<i>Area in Old Growth (acres)</i>
Larry Damm Creek (LDC)	1.9	1181	27.6	1600	853 [72%]	245
North Fork Lost Man Creek (NFL)	2.4	1422	35.6	1440	742 [52%]	135
Middle Fork Lost Man Creek (MFL)	2.4	1444	37.0	1600	583 [40%]	35
South Fork Lost Man Creek (SFL)	4.3	2522	39.3	1920	177 [7%]	304
Other Areas (Interfluves)	1.1	1160	---	---	106 [9%]	1116
Basin Totals	12.1	7729	34.9	-----	2461 [36%]	1835

More than 60 mi of large, poorly constructed, logging roads were built within the Lost Man

Creek watershed in the decades prior to the establishment of Redwood National Park. Within this 12 mi² watershed, approximately 44 mi of abandoned, failing haul roads were identified for removal. Since restoration work in Lost Man Creek began in 2000, over half of these roads have been treated, along with associated skid roads. This work has restored natural runoff patterns to 2,296 ac (929 ha) or approximately 30% of the watershed. See the Table 3 relative to data on recent road removal work in the watershed.

Table 3. Restoration progress in Lost Man Creek as of 2005.

Sub-basin	1987	2000	2001	2002	2003	2004	Total to date
Larry Damm Creek							
Miles Removed	0.4	0	0	2.9	4.2	0.2	7.7
Acres Restored	72.6	0	0	352.3	443.1	48.5	916.5
N. Fork Lost Man Creek							
Miles Removed		6.9	1.6	2.4	0	0	10.9
Acres Restored	0	452.2	137.9	126.3	0	0	716.4
M. Fork Lost Man Creek							
Miles Removed		2.1	1.5	0	0	0	3.6
Acres Restored	0	173.7	262.0	0	0	0	435.7
S. Fork Lost Man Creek							
Miles Removed		2.0	0.7	0	0	0	2.7
Acres Restored	0	156.2	143.6	0	0	0	299.8
Manning Creek							
Miles Removed	0	0	0	0	0	0	0
Acres Restored	0	1.4	0	0	0	0	1.4
Total Miles Removed:	0.4	11.0	3.8	5.3	4.2	0.2	24.9
Total Acres Restored	72.6	782.1	543.5	478.6	443.1	48.5	2,368.4

Because much of the area was harvested using prescriptions that left behind old growth legacy (“residual old growth”) large dominant redwood, and to a lesser extent Douglas-fir, trees dot the landscape throughout the project area, in some cases supported by mature residual codominants. Most of the Lost Man Creek watershed was harvested greater than 40 years ago and as of 2005 there were 3,940 ac (1,594 ha) of ≥ 40 year old second growth within the project area. This second growth is of variable quality depending on the site, species composition, and its association with residual old growth. There are approximately 450 ac (182 ha) within the project area consisting of young second growth considered unsuitable for the spotted owl and marbled murrelet.

In order to be able to most accurately document a project’s influence on residual habitat all old growth and mature trees (in Lost Man Creek watershed and throughout other areas of the park) were mapped using air photo interpretation, digitized, and scanned into GIS. Given that the numbers and locations of trees vary across the landscape, residual old growth trees were buffered using a standard approach to avoid the subjectivity inherent in case by case habitat suitability assessments. For example, if there was one old growth tree per acre that lacked mature residuals

around it, a 0.1 ac buffer was centered on that tree. Where higher densities of old growth trees per acre occurred, or a low density of old growth surrounded by a high density of mature trees, each old growth tree was buffered with 0.5 acre. These larger buffers in many cases overlap, thus, creating “stands” of residual habitat. In this way the quality and amount of residual habitat within a given area can be quantified using a spatial analysis. This residual habitat GIS coverage was used to quantify impacts on the species considered in this document.

VI. STATUS AND DISTRIBUTION OF LISTED SPECIES

Please refer to *A Conservation Strategy for Managing Threatened and Endangered Species in Redwood National and State Parks* (Sakai 2003 as amended) for detailed species account, habitat status, and literature summaries for the three species considered in this document.

1. Northern Spotted Owl (*Strix occidentalis caurina*), Threatened

A. Species Account

There are no known spotted owl activity centers within the action area. Surveys in 2003 and 2004 in the South Fork sub-basin failed to detect any spotted owls although two barred owl (*Strix varia*) territories were confirmed, and at least one of these two sites was occupied by a pair. Routine night surveys along Holter Ridge Road did detect at least two spotted owls in two different locations not associated with a known territory, however, day time follow-up surveys failed to locate either of them. There was one incidental detection of a spotted owl during a marbled murrelet survey in 2001 north of Geneva Road in the North Fork sub-basin.

Portions of home ranges of three spotted owl pairs overlap the project area. The activity centers of these pairs are monitored annually. Barred owls have been detected at all three of these activity centers, and appear to have taken up residence at two or possibly all three of these sites. For example, barred owls have been observed in the South Fork Little Lost Man Creek nest tree, and it's possible that the spotted owls from this site have moved east of the historic activity center. Both male and female spotted owls have been detected on multiple occasions at night and during the day around the junction of Holter Ridge and Bald Hills Road, and the junction of Holter Ridge Road and the A170 outside of the project area. When detected these birds stay high up in the canopy, refusing to come down when a mouse is offered, so identifying a current activity center is problematic. In 2005 a single spotted owl was detected in the vicinity of the Little Lost Man Creek activity center, but again mousing the bird proved futile. In 2005 a pair of barred owls had taken up residence near the Lost Man Creek activity center and the spotted owls at that site were not detected.

B. Habitat Status

Out of the 5,804 ac (2,349 ha) within the action area, approximately 4,172 ac (1,688 ha) are likely to be suitable nesting, roosting, and/or foraging habitat, although due to barred owl occupancy some of the suitable habitat is probably not available to spotted owls. Due to the lack

of specificity on locations of current spotted owl activity centers, habitat “circle analyses” were run on the most recent, historic activity center location of the three known territories. All three activity centers are in the contiguous block of old growth west of the project area. The amount of potentially suitable habitat in each of the three territories is as follows:

Lost Man Creek- 705 ac (285 ha) within 0.7 mi radius and 2,566 ac (1,038 ha) within 1.3 mi radius;

Little Lost Man Creek- 977 ac (395 ha) within 0.7 mi radius and 3,267 ac (1,322 ha) within 1.3 mi radius;

South Fork Little Lost Man Creek- 886 ac (358 ha) within 0.7 mi radius and 3,052 ac (1,235 ha) within 1.3 mi radius.

Some habitat within the project area would be removed by road restoration activities, but this equates to a small percentage of the total habitat available within each of the three home ranges (see Section VII, “Impacts”).

Within the action area there are an estimated 1,400 ac (567 ha) of potentially suitable spotted owl nesting and roosting habitat that have not been surveyed to date. This remaining suitable habitat will be surveyed beginning in 2006.

2. Marbled Murrelet (*Brachyramphus marmoratus*), Threatened

A. Species Account

Surveys conducted in the Lost Man Creek watershed indicate marbled murrelets use the residual old growth habitat within the action area. In 2000 and 2001 survey results indicated occupancy in residual old growth within the steep canyon of the Middle Fork; there were numerous observations of below-canopy or canopy-level flight at this site (see Figs. 2, 5 and 6). Murrelet presence was documented to the north in the North Fork sub-basin, but murrelet activity appeared to drop off with increasing distance away from the contiguous old growth. Likewise, surveyors in 2003 and 2004 documented occupancy in the northern-most survey site (“Site H”) in the South Fork sub-basin. This area also is very steep and contains a relatively dense patch of old growth residuals. Based on murrelet behaviors such as stationary calling (from a tree perch), groans, and one evening fly-through, surveys suggested a high likelihood of nesting at this site. South of this location murrelets were present at two other sites along the South Fork, including the Manning Creek tributary, but as in the northern part of the project area detections dropped off with increasing distance upstream in the South Fork from Site H. No murrelets were detected south of Manning Creek, in the southern 1/3 of the project area.

Because of these survey results, plus documented use of residual habitat elsewhere throughout the species range in the Pacific states, we assume that all stands with trees providing nesting opportunities for marbled murrelets have the potential to be occupied unless surveys indicate probable absence at a site.

Corvids (i.e., jays, crows, and ravens) have been implicated as primary predators of murrelet

nest, especially adjacent to forest edges (Nelson and Hamer 1995, Raphael et al. 2002). In redwood forest habitat a variety of studies on real and simulated nests suggest that Steller's jays (*Cyanocitta stelleri*) are the most significant predator on murrelet eggs and chicks (Carey et al. 2003) and indeed Steller's jays have been documented preying on murrelet eggs in RNSP (R. Golightly pers. comm. 2005). In an attempt to document corvid abundance within the project area surveyors conducted a 10-minute point count at the murrelet survey station at the end of each morning murrelet survey. The greatest number of Steller's jays recorded at each station ($n = 73$) during all point counts was included in a calculation of the average number of jays, $3.2 (\pm 1.9)$, per murrelet station. Only two stations out of 73 surveyed had zero Steller's jays recorded during all point counts. At stations with jays recorded numbers ranged from 1 (10 stations) to 8 (4 stations) (see Fig. 5). Common ravens (*Corvus corax*) were detected at 18 stations; most often only a single raven was detected, with a maximum of four at one station. A single gray jay (*Perisoreus canadensis*) was detected at one station.

It is unclear how the numbers of Steller's jays detected in the Lost Man Creek action area compare to numbers in different habitats, e.g., contiguous patches of interior old growth, however, based on a limited number of surveys along Little Lost Man Creek in spring of 2005 it appears that numbers of Steller's jays are indeed higher in the residual habitat. Point counts along Little Lost Man Creek yielded 0-2 Steller's jays detected per survey (RNSP unpub. data).

B. Habitat Status

There are 871 ac (352 ha) of potentially suitable marbled murrelet nesting habitat in the action area, 662 ac (268 ha) of contiguous old growth and 209 ac (84 ha) of residual old growth habitat. Residual old growth trees- mainly redwood, but in some instances old growth Douglas-fir- are scattered throughout the action area. This residual habitat is of variable quality in terms of its suitability as marbled murrelet nesting habitat; its suitability probably depends upon the density of residual trees plus density and size of mature trees (if any) beneath or surrounding the residual old growth, and proximity of residual clusters to the contiguous old growth block. To date, surveys have shown a small proportion of the total residual habitat in this area to be occupied by marbled murrelets (Figs. 2 and 5).

Regarding residual old growth habitat's function as suitable for Steller's jays as well as for marbled murrelets, Carey et al. (2003) stated "...harvest that produces landscapes including regenerating clearcuts and old growth forests with some tree removal will likely elevate Steller's jay abundance." Lost Man Creek watershed, with its mosaic of stand types and residual patches matches this description.

Marbled Murrelet Critical Habitat

For successful murrelet nesting the following primary constituent elements of critical habitat were identified (USDI 1996):

- 1) individual trees with potential nesting platforms;

- 2) forested areas within 0.5 mi (0.8 km) of individual trees with potential nesting platforms, and with a forested canopy height of at least one-half the site-potential tree height.

This includes all such forest, regardless of contiguity.

The proposed project area in Lost Man Creek is not in a designated critical habitat unit, however, both of the above primary constituent elements of critical habitat are present in and adjacent to the project area.

3. Fisher (*Martes pennanti*), Candidate

A. Species Account

No forest carnivore surveys have taken place specifically within the project area. In 2002 Slauson et al. (2003) placed two sample units, with six track plate stations in each, along the west-central and southern borders of the project area. These stations were set up in a circular array surrounding a central station, each separated by 0.3 mi (0.5 km). These sample units were part of a larger study designed to detect the Humboldt marten (*M. americana humboldtensis*) in RNSP. No fishers were detected at these stations. There are no incidental observations of fishers within the action area in the RNSP wildlife observations database. However, it is expected that fishers have the potential to use the action area for denning, resting, or foraging wherever suitable structures occur.

B. Habitat Status

The number of acres of potentially suitable fisher habitat in Lost Man Creek is not known, but probably equates roughly with the amount of suitable spotted owl nesting and roosting habitat. In residual old growth habitat structure is most likely present for fisher denning, resting, and foraging.

VII. IMPACTS TO THREATENED AND ENDANGERED SPECIES

A. Northern Spotted Owl

1. Disturbance

Surveys in the South Fork sub-basin indicate that spotted owls are not present in this portion of the action area. Barred owls occupy at least part of this area; a pair of barred owls was consistently located in the vicinity of the A130 (near murrelet survey site "H") and multiple detections of one or more single barred owls occurred in the area between the A142 and A160. The size of an area used by a pair of barred owls in the breeding season is not known, however, it can be assumed that habitat within the general vicinity of the barred owl detections is probably unavailable for use by spotted owls when barred owls are occupying those sites. All known

historic locations of spotted owl activity centers are outside the action area. In one case, South Fork Little Lost Man, it is likely the spotted owls have moved from their historic activity center due to barred owls, however, all detections of spotted owls that might be associated with that site have been greater than 0.25 mi south of the project area near the Bald Hills Road and Holter Ridge Road/A170 junction.

Surveys are planned in the Middle and North Fork sub-basins of the project area in 2006 and 2007. Should spotted owls be located in any portion of the project area and their reproductive status confirmed as nesting, appropriate seasonal restrictions (e.g., no noise disturbance prior to 10 July) would be put in place to protect nesting and fledgling spotted owls.

2. Loss and Modification of Suitable Habitat

This project could have slight impacts on spotted owls through loss or modification of suitable habitat. Suitable habitat within the project area includes old growth, second growth ≥ 40 years old, and moderate- high density old growth residuals regardless of the age of the second growth understory. Table 4 shows the estimated acres of habitat that could be removed by road rehabilitation activities in the home ranges of the three known owl territories that overlap the action area. Taken individually the affected acres within known home ranges equates with 1.9% of the total suitable habitat within the three territories. Due to overlap of home range circles, and some roads falling within two adjacent territories, the actual number of affected acres is 118.0 ac or 1.3% of the total suitable habitat.

Table 4. Acres of suitable nesting and roosting (N/R) habitat currently within 0.7 and 1.3 mi radius circles centered on the historic activity center of three known spotted owl territories overlapping the project area before and after road removal and percent of total acres affected in each.

Territory	Suitable N/R Habitat in 0.7 Mile Radius	Suitable N/R Habitat in 1.3 Mile Radius	Affected Acres in 0.7 mi Circle	Affected Acres in 1.3 mi Circle
Lost Man Creek	705 ac	2,566 ac	3.9 (0.5%)	58.4 (2.3%)
Little Lost Man Creek	977 ac	3,267 ac	4.1 (0.4%)	76.7 (2.3%)
So. Fork Little Lost Man Ck	886 ac	3,052 ac	2.9 (0.3%)	24.4 (0.8%)
Totals:		8,885 ac	10.9 (0.4%)	159.5 (1.8%)
Actual acres affected when overlap is considered:				118.0 (1.3%)

See Appendix A for specific roads in each territory and estimated affected acres in each year of the project for each territory.

The acres of suitable habitat within the ground disturbance polygons (affected habitat patch size) range from 0.01 ac to 15.0 ac, with average patch size ranging from 2.0 ac in the Lost Man Creek

territory to 2.8 ac in Little Lost Man Creek. In addition to the acres affected in each of the known territories, approximately 82.0 ac (33 ha) of potentially suitable nesting and roosting habitat outside of known territories, but within the action area, would potentially be impacted by restoration activities. Taken together, the total acres of potentially suitable nesting and roosting habitat that could be impacted by project activities is 199.4 (80.7 ha) or 4.8% of the potentially suitable nesting and roosting habitat in the action area. Because the affected habitat acres outside of known territories are dispersed throughout the remainder of the action area in small patches similar to those in the known territories, loss of this additional suitable habitat is not expected to adversely impact spotted owls that may establish a territory in a new location within the Lost Man Creek watershed in the future.

3. Direct Injury

Because no spotted owls have been detected to date within those portions of the action area that have been surveyed, and surveys would be conducted prior to project activities taking place, the likelihood of direct injury is negligible. If spotted owls are detected in stands with roads proposed for removal, seasonal restrictions would be put in place between 1 February and 15 September if nesting occurs or in occupied stands where reproductive status could not be determined. This would ensure protection of vulnerable juveniles as well as nesting adults.

B. Marbled Murrelet

1. Direct Effects

a. Noise Disturbance

This project could affect the marbled murrelet due to noise disturbance from heavy equipment operating during the breeding season. Restrictions to limit noise disturbance would be imposed on all noise-generating activities within 0.25 mi of the large block of old growth (old growth buffer) and within 0.25 mi of all murrelet survey stations where occupied behaviors were recorded during surveys with a couple of exceptions. The A120 is located almost entirely within unsuitable marbled murrelet habitat, with minimal amounts of residual old growth within 0.25 mi. However, at the far end, where work would need to begin during the breeding season in 2007, approximately 0.2 mi occurs within the occupied site buffer ("MAMU buffer"- see Table 1). There is one acre of residual habitat within 0.25 mi of this road segment. Likewise, work would need to begin on the far end of the A300 during the breeding season in 2009, along approximately 0.1 mi of road that is within 0.25 mi of 1.0 ac of residual habitat. Therefore, any murrelets nesting in these two acres of residual habitat may be significantly negatively impacted by noise disturbance.

There are 125 ac (51 ha) of residual habitat outside of old growth and/or occupied murrelet buffers that have either been surveyed or would be surveyed (or resurveyed) prior to road rehabilitation activities taking place. Work on roads that are within 0.25 mi of survey stations where murrelet occupancy is noted by future surveys would be restricted to after 15 September. Work on roads that are within 0.25 mi of survey stations where murrelet presence was noted (or

is noted by future surveys) would be limited daily to the hours between two hours after sunrise and two hours before sunset (see Table 1). Due to the limited number of presence detections and the nature of the detections (high fly-overs) allowing work to proceed within the DLOP is not expected to result in an adverse impact. Roads that are within 0.25 mi of stations without any murrelet detections would not be subject to any limited operating period. Given the slight chance that murrelets could occur in suitable habitat in subsequent years within 0.25 mi of these roads there is the potential to cause unforeseen disturbance to any murrelets nesting within these 125 ac of residual old growth habitat.

Vehicle and heavy equipment access is not expected to result in an appreciable increase in noise disturbance impacts. Due to the increase in noise volume and relatively slow speed of heavy equipment access to a work site, a seasonal restriction or daily limited operating period applied to a specific road for removal would also be applied to heavy equipment access. A two hour daily limited operating period also would be imposed during the breeding season along the portion of Geneva Road through contiguous old growth. Other than that portion of Geneva Road, there would be no restrictions on heavy equipment access along the main access routes due to the fact that these roads receive a moderate amount of vehicular traffic throughout the year and murrelets nesting within 0.25 mi of these roads are expected to be habituated to vehicle traffic noise. For the same reason, there would not be restrictions imposed on passenger vehicle access into the action area, due to the existing level of traffic that occurs along these roads throughout the year.

b. Loss and Modification of Suitable Habitat

This project is likely to cause the modification of some suitable marbled murrelet nesting habitat. In some areas trees growing in the road fill have developed height and crown conditions to the point where they provide cover to limbs of residual old growth and contribute to the canopy closure of the residual “stands”. Preliminary mapping of the area of potential ground disturbance associated with haul road, landing, skid road, and stream crossing removal has indicated that residual old growth habitat may be negatively impacted by vegetation removed in the course of rehabilitation work.

When a ground disturbance polygon intersected a residual habitat polygon (“buffer”) it was assumed that the residual habitat would be adversely impacted even though no old growth trees would be removed by project activities. This is a general assumption because the quality (e.g., bole and crown height, tree density,) of both the old growth and mature residual habitat is not precisely known. Acres of habitat affected, thus, include either individual old growth residual trees or old growth trees plus associated mature second growth. Only that portion of the road disturbance polygon that contained or was likely to impact residual habitat was included in the effects analysis, while the remaining portion of the disturbance polygon in second growth was categorized as unsuitable. In areas with dense (e.g. higher quality) clusters of residual old growth intersecting a ground disturbance polygon the area of potentially affected habitat was expanded to include the contiguous residuals in order to avoid underestimating the area that could be negatively impacted by rehabilitation activity. By these methods it was determined that a total of 22.4 ac (9.1 ha) of suitable habitat could be degraded within the action area; 15.7 of those acres (6.4 ha) occur within 0.25 mi of occupied sites, sites with presence, or roads in unsurveyed

areas.

Critical Habitat

Although this project would not take place in a designated critical habitat unit, individual old growth trees with potential nest platforms are expected to be impacted by project activities. No old growth trees would be removed, but due to removal of protective second growth canopy in or adjacent to residual old growth, some nesting platforms in old growth trees are likely to be exposed, and rendered unsuitable for nesting until the understory canopy re-develops beneath the residual old growth trees. Again, 22.4 ac of suitable nesting habitat could be degraded that meet the definition of marbled murrelet critical habitat primary constituent elements.

c. Direct Injury

The likelihood of direct injury of nesting adult marbled murrelets or chicks by project activities is negligible. Surveys have been or would be completed prior to project activities taking place. In areas with occupied behaviors or other high levels of murrelet activity seasonal restrictions would be required through 15 September to protect nesting birds and chicks.

2. Indirect Effects

Watershed rehabilitation activities proposed by this project could indirectly impact nesting marbled murrelets by creating corvid flight corridors and access to murrelet nest platforms when protective canopy around residual old growth trees is eliminated. Project activities also could indirectly influence corvid behavior and activity when openings are created that cause food-producing shrubs or trees to become established in the vicinity of residual old growth, effectively creating “edge effects” similar to those described in the corvid/nest predation literature. A number of studies in Oregon and Washington (cited in McShane et al. 2004) found Steller’s jays to be most abundant along forest edges bordered by early seral vegetation with berry-producing shrubs. Other studies indicate that the type of edge plays a role in predation rates; rates were lower near feathered edges or natural edges compared to abrupt or suburban edges (McShane et al. 2004). Nelson and Hamer (1995) found that successful murrelet nests were a mean of 545 ft (166 m) and a minimum of 180 ft (55 m) away from a forest edge, defined in their study as “unnatural openings, including...roads and clearcuts”. All nests that failed because of predation were located within 210 ft (64 m) of an edge.

One could argue that in terms of creating optimal Steller’s jay habitat, in the case of the Lost Man Creek project area, the “damage has been done” previously by the road building and logging that occurred prior to the land becoming part of the national park. The project area has all the attributes of high quality Steller’s jay habitat (e.g., logged areas with individual legacy trees and patches of such trees, and openings created by roads and landings). Point count data indicate that Steller’s jays are fairly ubiquitous throughout the project area. However, given the amount of time that has passed since road building ceased, conifers have grown in along many of the roads and landings, filling in gaps in the canopy and shading out understory vegetation that can be primary food sources for Steller’s jays. Re-opening these areas by removing trees from the fill slopes would undoubtedly re-create an edge that could attract Steller’s jays, as well as allow for

high numbers of jays to persist, perhaps for a longer period than otherwise, in the project area.

For these reasons, it was determined that road removal activity in the Lost Man Creek sub-basins would potentially result in additional edge being created along either side of 27.9 mi of roads, landings, skid roads, and stream crossings slated for removal. Based on the best available information and given the type of actions that are proposed, the disturbance polygon of the rehabilitated site plus a 50-m wide buffer adjacent to the edge of the disturbance polygon (“zone of increased predation threat”) was used as the potential area that could attract an increased number of corvids, particularly Steller’s jays, thus increasing the potential for predation on murrelet eggs or chicks to occur. As was done in the habitat degradation analysis, only the residual habitat falling within the ground disturbance polygon and surrounding 50 m wide buffer was included in the calculation of effects. By these methods it was determined a total of 96.5 ac (39.1 ha) of residual habitat could potentially contain increased corvid activity post-project. Of those acres 55.9 (22.6 ha) occur within 0.25 mi of occupied sites, sites with presence, or roads in unsurveyed areas and 30 ac are in contiguous old growth.

C. Fisher

Fishers may be affected by road rehabilitation if they are denning or resting in structures near areas where project activities are taking place. Fishers are known to avoid areas of loud noise and would most likely leave the area to avoid contact with humans. Due to the timing of the proposed action, late in the fisher breeding season when kits would be mobile and traveling among den sites, it is unlikely that females with kits would be adversely impacted by project activities.

D. Cumulative Effects

The action area borders private industrial timber land on its eastern edge along Holter Ridge. Timber harvest has occurred in the recent years on this private land and is likely to occur in the future. Spotted owls and/or marbled murrelets that nest in habitat in the Lost Man Creek watershed near Holter Ridge Road could be subject to increased noise disturbance (helicopter logging has occurred near the ridge top in the past few years), or increased predation threat, or both. Only federal land occurs within the action area.

VIII. DETERMINATION

Based on the nature and timing of the proposed action, it is my determination that Lost Man Creek Erosion Control and Disturbed Land Restoration Plan in RNSP will have the following effects on the threatened and endangered species listed in this document:

This project may affect and is likely to adversely affect the marbled murrelet in occupied or potentially occupied nesting habitat due to habitat degradation of 22.4 acres, the increased threat of corvid predation in 96.5 ac, and noise disturbance in 2.0 acres.

This project may affect, but is not likely to adversely affect the northern spotted owl.

This project may cause disturbance to fishers using the project area for rest sites.

VIII. MANAGEMENT RECOMMENDATIONS

There are no management recommendations.

VIX. CONTRIBUTORS

Greg Gibbs, Geologist, RNSP- Orick

Mike Sanders, Geologist, RNSP- Orick

Terry Spreiter, Geologist, RNSP- Orick

Judy Wartella, GIS Specialist, RNSP- Orick

Neal Youngblood, Geologist, RNSP- Orick

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PERSONAL COMMUNICATIONS

Rick Golightly, Humboldt State University, Wildlife Department

Appendix A. Spotted owl territories that overlap the project area, the roads proposed for removal from each territory and the associated affected acres of suitable habitat for each year of the project. Acres in bold and italic are shared with the adjacent territory.

Lost Man Territory- Acres Affected by Road by Year				
Road	2006	2007	2008	2009
A100 North			0.1	
A100 South		3.3		3.1
A100/A130 Connector			2.3	
A110		0.3		
A120		11.3		
A130	8.1	14.1		
A140				0.9
A200			3.7	
A300				1.4
A350			3.3	
A400			4.7	
No. Branch No. Fork		0.01		
Shangri-La		1.8		
Upper B500			0.02	
Total	8.1	30.8	14.1	5.4

Little Lost Man Territory- Acres Affected by Road by Year				
Road	2006	2007	2008	2009
A100 South		4.8	15.9	3.1
A100/A130 Connector			2.8	
A130	8.1	11.7		
A140		3.0		4.7
A141				2.5
A142		8.2		
A150			4.9	
A160			4.6	2.4
Total	8.1	27.7	28.2	12.7

Appendix A continued

South Fork Little Lost Man Territory- Acres Affected by Road by Year				
Road	2006	2007	2008	2009
A100 South		4.7		
A140	1.5			
A100/A140 Connector				1.2
A150			3.1	
A160		1.0	6.9	4.4
A170				1.9
Total	1.5	5.7	10.0	7.5