

AMENDMENT to
Northern Spotted Owl (NSO)
2019 Nesting Season Monitoring Report
Project #716001: McKay Community Forest

Submitted to:

Humboldt County Public Works Department
Environmental Services Division
Hank Seemann, Deputy Director
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December 20, 2019



This document hereby amends the McKay Community Forest's 2019 Northern Spotted Owl (*Strix occidentalis caurina*) Nesting Season Monitoring Report, as well as survey summary reports from 2017 and 2018, all prepared for the Humboldt County Public Works Department. The original document titled **"Northern Spotted Owl (NSO) 2019 Nesting Season Monitoring Report Project #716001: McKay Community Forest"**, submitted to the Humboldt County Public Works Department on September 9, 2019 contained detailed maps and habitat descriptions created with incorrect McKay Community Forest (MCF) property boundaries. Upon entering into a work agreement with NRM, hereafter referred to as "CONSULTANT", to provide Northern Spotted Owl (NSO) surveying and consulting services on March 17, 2017, the Humboldt County Public Works Department, hereafter referred to as "THE COUNTY" provided NRM with the aforementioned property boundary data in the form of geographic information system, or GIS, shapefiles. Additional information, including accurate property boundary GIS shapefiles were provided to the consultant on October 18, 2019. All data presented in this amendment have been updated to include accurate property boundaries for MCF, as verified by Senior Environmental Analyst Robert Vogt. Points from the original document that are to be amended include all survey and habitat maps (AMENDED Figures 1-14), habitat protection zones (AMENDED Figures 15-22) and acreage totals (AMENDED Table 2), as well as habitat protection zone descriptions detailed in the 'Habitat Considerations' section for Activity Centers HUM0063, HUM1091 and HUM1018.

In addition to this year's survey data, figures 23-28 show AMENDED maps for detections from the 2017 and 2018 seasons. Figures 29 and 30 show all detections from years 2017, 2018 and 2019 compiled.

A section in the northern-most portion of MCF was previously unmapped. This portion of MCF is made up of approximately 58 percent marginal, edge-coastal-forest habitat type, and approximately 42 percent of a complex mosaic of coastal, marine and freshwater wetland. Figures 1a and 1b show the detailed convergence between these habitat types that occur within the MCF boundaries. NSO habitat is generally marked by mature and old-growth forests which contain the structures and characteristics required for nesting, roosting, and foraging, such as high canopy closure, and a multi-layered tree and forest vegetation species composition. Approximately 63 acres of the forest habitat within the northern portion of MCF occurs in the immediate vicinity of Redwood Acres Fairgrounds, the site of multiple commercial and private businesses, and a community events venue located in the town of Eureka, CA. Because of its proximity to the fairgrounds, and the amount of none-suitable NSO habitat within the northern portions of MCF (i.e., wetlands) additional survey coverage for this area is not thought to be necessary.

Amended habitat retention calculations and subsequent protection determinations remain relatively unchanged. The same five NSO Activity Centers (ACs) that fell within the past property boundary buffer still fall within the updated 0.70-mile habitat retention buffer around MCF; those five ACs are HUM0063, HUM1091, HUM1018, HUM0921 and HUM0949 (AMENDED Figures 1 and 2). Of these five ACs, three contain pertinent disturbance restriction zones which fall within MCF boundaries; those three ACs are HUM0063, HUM1018, and HUM0921 (AMENDED Figures 3 and 4). Habitat typing for each AC remains unchanged and AMENDED maps for them can be found in AMENDED Figures 7-15. Habitat protection zones remain unchanged for ACs HUM1091 and HUM1018 as the sections of the MCF border with which they intersect were mapped correctly in the original document; habitat protection zones for HUM0063

deviated slightly from those mapped in the original document when the MCF boundary was adjusted for this amendment. AMENDED total and respective habitat protection zones have been mapped in Figures 16-24. Subsequent habitat calculations were adjusted to reflect the accurate intersections with MCF, resulting in slight changes in the reported acreage totals. These totals can be found in the AMENDED Table 2, below. Updated detection maps with the correct MCF boundaries can also be found below (AMENDED Figures 5 and 6).

As reported in the original document, survey efforts for MCF were coordinated between the consultant and Green Diamond Resource Company (GDRC) to provide sufficient survey coverage within 0.70-miles of MCF boundaries. Updated call station maps with NRM's and GRDRC's respective survey coverage of MCF are shown in AMENDED Figures 1 and 2.

It is still recommended that the management of all existing NSO habitat occurring within and adjacent to MCF be coordinated with neighboring landowners, including GDRC, to optimize habitat quality and accurately develop long term harvest goals. For the 2020 breeding season, timber harvest operations can occur once a minimum of 3 spot check surveys, including AC stand searches of those ACs within 0.25 miles of timber operations, have been completed. AMENDED Figures 15-22, along with acreage calculations from AMENDED Table 2 can be used to provide guidance during timber harvest activities.

Attached in this Amendment is the referenced 'Attachment A' document, a copy of the *Revised 2012 Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls* (Appendix A), and all 2019 survey data, including the consultants and those obtained by GDRC (Appendix B and Appendix C).

AMENDED Table 2. Respective Distances and Habitat Acreage Totals

NSO Activity Centers	Respective Distance to MCF from AC Center (ft)	Habitat Acreage within MCF Boundaries			Total Habitat Acreage within AC 0.7-mile Buffer	
		Core Area	Nest/ Roost	Forage	Nest/ Roost	Forage
HUM0063	0 (AC is within MCF boundaries)	79	421	0	759	89
HUM1091	41	60	297	73	589	358
HUM1018	592	19	160	0	712	259

The following text is to hereby amend the '*Habitat Considerations*' section of the original document and provide, in detail, habitat descriptions and related restrictions on timber harvest activities, should they exist, as considered in Attachment A (Appendix A).

AMENDMENT to Habitat Considerations

1. HUM0063

To illustrate, when comparing habitat acreage values (AMENDED Table 2) to the HUM0063 habitat maps, 79 acres of the 100-acre core area (AMENDED Figures 9 and 10) occur within the MCF boundary, with the remaining 21 acres outside of the MCF boundary in the Ridgewood Heights area; approximately 6 acres of this land is owned and managed by GDRC, the remainder is residential and otherwise under unknown ownership. These 21 acres were mapped as core use areas based on NSO response data from the 2019 season. Because these 21 acres are not under the management of MCF, the management of this habitat must be coordinated with GDRC, the nearest known stakeholder, or set aside within MCF boundaries. It is noted that this portion of the core area is only 21 acres, a small amount in comparison to the 421 acres of nest/roost habitat available within the MCF boundaries. Should these 21 acres be degraded to the point that they no longer fulfill the characteristics of nest/roost habitat they can theoretically still be available within the 421 acres available in MCF.

As discussed in Attachment A (Appendix A), a minimum of 500 acres surrounding each known AC are to be retained as suitable NSO habitat. Two-hundred acres of this 500-acre minimum are to be retained as nest/roost habitat, a defined category of NSO habitat marked by high canopy closure, a multi-layered, multispecies canopy with large overstory trees and a presence of broken-topped trees or other nesting platforms (Appendix A, Appendix A) Of this 200-acre nest/roost habitat minimum at least 100 acres are to be contiguous, if possible, with the AC, and is hereafter known as the "core use area" (Attachment A, Appendix A)

Consequently, 100 acres of the 421 acres of nest/roost habitat available within MCF boundaries must be retained as such as to ensure the 100-acre core stipulation remains intact, and as contiguous with the AC as possible. In addition, the habitat available must be managed in coordination with GDRC as to not reduce the current nest/roost habitat quantities to below 200 acres total within the 0.7-mile buffer.

The remaining 300 acres of the 500-acre minimum are to be retained at forage quality habitat, at minimum. Currently, there are 89 acres of forage within the home range of HUM0063. Once 200 acres of nesting/roosting acres are determined, the remaining acreage of this habitat type on MCF is available to convert to forage. For more specific details on acreage retention requirements please see Attachment A in Appendix A of this document.

2. HUM1091

For HUM1091, approximately 60 acres of the 100-acre core area (AMENDED Figures 11 and 12) are within the MCF boundary, the remaining 40 acres are on GDRC land. In total, there are 589 acres of nest/roost habitat currently available within the 0.70-mile buffer for HUM1091, of which 297 acres are within MCF boundaries. The remaining 292 acres of nest/roost habitat are on GDRC land. Of the total nest/roost habitat available, (excluding that which has been delineated as part of the 100-acre core area) 100 acres need to remain as nest/roost habitat to meet the 200-acre minimum. The remaining 300 acres of the 500-acre minimum are to be retained as forage habitat, at minimum. Currently, there are 358 acres of forage within the 0.70-mile buffer for HUM1091, approximately 20 percent of it (73 acres) are within the MCF boundary.

3. HUM1018

Approximately 25 percent of the habitat within 0.70-mile buffer around HUM1018 occurs within the MCF boundary, including 19 acres of core habitat in the northern portion. Only 22 percent of nest/roost habitat (160 of 712 acres), and no foraging habitat, for this AC occur within MCF boundaries. Coordination with GDRC must ensure that the remaining 81 acres of required core nest/roost habitat on GDRC land is retained, and that at least 100 acres of the 712 acres of nest/roost habitat within the 0.7-mile buffer around the AC remains as such (AMENDED Figures 13 and 14). No foraging habitat is present within the MCF boundary for this AC, therefore some conversion of the 160 acres of nest/roost habitat may occur as long as coordination with GDRC results in the retention of the minimum habitat requirements for this AC.

Citations

Forsman, E.D. and 26 others. 2011. Population demography of northern spotted owls. *Studies in Avian Biology* 40:1-106.

U. S. Fish and Wildlife Service (USFWS). 2019. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. <http://www.fws.gov/wetlands/>

U.S. Fish and Wildlife Service-Arcata Office [AFWO], 2011. Northern Spotted Owl Take Avoidance Analysis and Guidance for California Coast Forest District (“Attachment A”). P. 1, 4-9

U.S. Fish and Wildlife Service, 2012. Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls. P. 7, 26-27

U.S. Fish and Wildlife Service. 2011. Revised Recovery Plan for the Northern Spotted Owl (*Strix occidentalis caurina*). U.S. Fish and Wildlife Service, Portland, Oregon. xvi + 258 pp. <http://www.fws.gov/species/nso>

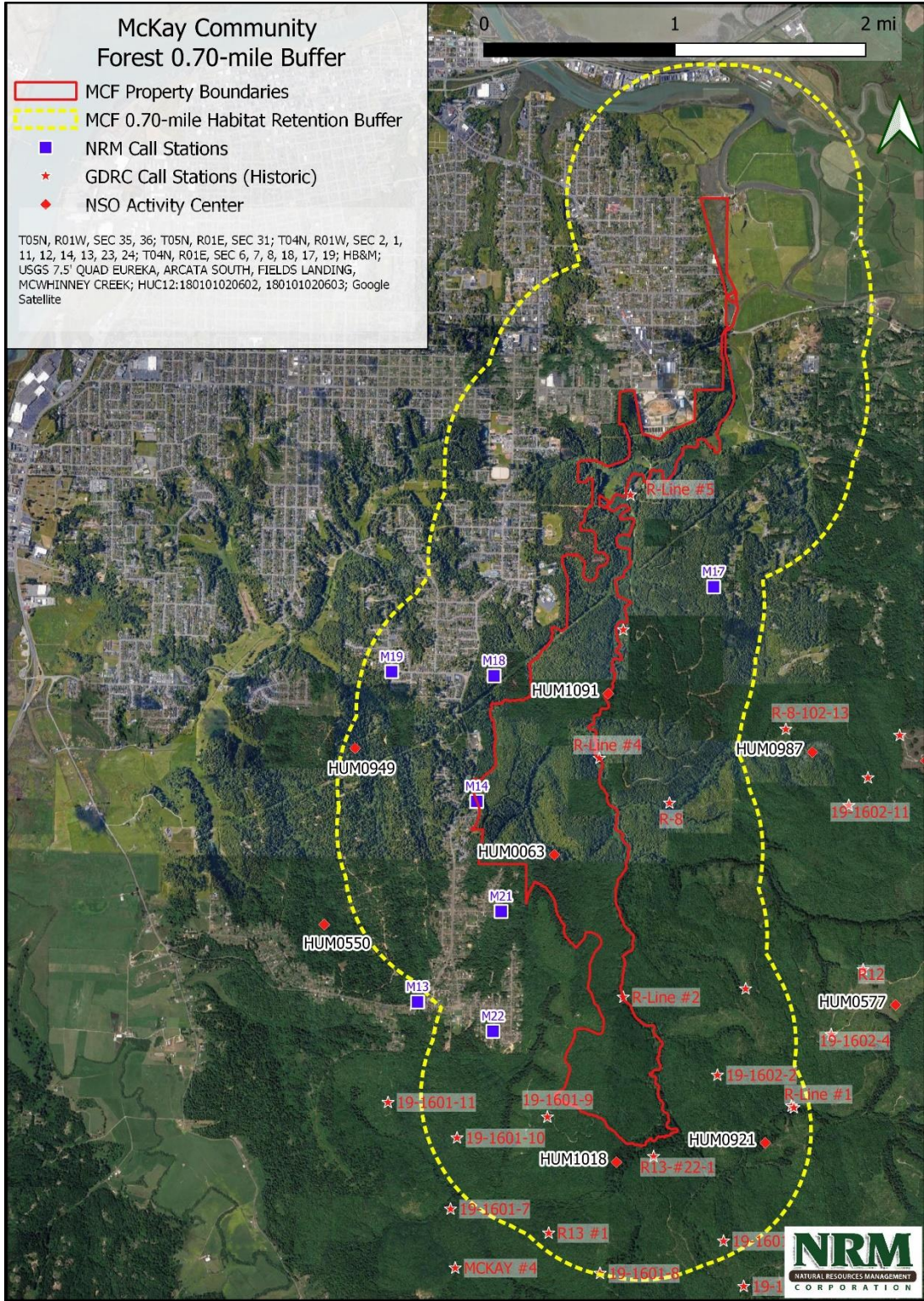


Figure 1. AMENDED 2019 MCF Call Station Map

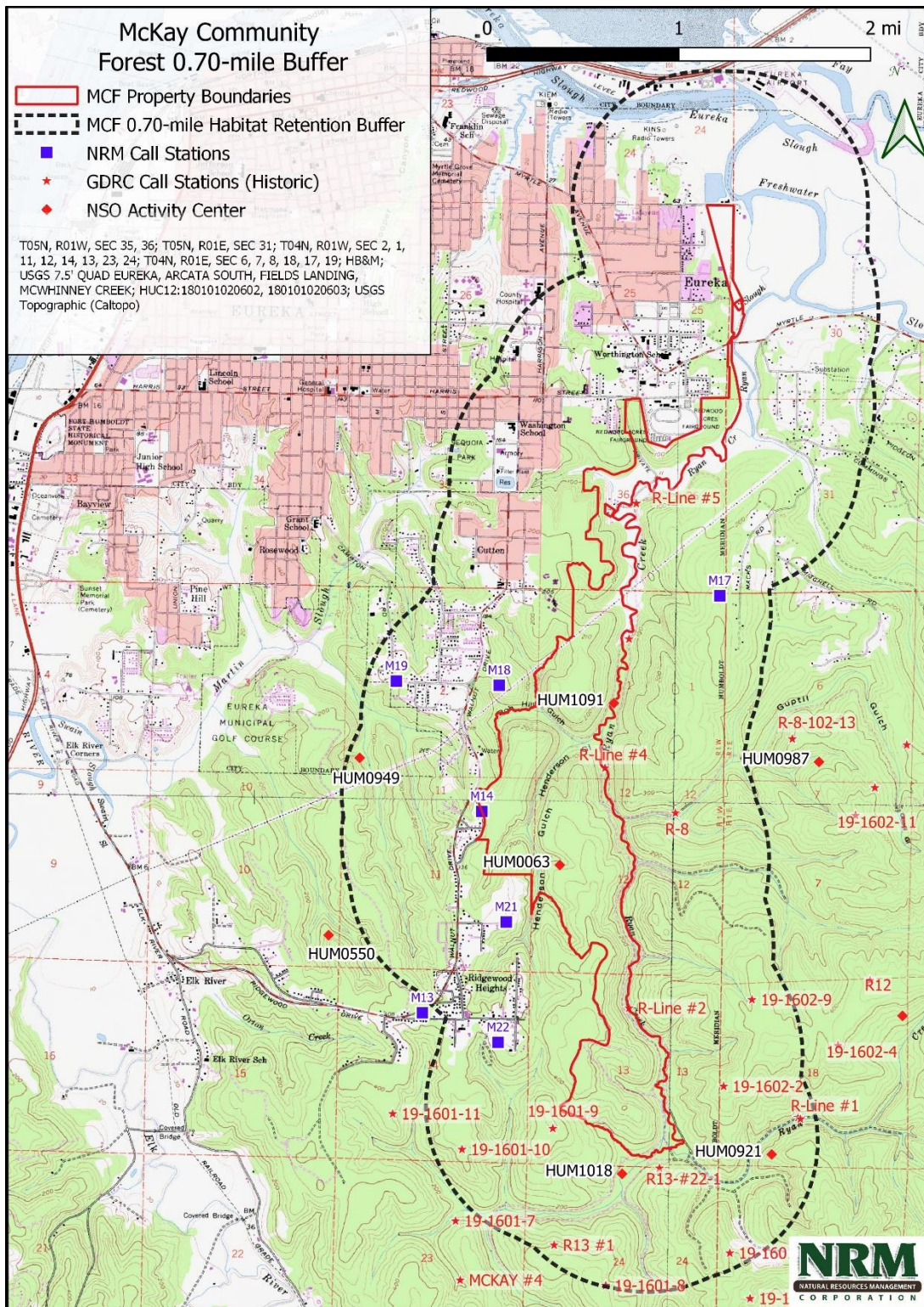


Figure 2. AMENDED 2019 MCF Call Station Map

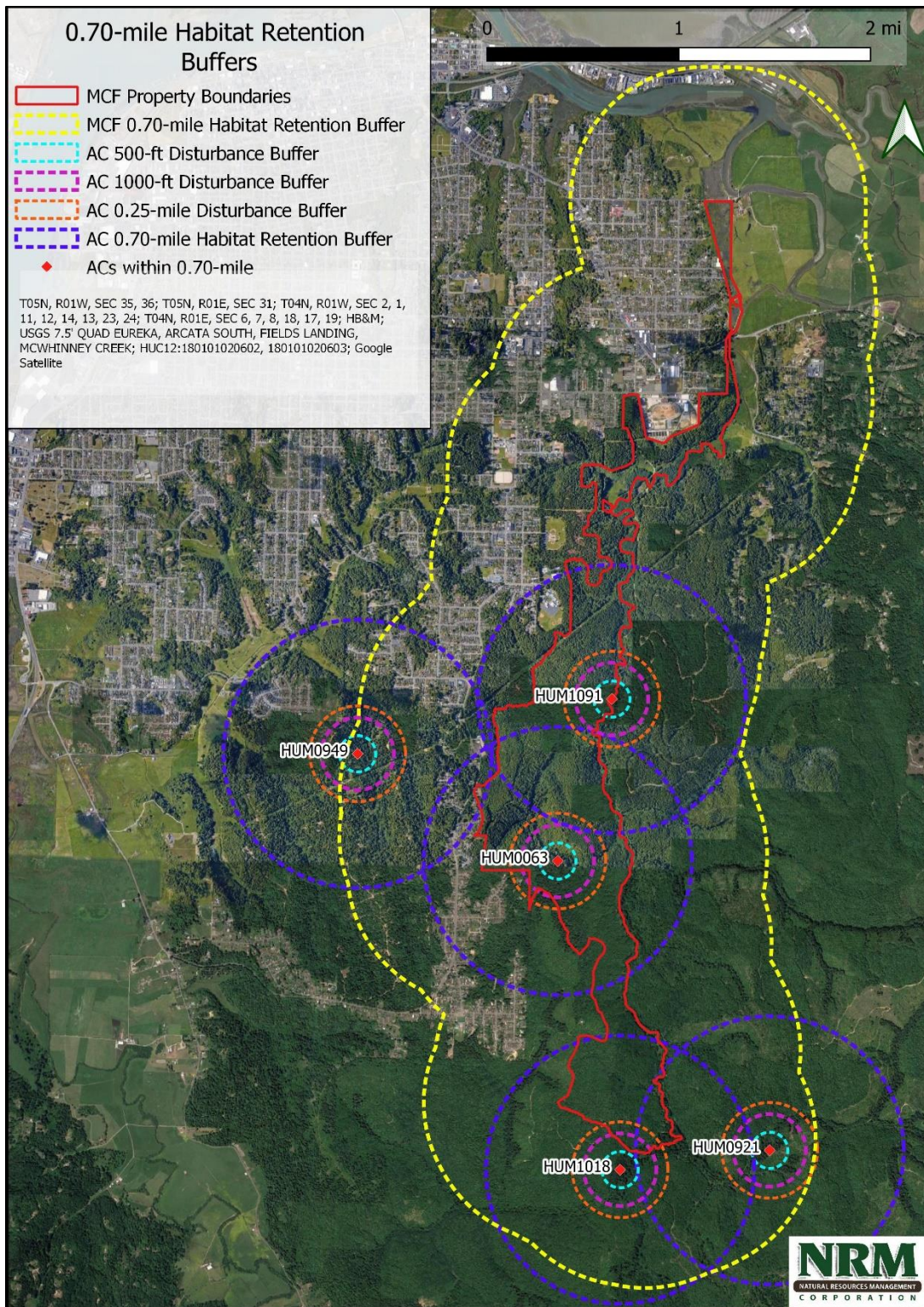


Figure 3. Habitat Retention Buffers

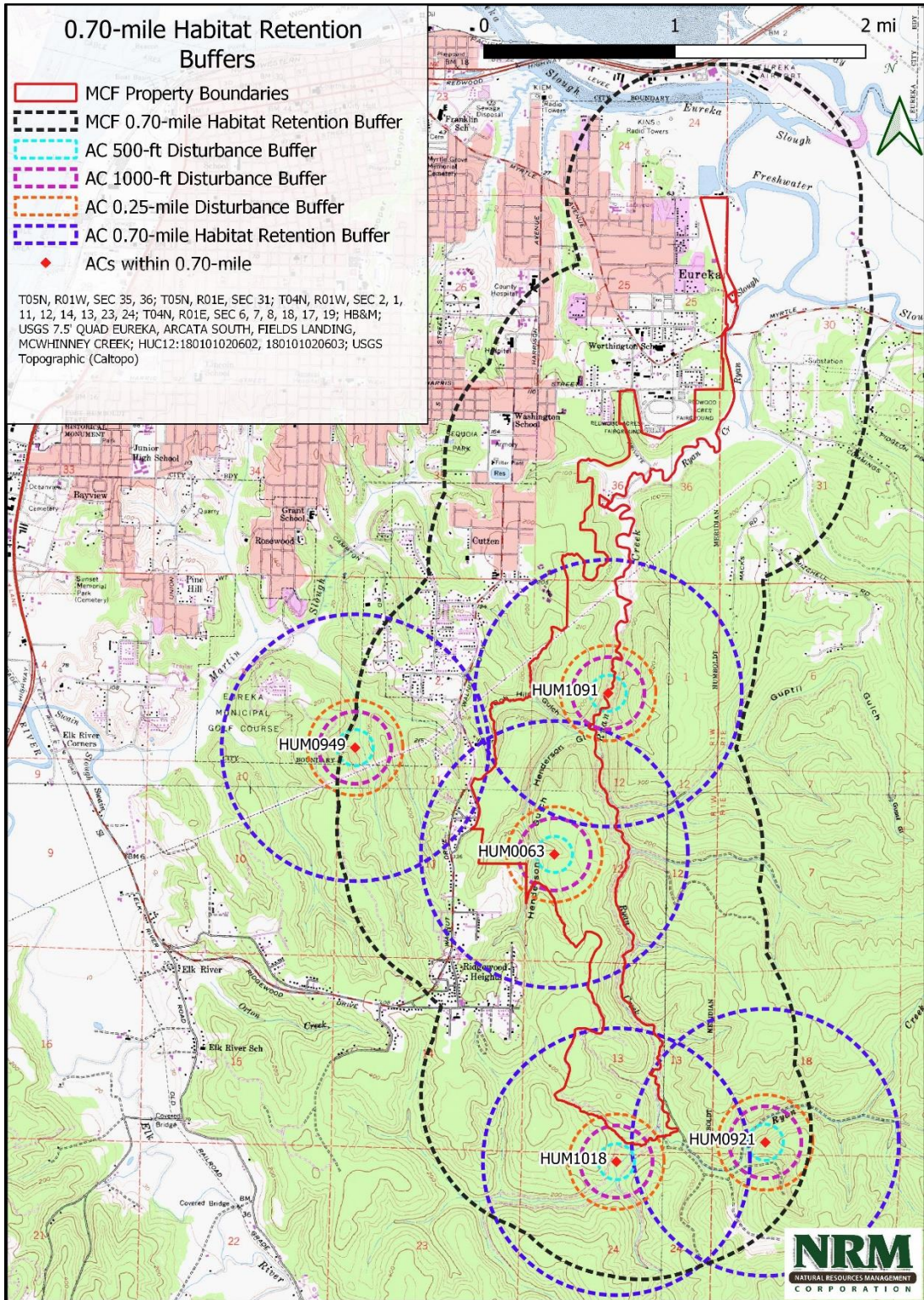


Figure 4. Habitat Retention Buffers

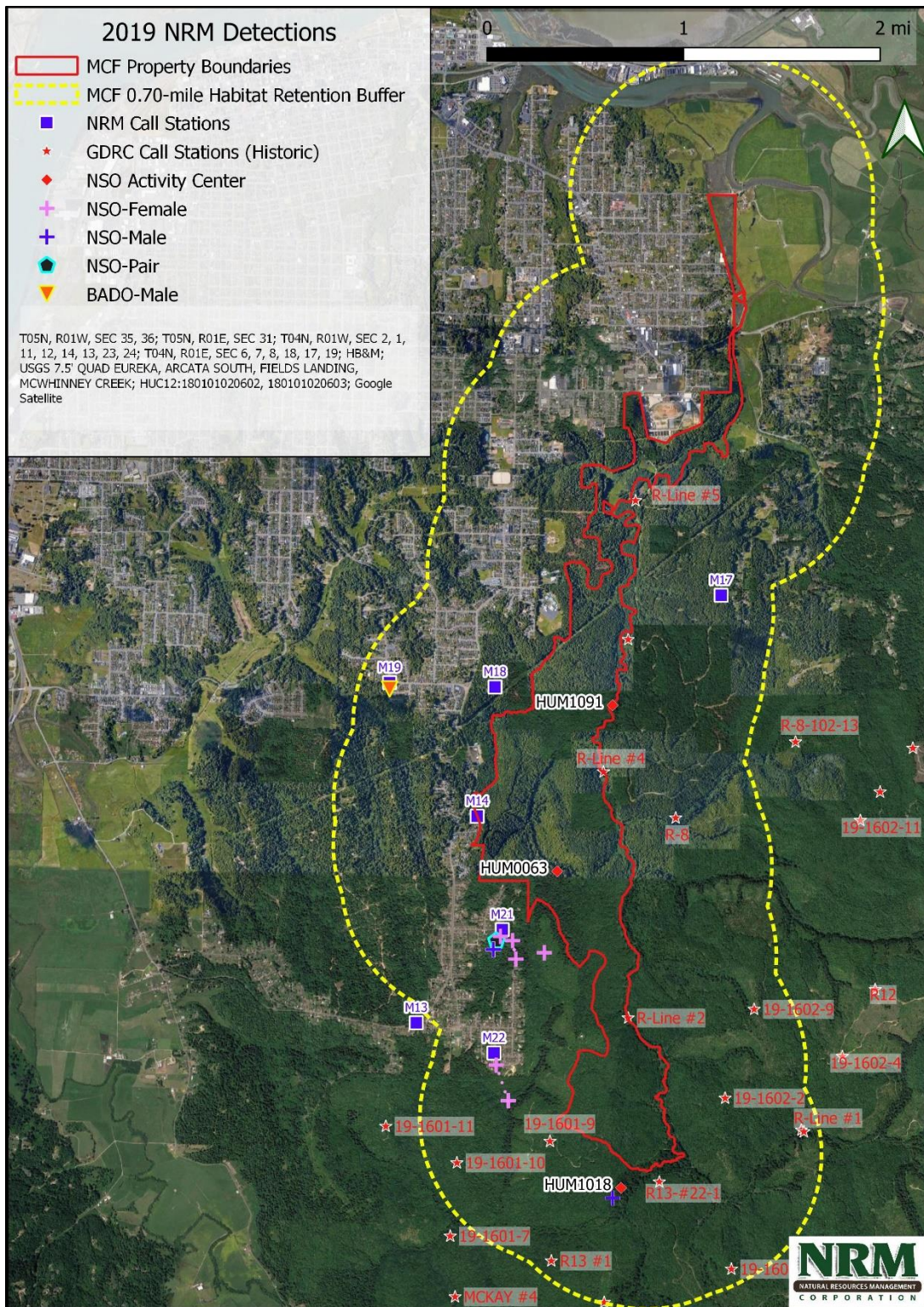


Figure 5. 2019 NRM Detections Map

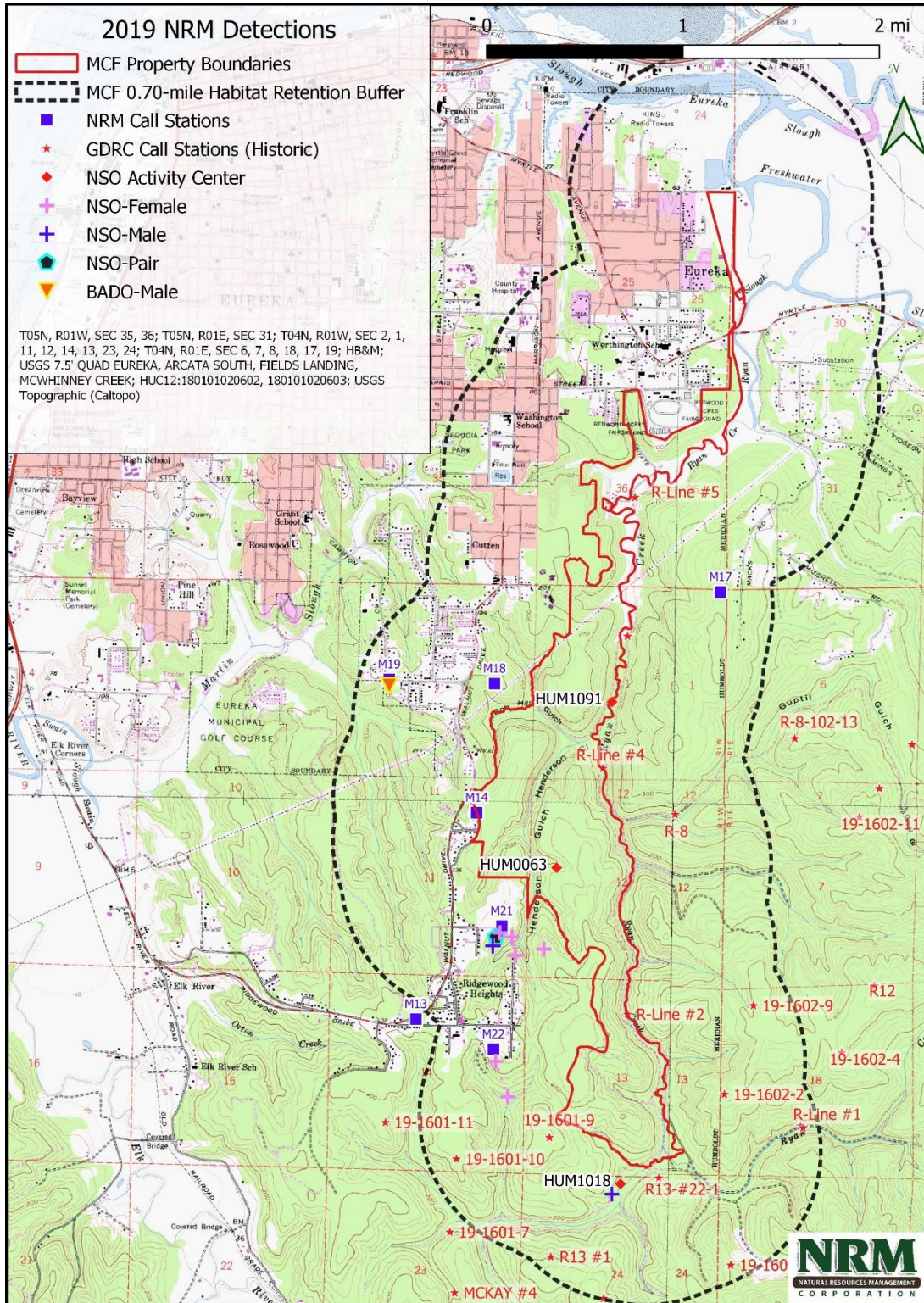


Figure 6. 2019 NRM Detections Map

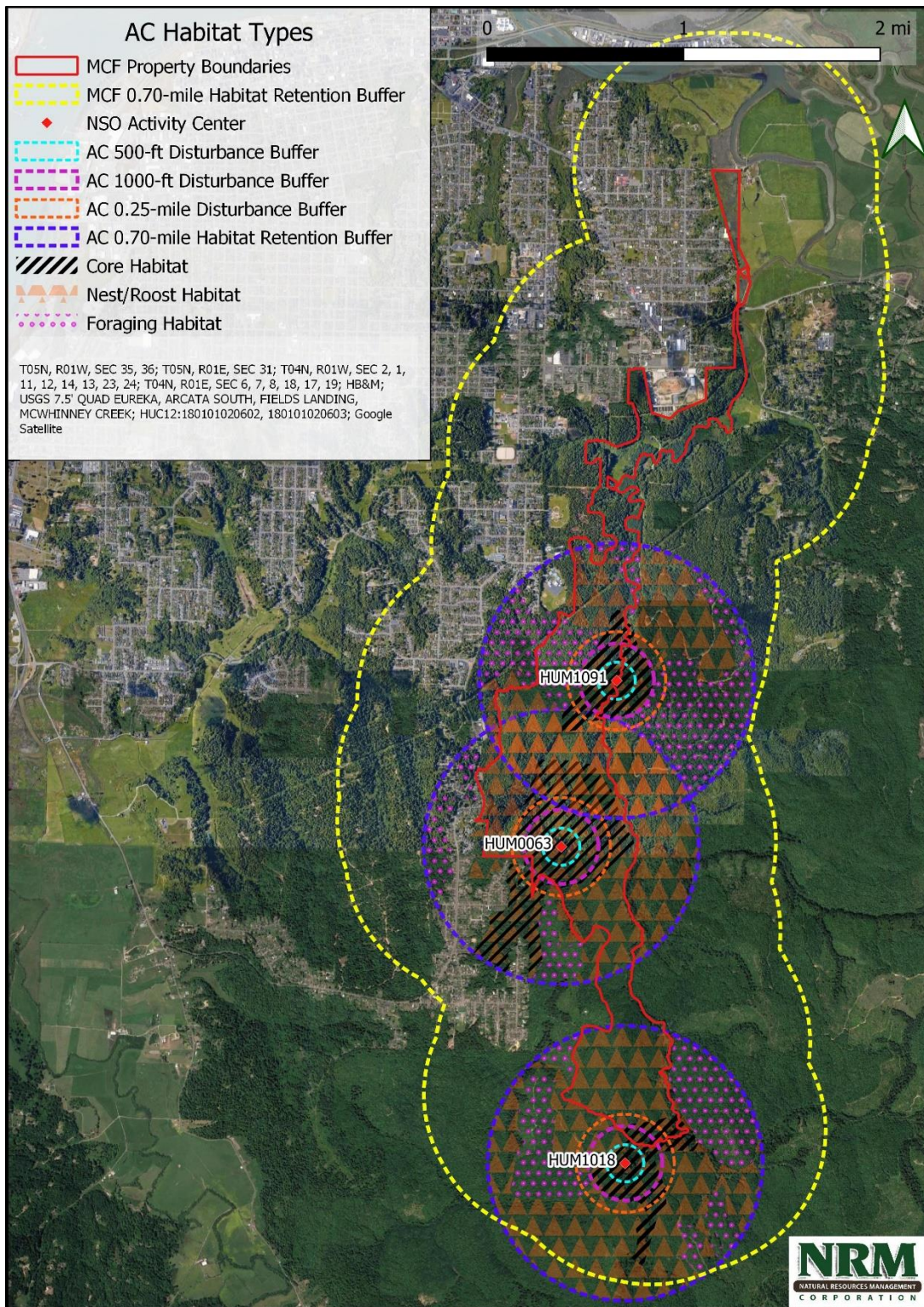


Figure 7. AC Habitat Types

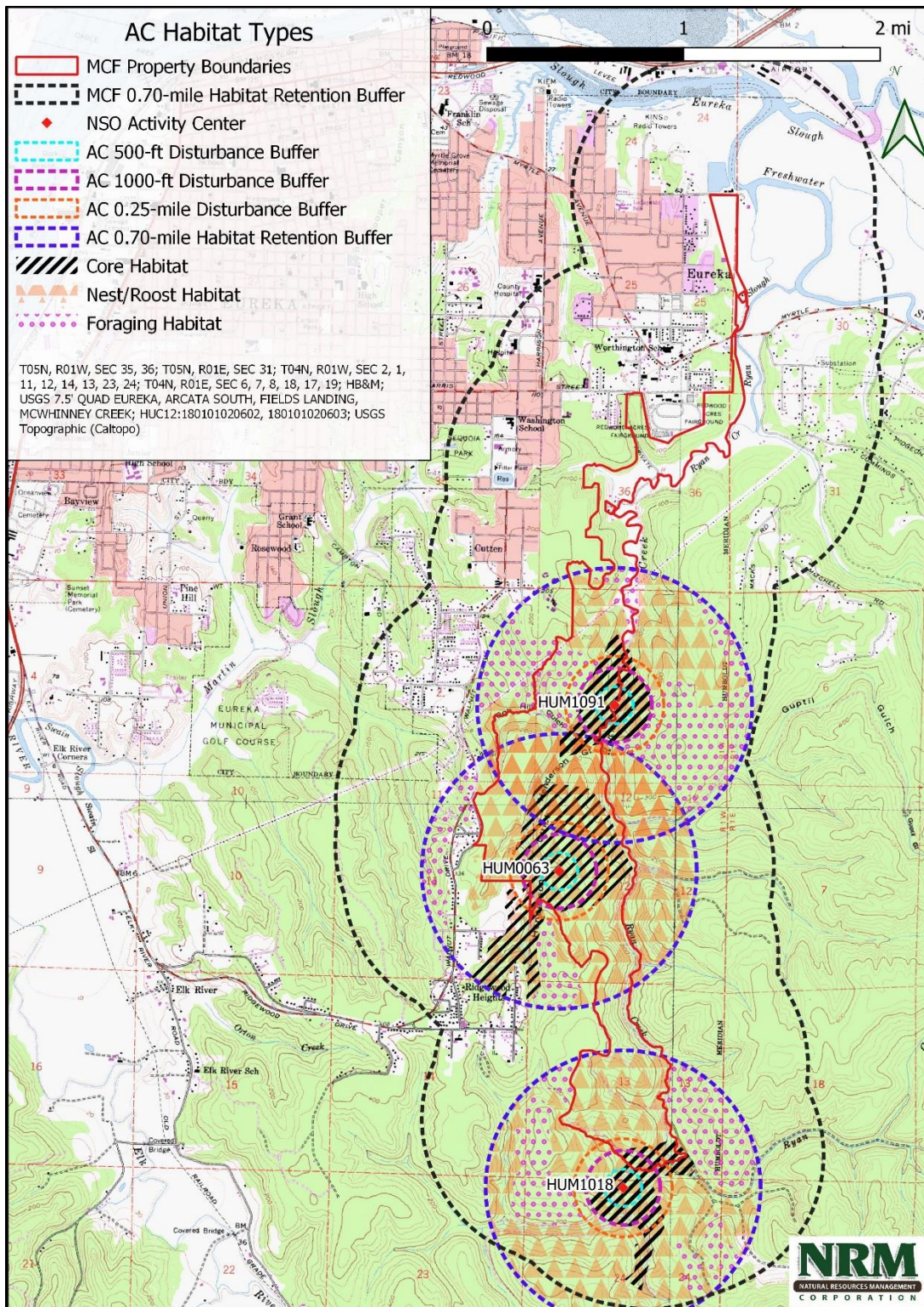


Figure 8. AC Habitat Types

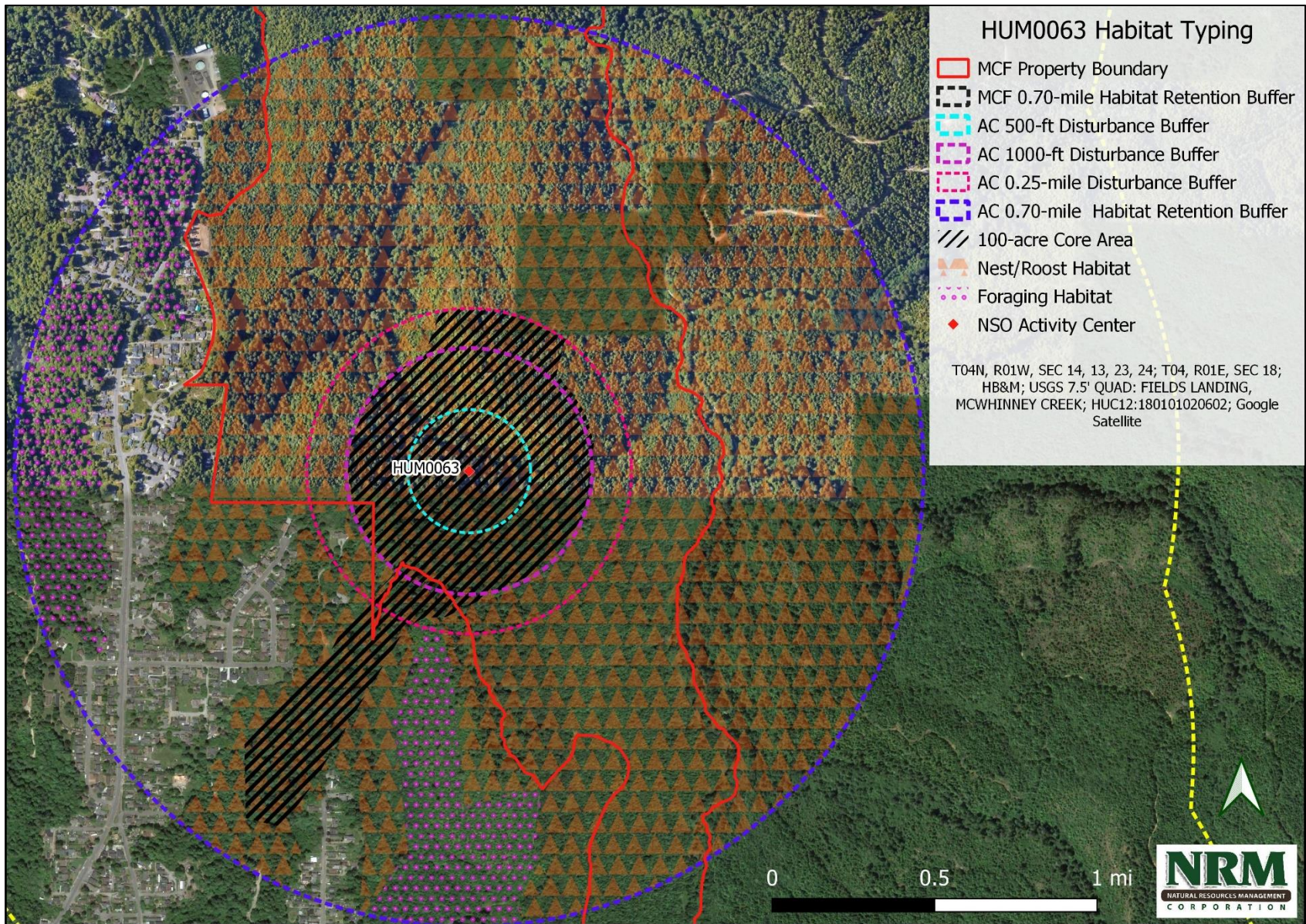


Figure 9. HUM0063 Habitat Types

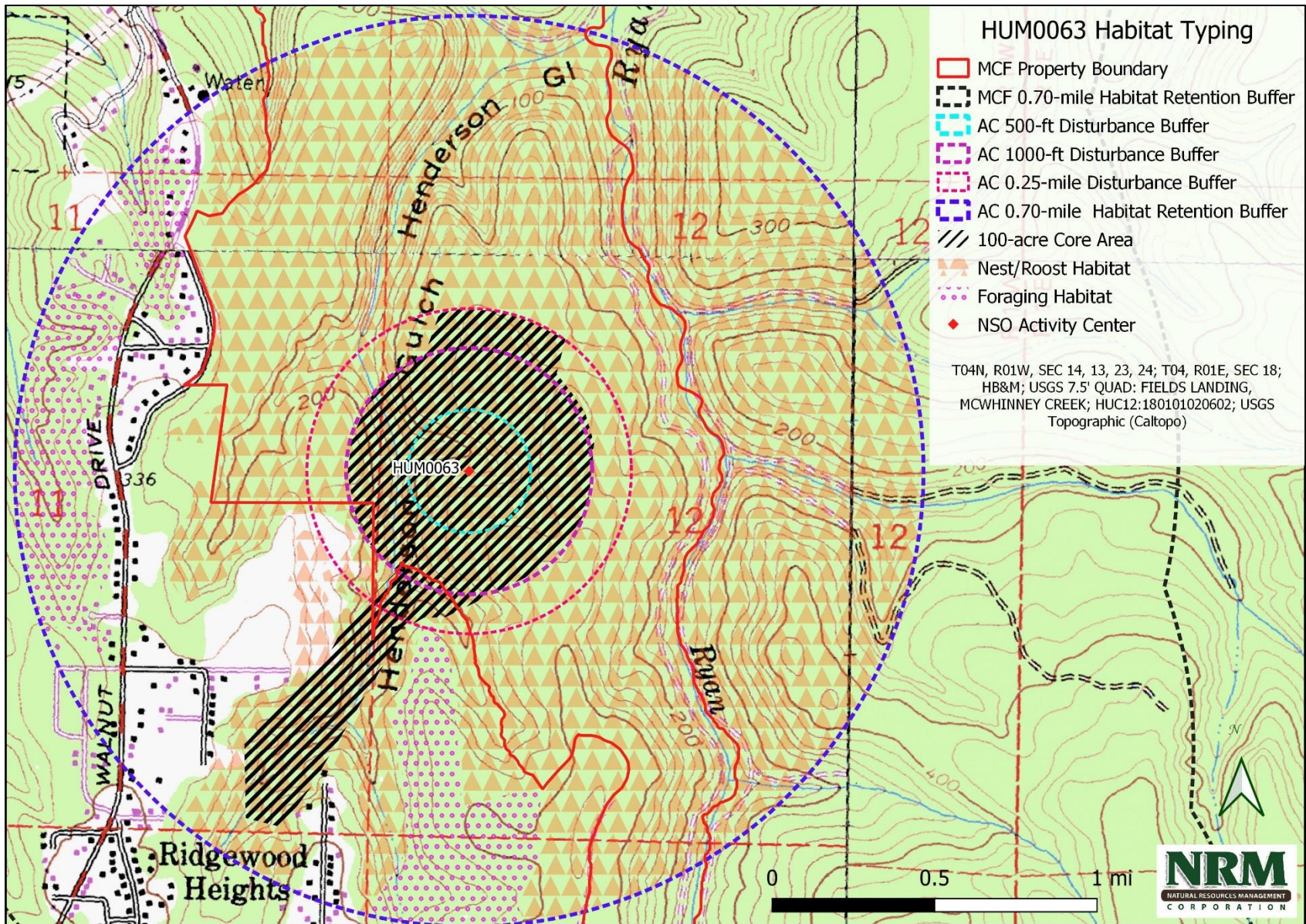


Figure 10. HUM0063 Habitat Types

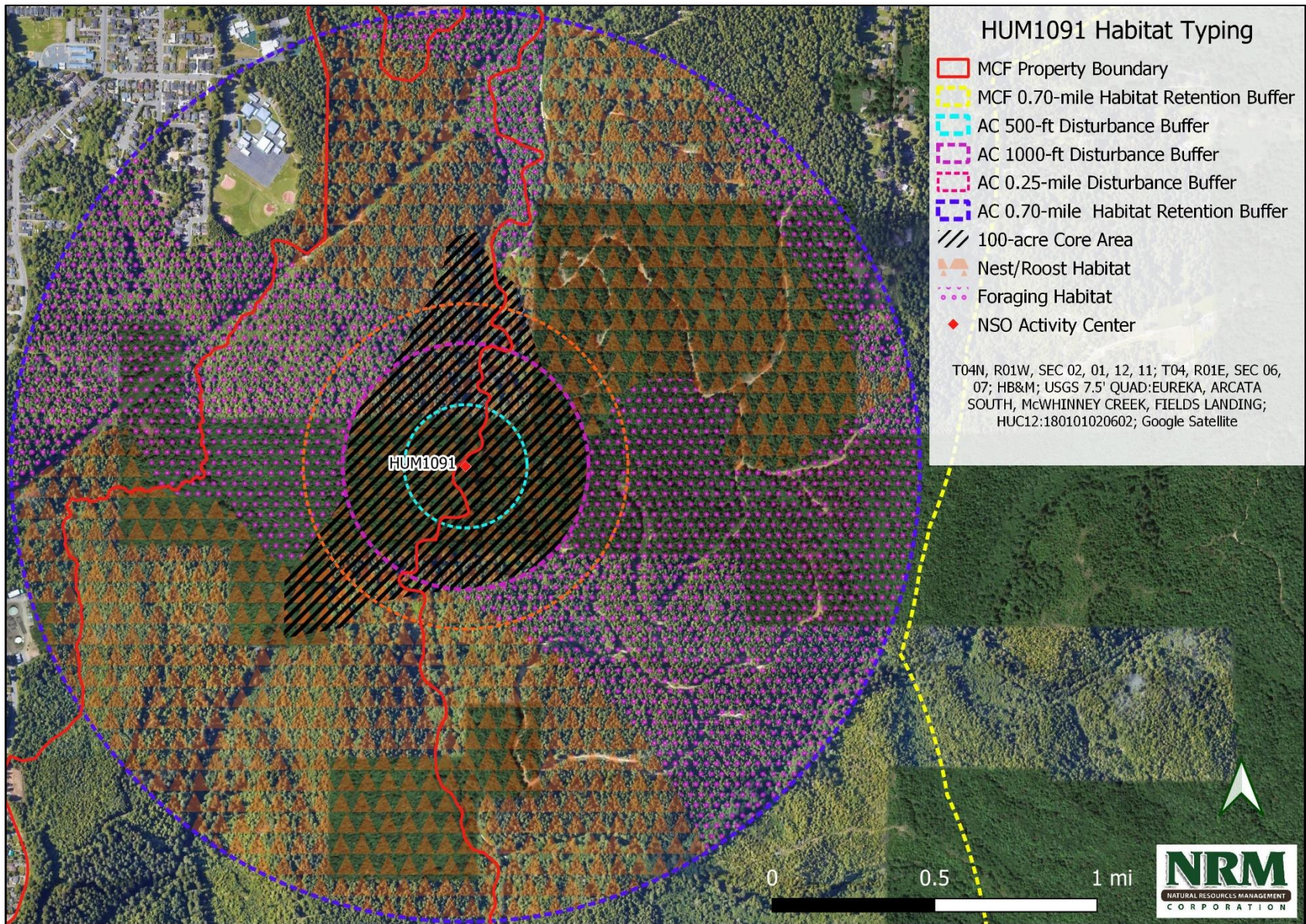


Figure 11. HUM1091 Habitat Types

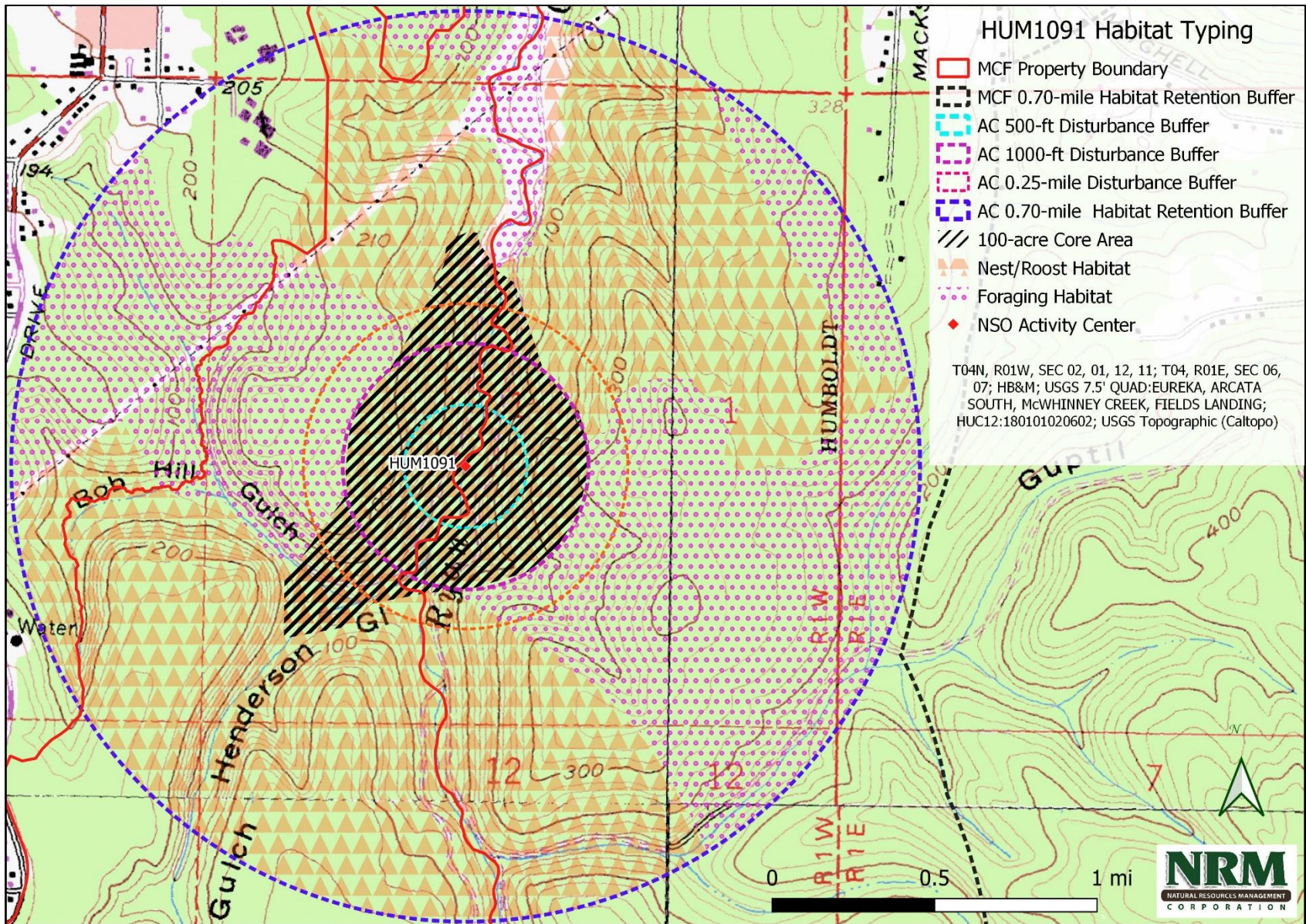


Figure 12. HUM1091 Habitat Types

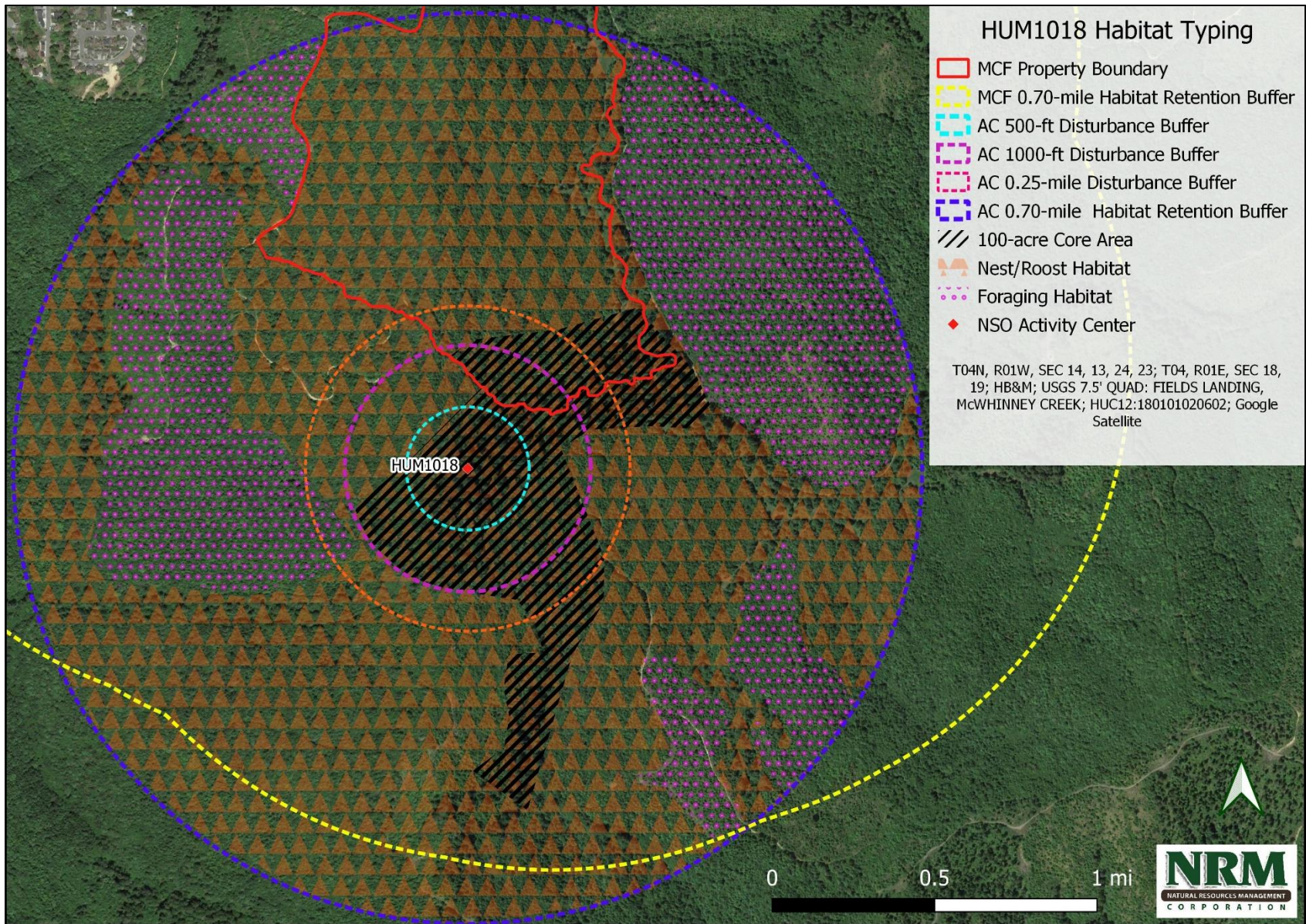


Figure 13. HUM1018 Habitat Types

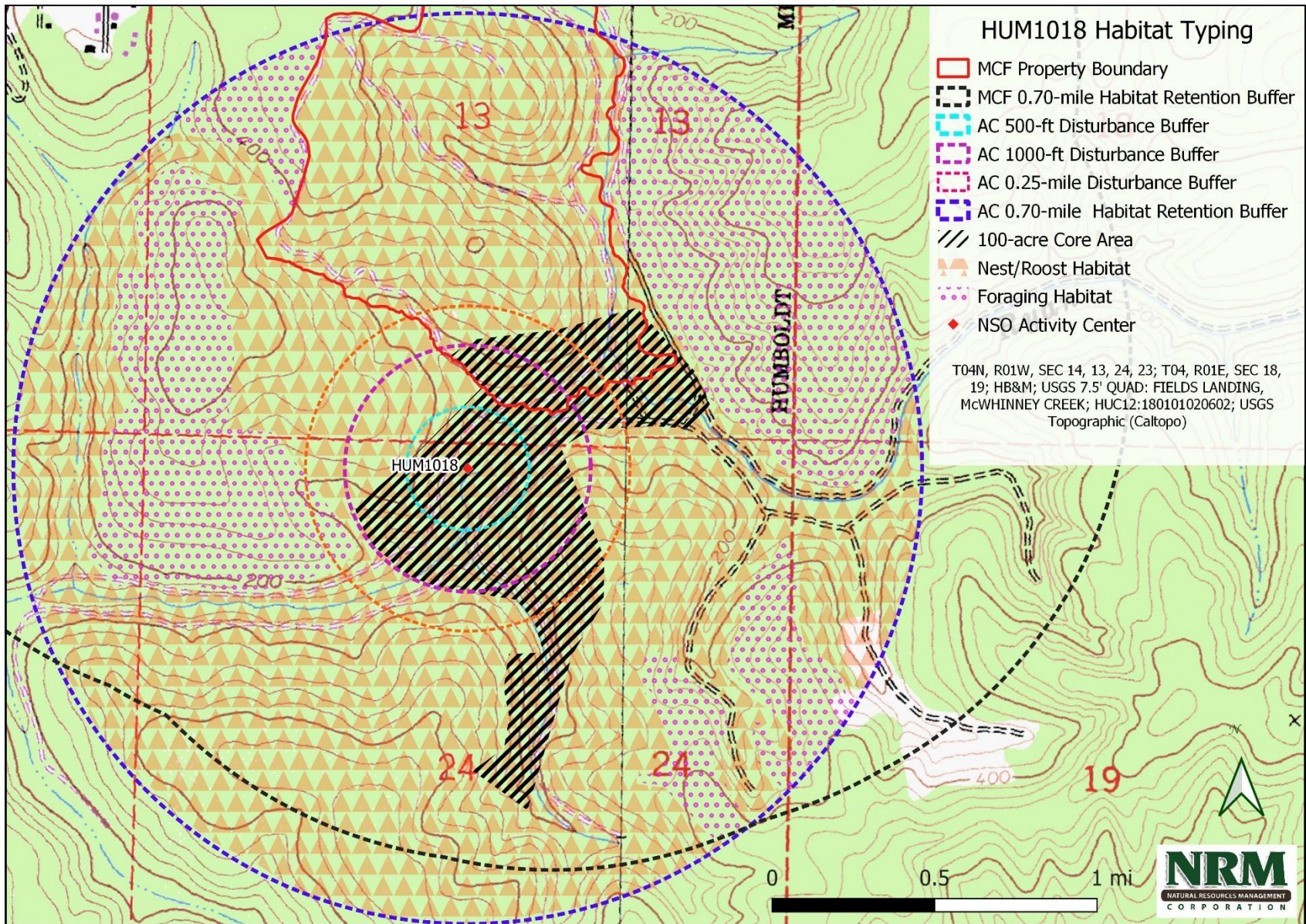


Figure 14. HUM1018 Habitat Types

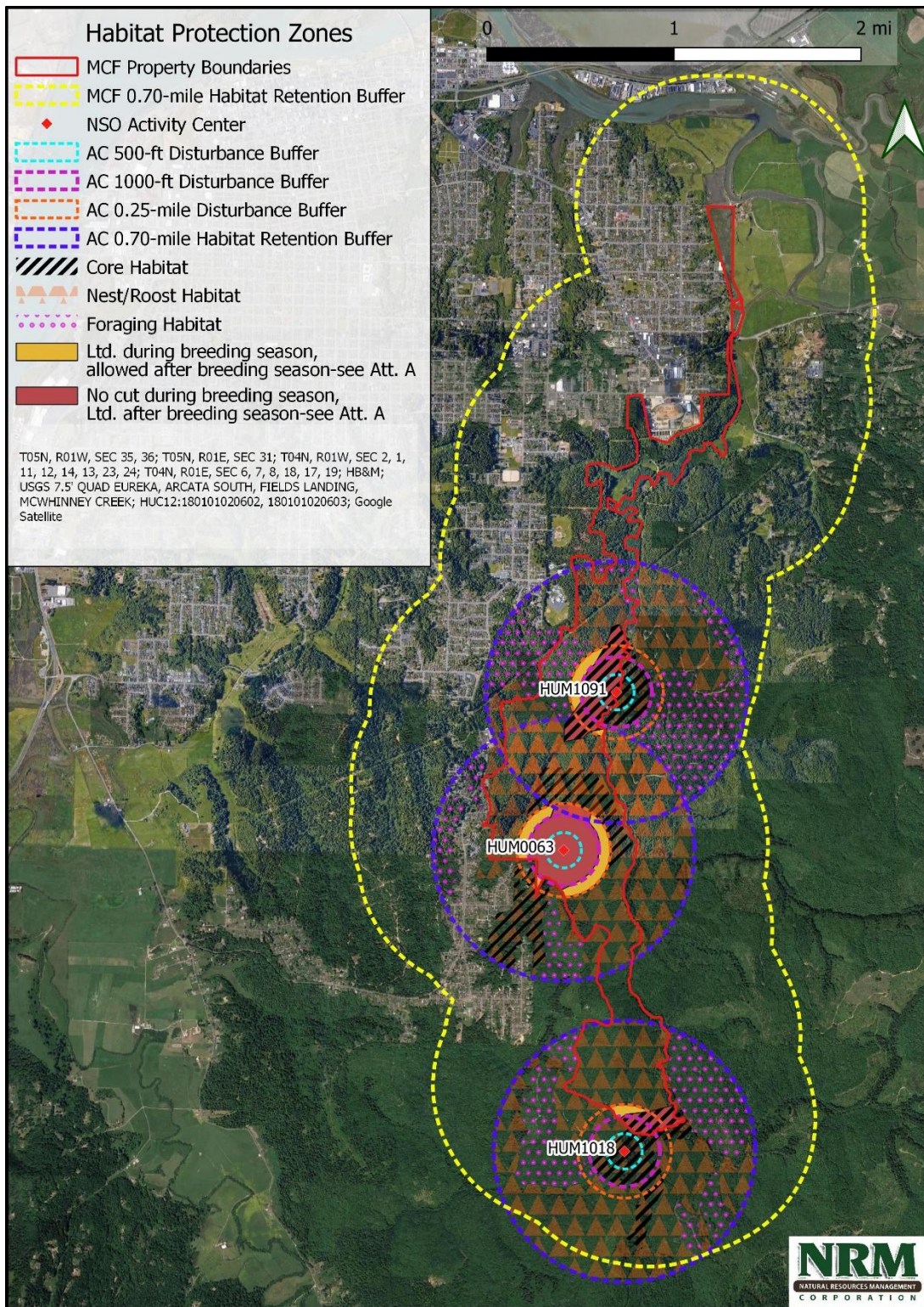


Figure 15. Habitat Protection Zones

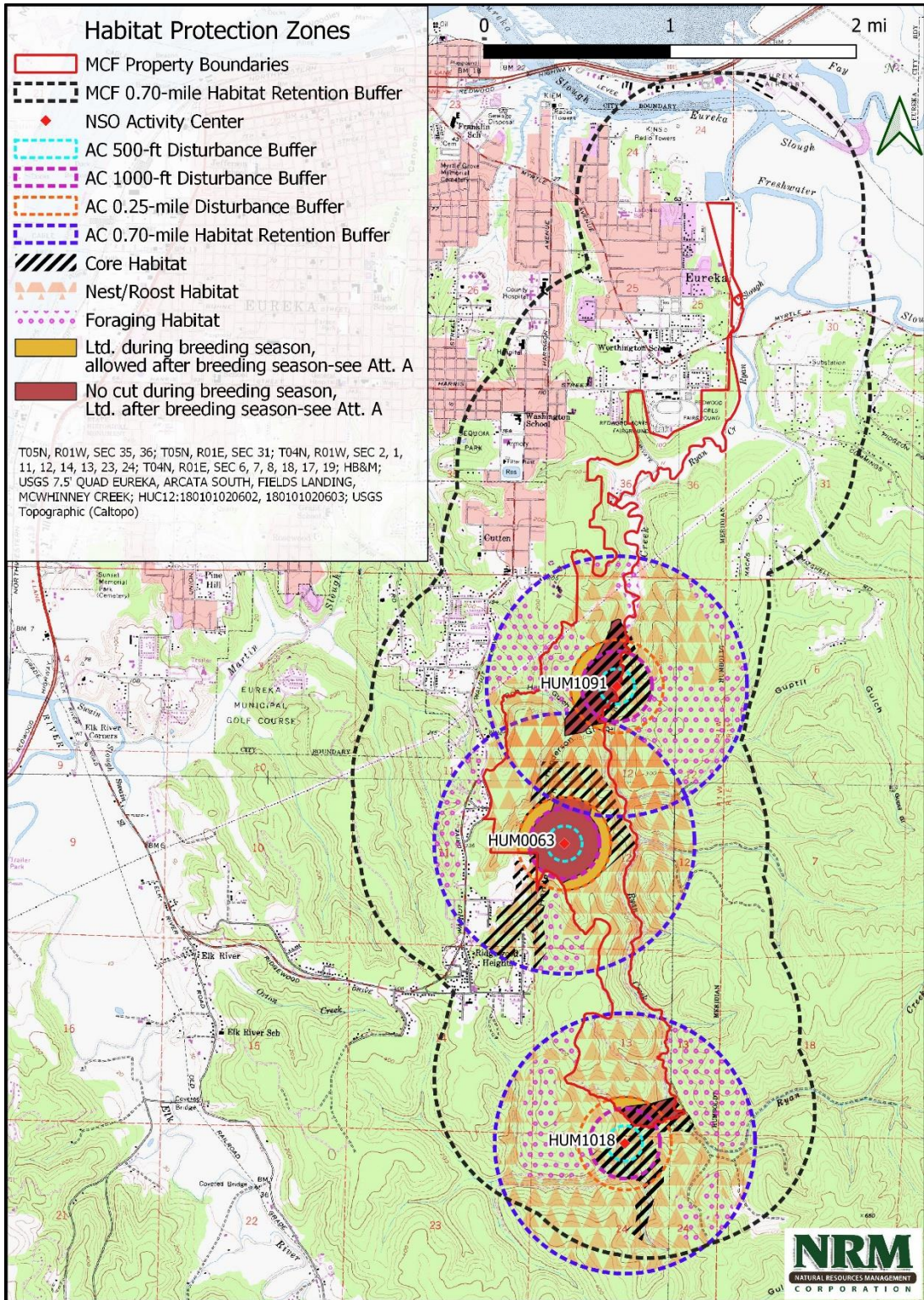


Figure 16. Habitat Protection Zones

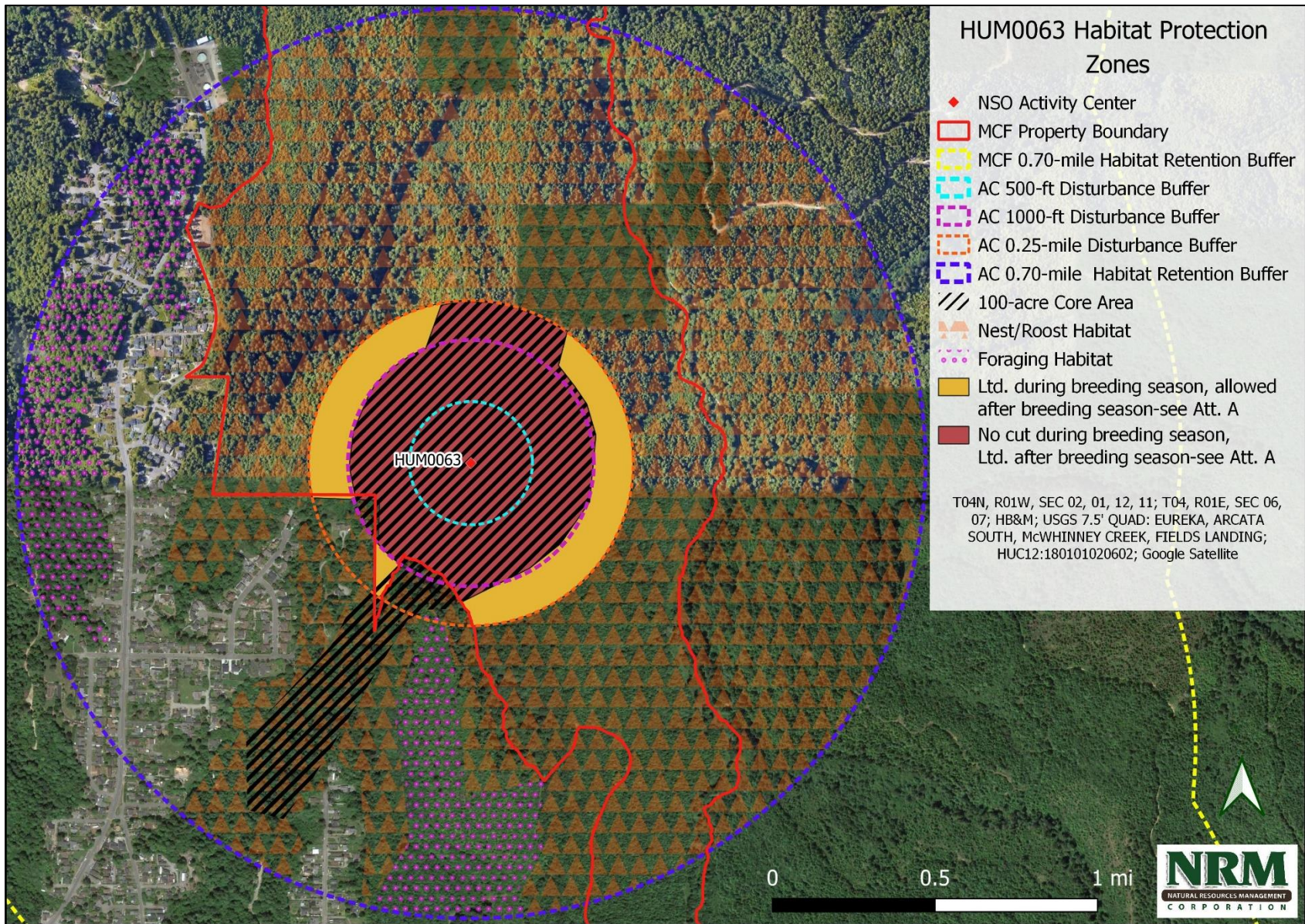


Figure 17. HUM0063 Habitat Protection Zones

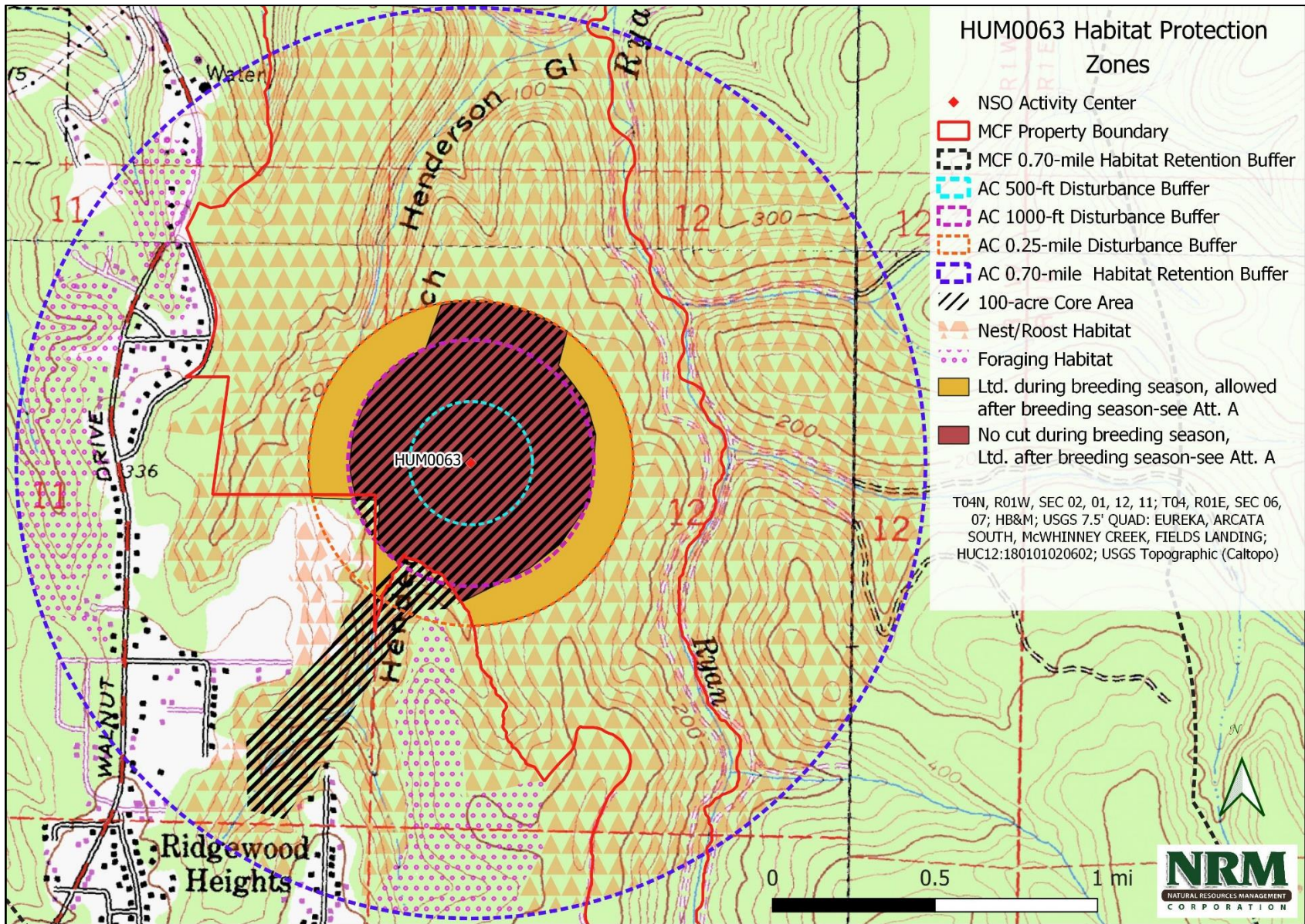


Figure 18. HUM0063 Habitat Protection Zones

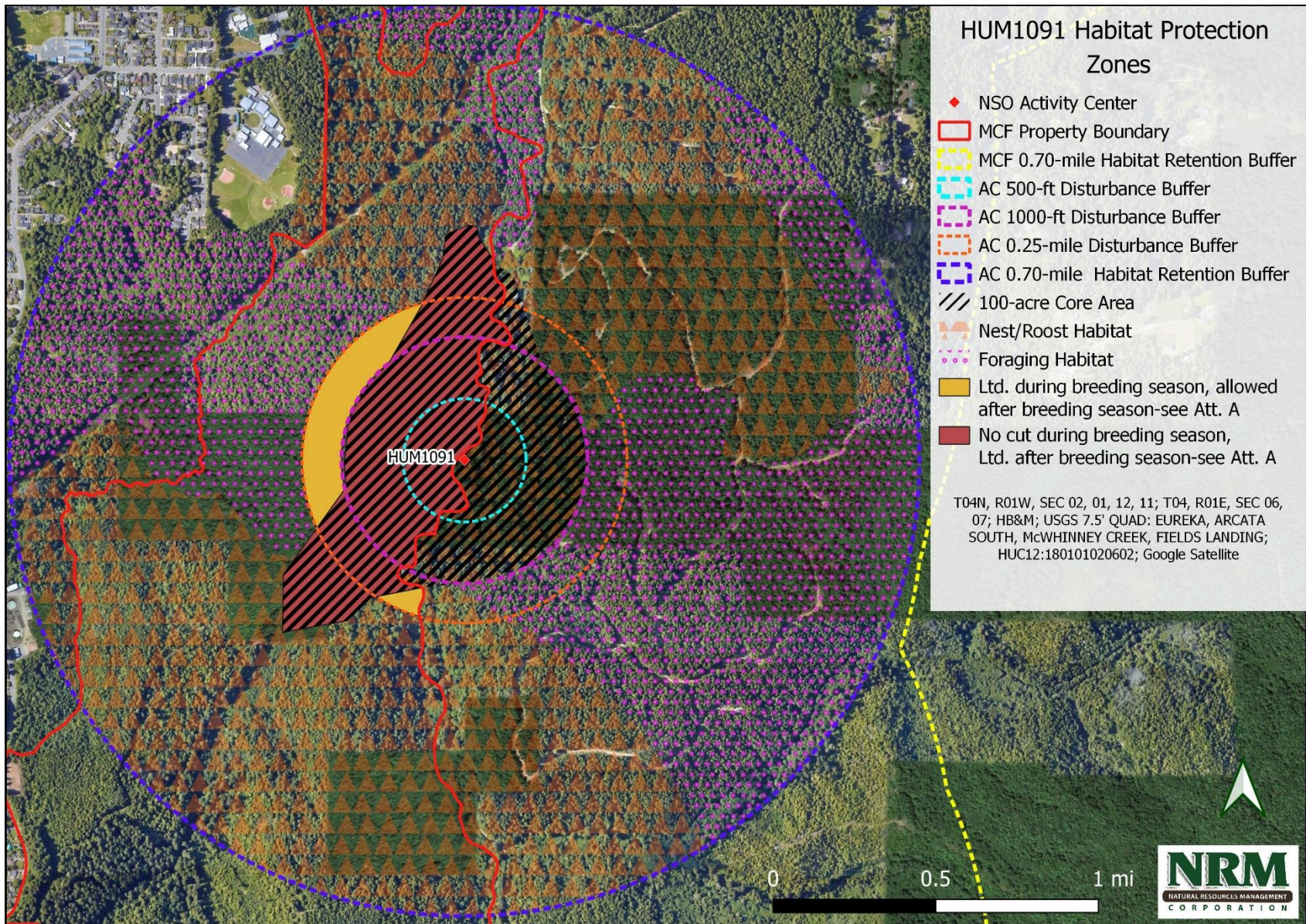


Figure 19. HUM1091 Habitat Protection Zones

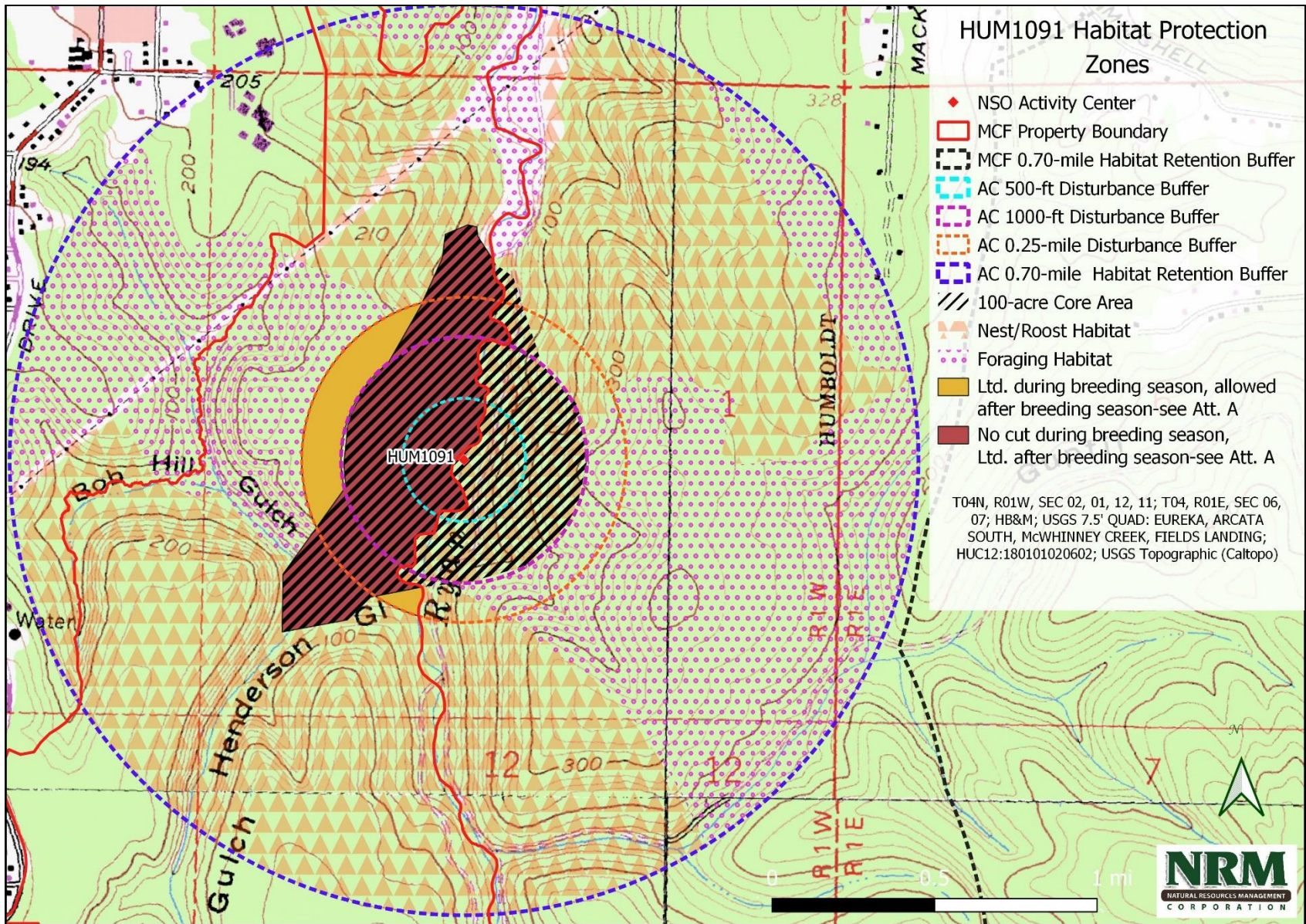


Figure 20. HUM1091 Habitat Protection Zones

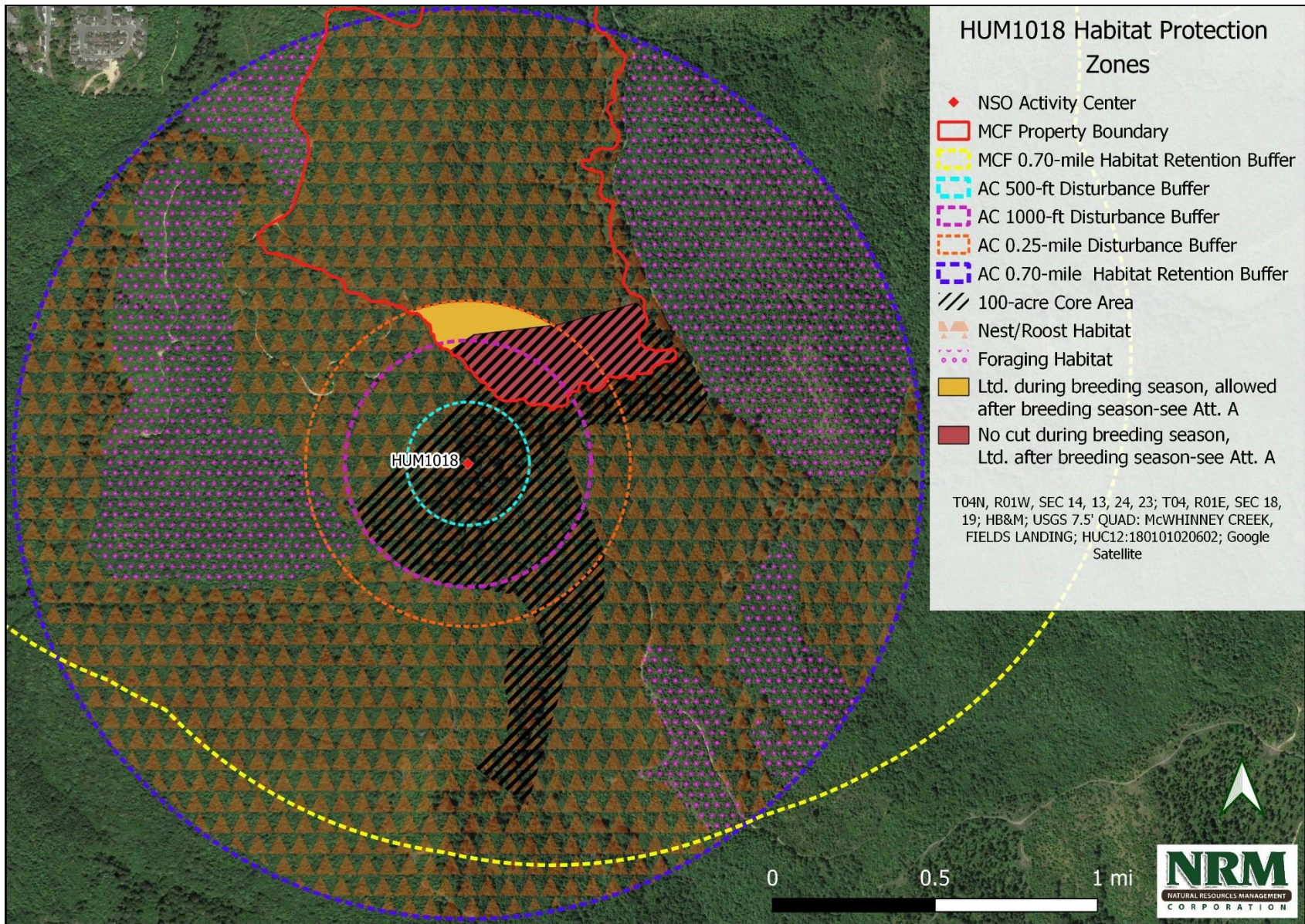


Figure 21. HUM1018 Habitat Protection Zones

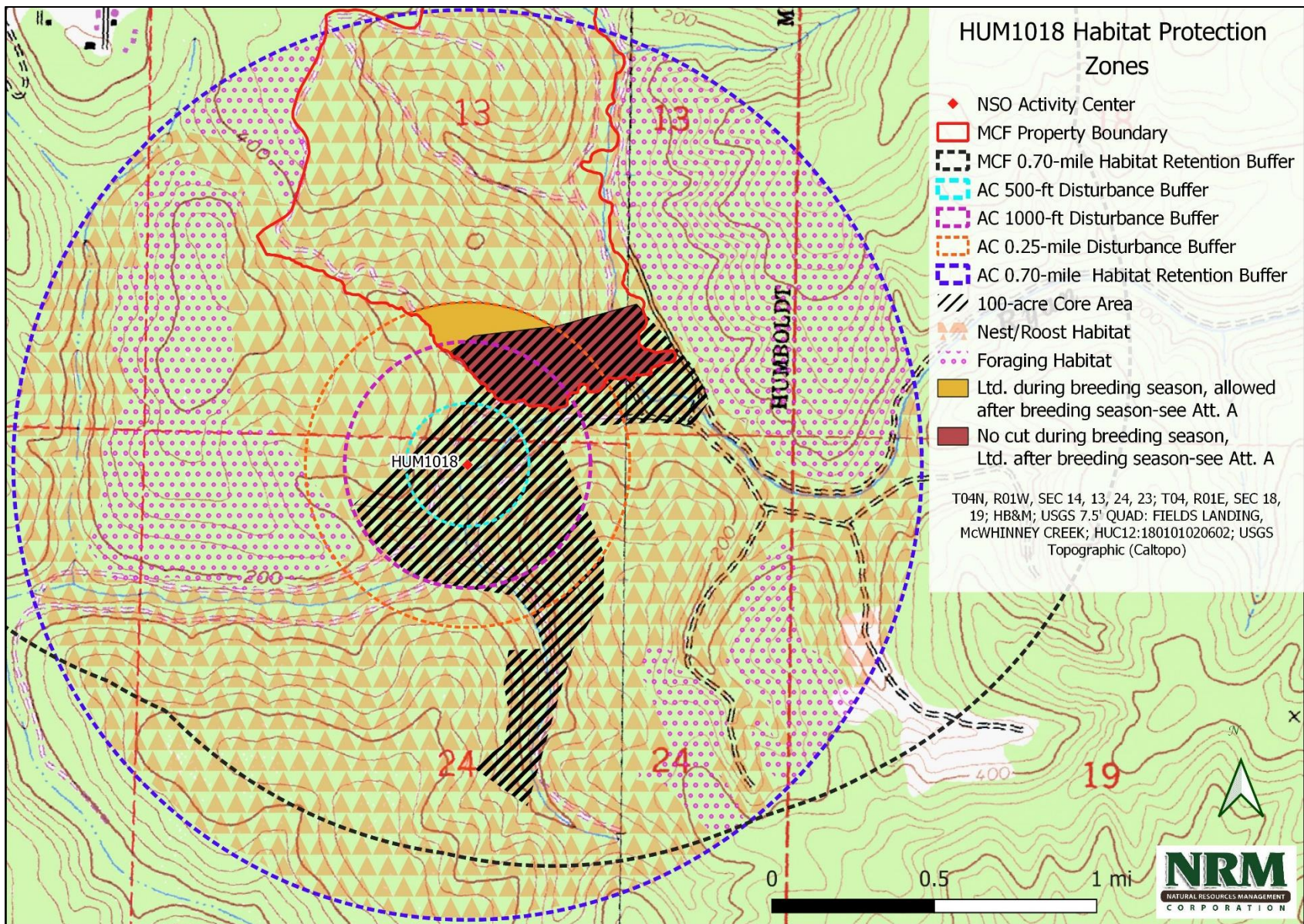


Figure 22. HUM1018 Habitat Protection Zones

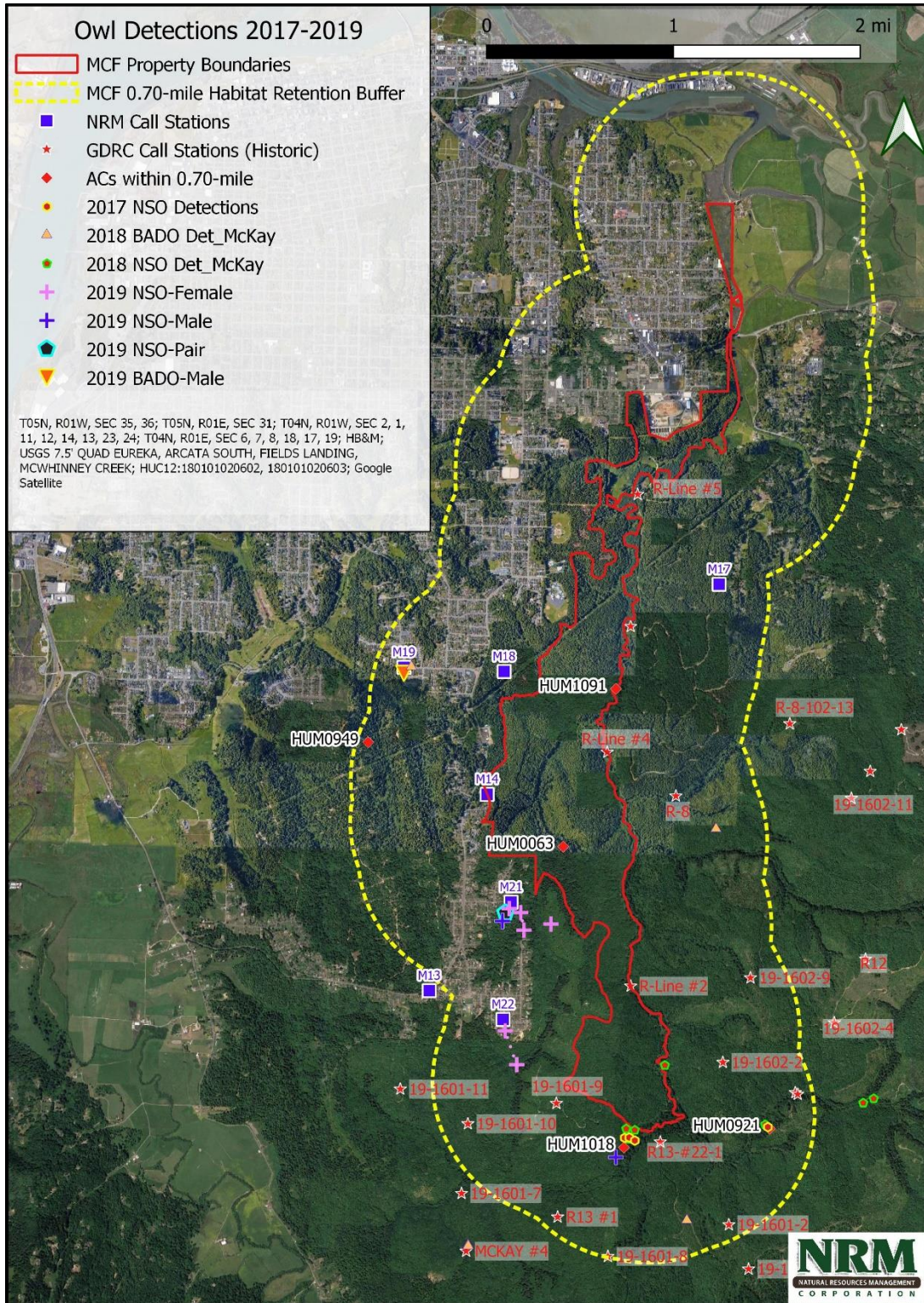


Figure 23. Documented Owl Detections Between 2017-2019

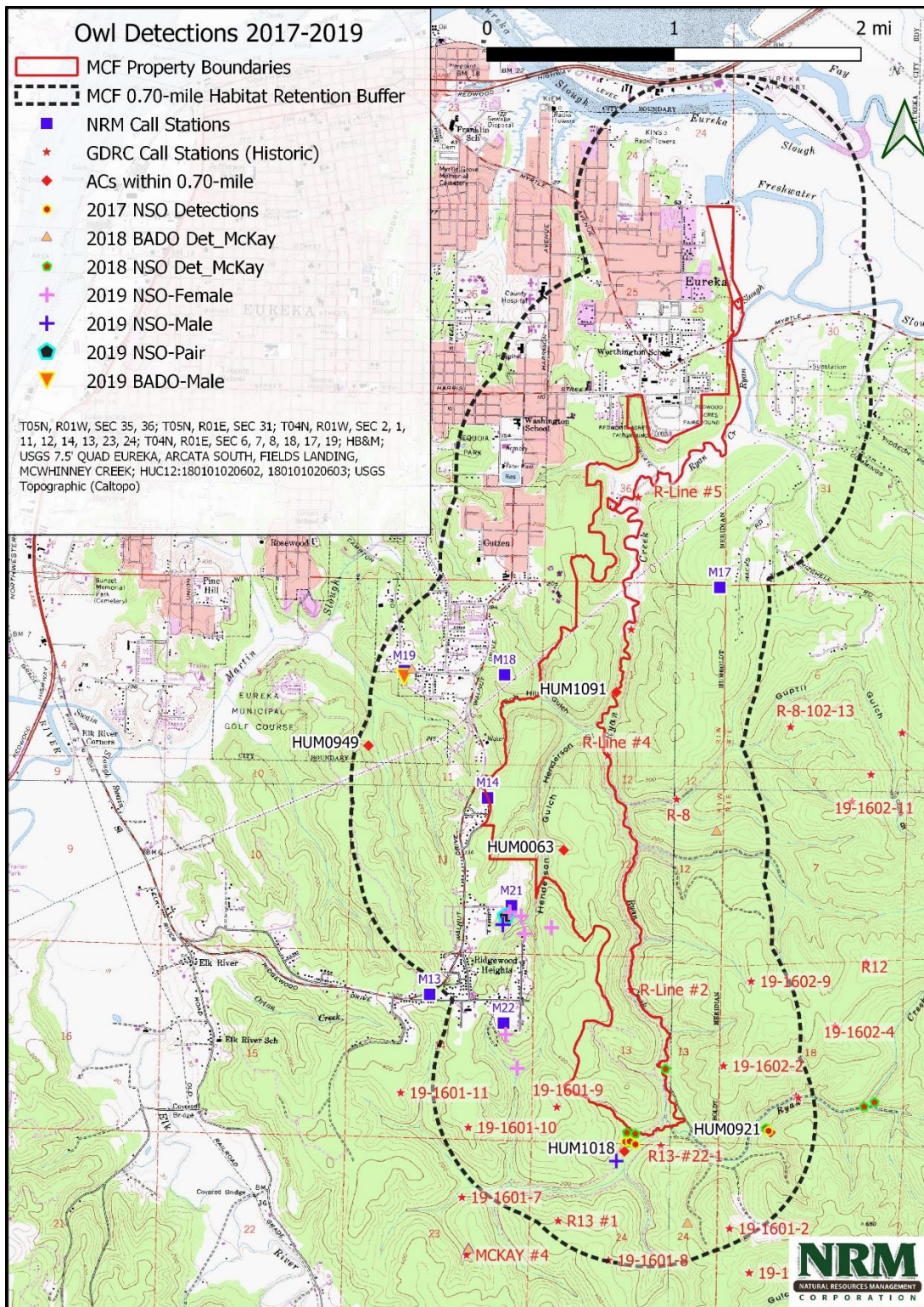


Figure 24. Documented Owl Detections Between 2017-2019

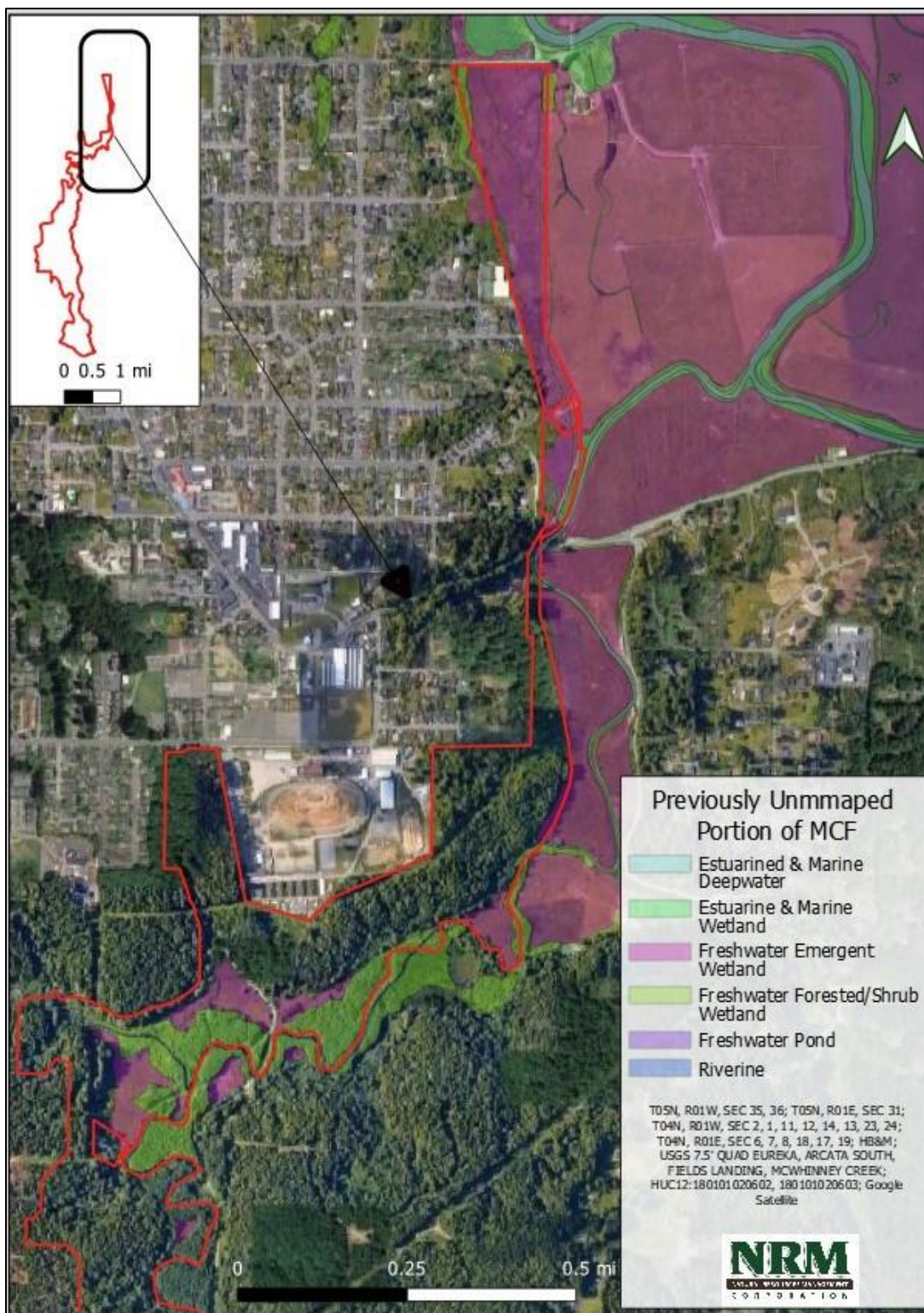


Figure 1a. Habitat in Previously Unmapped Portion of MCF (National Wetland Inventory (NWI) surface waters and wetlands, UFWs, Last update: October 9, 2019)

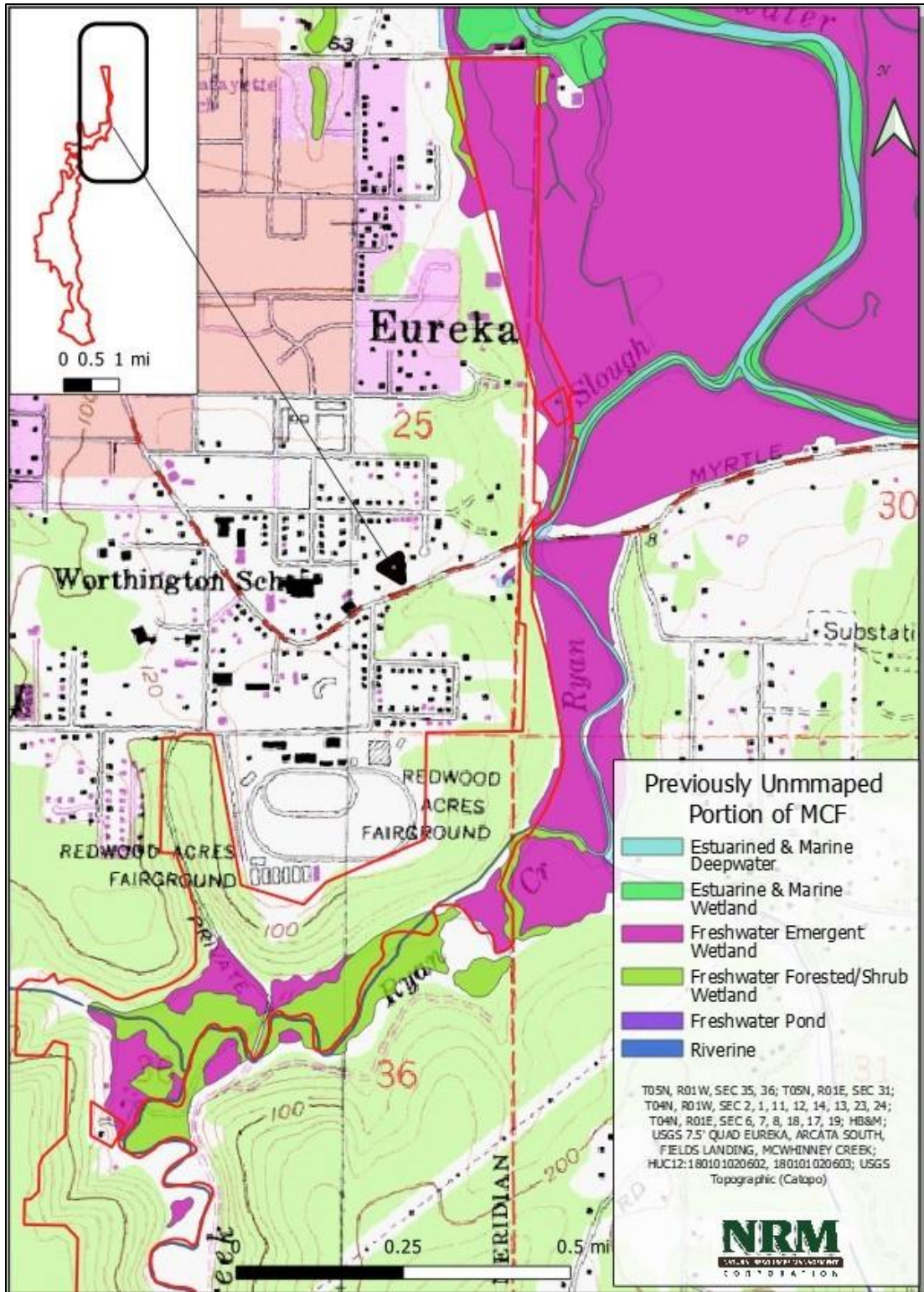


Figure 1b. Habitat in Previously Unmapped Portion of MCF (National Wetland Inventory (NWI) surface waters and wetlands, UFWs, Last update: October 9, 2019)

Appendix A:

Northern Spotted Owl Take Avoidance Analysis and Guidance for California Coast Forest District ("Attachment A"), March 15, 2011. USFWS-Arcata Office (AFWO).

Revised 2012 Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls, January 9, 2012. USFWS.



United States Department of the Interior



FISH AND WILDLIFE SERVICE

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Arcata, California 95521

Phone: (707) 822-7201 FAX: (707) 822-8411

In Reply Refer To:
AFWO-11B0075-11TA0069

MAR 15 2011

Mr. Bill Snyder
Deputy Director for Resource Management
CAL FIRE
1416 9th Street
Sacramento, California 94244-2460

Subject: 2011 Revision of the Northern Spotted Owl Take Avoidance Analysis and Guidance for California Coast Forest District.

Dear Mr. Snyder:

This letter transmits the Arcata Fish and Wildlife Office's 2011 revision of the Northern Spotted Owl Take Avoidance Analysis and Guidance for California Coast Forest District, also referred to as "Attachment A." This revision provides an overview of recommended post-habitat retentions, survey protocol recommendations (when they differ from the Fish and Wildlife Service 2011 NSO Survey Protocols), and other operational guidance for the redwood ecotype of the Coast Forest District. The enclosed guidance document outlines Northern Spotted Owl take avoidance measures for activities associated with California timber management.

If you have any questions regarding this correspondence, please contact Bill McIver or Steve Kramer of my staff at the above letterhead address or at (707) 822-7201.

Sincerely,

Nancy J. Finley
Field Supervisor

enclosure:

"Northern Spotted Owl Take Avoidance Analysis and Guidance for California Coast Forest District"

cc:

Region 8, FWS, Sacramento, CA (Attn: Darrin Thome)

YFWO, Yreka (Attn: Erin Williams)

**TAKE PRIDE
IN AMERICA**



Northern Spotted Owl Take Avoidance Analysis and Guidance For California Coast Forest District ("Attachment A")

March 15, 2011

Through this document, the Fish and Wildlife Service's (Service) Arcata Office (AFWO) establishes guidelines to avoid the incidental take¹ of the federally listed as threatened northern spotted owl (*Strix occidentalis caurina*, NSO), that may result from timber operations occurring within the range of the coast redwood (*Sequoia sempervirens*) ecotype, in the Coast Forest District (Coast District) of the California Department of Forestry and Fire Protection (CAL FIRE). This document will be referred to hereafter as "Attachment A." The eastern portion of the Coast District is outside of the range of the coast redwood. In these eastern areas, the Revised USFWS Attachment B: Take Avoidance Analysis-Interior ("Attachment B") applies to proposed timber operations where no redwoods are present in the timber harvest plan area.

This document (Attachment A) applies to Timber Harvest Plans (THPs) and to Non-industrial Timber Management Plans (NTMPs). This Northern Spotted Owl Take Avoidance Analysis and Guidance (Attachment A), dated March 14, 2011, replaces, in full, all prior versions of this guidance, and remains in effect until replaced or voided.

I. Background

On February 7, 2011, the Service released the *2011 Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls* (hereafter referred to as the 2011 NSO Survey Protocol), its associated transmittal memorandum (2011 transmittal memo) from Region 8 of the Service, and the transition matrix entitled *NSO Protocol Transition Guidance* for surveys initiated in 2009 through 2011. The 2011 transmittal memo and associated transition matrix provide additional details and clarification for surveys conducted within California (a similar memorandum has been prepared for distribution in Oregon and Washington). The transition matrix clarifies how past surveys would be appropriately credited toward meeting current protocol needs. Those documents are included herein by reference; the reader should consult those documents for details regarding survey methods and interpretation of survey data.

This document provides guidance on the application of survey results to evaluation of specific projects that may impact NSO and provides NSO habitat protection measures and operational procedures specifically recommended for the coast redwood ecotype. In addition, this revision of Attachment A crosswalks the pertinent issues addressed in previous AFWO Technical Assistance, previous versions of Attachment A, and the 2011 NSO Survey Protocol.

¹ **incidental take** - take that is incidental to, but not the purpose of, carrying out an otherwise lawful activity.

II. Definitions

This section defines several terms used in the analysis of take avoidance of the NSO within the coast redwood ecotype of the Coast District (additional terms are defined within the protocol guidance documents, referenced above):

Activity Center (AC): Area of concentrated activity of either a pair of NSO or a single territorial NSO, represented by a mapped location (e.g., usually a nest tree) that occurs within, but not necessarily in the exact center of, the “Core Area,” defined below.²

Core Area: 100 acres of the 200 acres of Nesting/Roosting habitat retained within a 0.7 mile radius contiguous with the Activity Center. If 100 acres of contiguous Nesting/Roosting is not available, then the highest quality habitat available shall be included.

Foraging Habitat: Habitat that contains $\geq 40\%$ canopy cover of trees that are ≥ 11 " DBH (diameter at breast height), and have a basal area ≥ 75 square feet per acre of trees ≥ 11 " DBH. Trees may be conifer or hardwood.

Nesting/Roosting Habitat: Forested habitat that supports successful nesting and associated roosting behavior by NSO. Habitat with $\geq 60\%$ canopy cover of trees that are ≥ 11 " DBH, and have a basal area ≥ 100 square feet per acre of trees ≥ 11 " DBH. Trees may be conifer or hardwood.

Nesting/Roosting Polygon: All Nesting/Roosting habitat which is contiguous with an NSO Activity Center.

NSO Breeding Season: Defined as February 1 to July 31 within the coast redwood ecotype found in the Coast District of California.

NSO Home Range: Defined as a 0.7 mile radius circle centered on the Activity Center for the coast redwood ecotype found in the Coast District.

Suitable or Functional Habitat: Habitat that meets either Nesting/Roosting or Foraging definitions, or a combination of Nesting/Roosting and Foraging habitat.

Survey Area: All Suitable/Functional NSO habitat within 0.7 mile from the project boundaries; or for disturbance only activities, a 0.25 mile area outside the edge of the project should be surveyed.

Survey-Start Date: In the coast redwood ecotype, Coast District, NSO Surveys should start on or after March 1.

² NSOs have been characterized as central-place foragers, where individuals forage over a wide area and subsequently return to a nest or roost location that is often centrally-located within the home range (Rosenberg and McKelvey 1999).

Survey-Last Survey Dates: For years 1 and 2 of the 2011 NSO Survey Protocol, the last survey visit should occur on or after May 15. For “Activity Center Searches” and Spot Check Surveys no fixed date is set, but the 2011 NSO Survey Protocols should be followed.

III. Accuracy of NSO Activity Center Location, Status and Mapping

The initial step in determining if the proposed timber operations may avoid take of NSO is to determine if the proposed operations would likely occur within the home range of a NSO (new or historical). A combination of survey data conducted to current protocol and current NSO California Department of Fish and Game (CDFG) database reports, covering all suitable NSO habitat located within the 0.7 mile radius of the proposed harvest operations, will be necessary to support a conclusion that a proposed timber harvest is not within the home range of a NSO.

Accurately mapping the location of the Activity Center is critical to the protection of Core Area habitat. Because NSOs can move from year to year, Activity Center locations are more accurate when plotted as a result of surveys rather than using the locations found in the CDFG NSO Database. Multiple Activity Centers for a NSO pair are possible. If one Core Area does not encompass all known Activity Centers, multiple Core Areas for a NSO pair, or territorial single NSO may need to be mapped and protected to avoid the likelihood of incidental take.

If some, or all, of the habitat in the survey area cannot be surveyed due to lack of access, the most recent update of the CDFG NSO Database should be consulted for Activity Center information within the 0.7 mile survey area. In addition, landowners that are adjacent to the proposed timber operations should be contacted so that all the known current NSO locations can be identified and mapped. All detections reported to the CDFG NSO Database are assigned to a known site or given a new site number. *CDFG NSO Database Report Number 2* identifies the most important detection locations for each site, and those sites should be included as “known” Activity Centers. The guidance contained herein applies to all sites listed in *CDFG NSO Database Report Number 2*, until such detections are determined by the Service not to qualify for protection (e.g., site abandonment or non-site determination). *CDFG NSO Database Report Number 3* may include more than one nest site location for a pair of NSO.

IV. Current 2011 Surveys, Subsequent Years, and Transition from Past Surveys

The 2011 NSO Survey Protocol replaces all prior versions of the NSO survey protocol. Reference to prior protocols should be limited to confirming compliance with earlier protocols during those survey years, for appropriate crediting of earlier, completed surveys, and should not be used as direction for surveys during 2011 and subsequent years. Please refer to the 2011 NSO Survey Protocol and associated NSO Protocol Transition Guidance documents for complete details regarding survey area, timing, design, and documentation of conditions necessitating deviation from the 2011 NSO Survey Protocol, with the exception of the deviation outlined below.

Data and information specific to the coast redwood region show that NSO nest slightly earlier in the year than interior areas within California. Furthermore, additional data from this coast redwood region have shown that the high response rates of NSO begin as early as March 1.

However, the 2011 NSO Survey Protocol states “At least 3 of the complete visits should be conducted before 30 June; this includes at least one visit in April, one in May and one in June.”

To accommodate the earlier breeding season for NSOs in the coast redwood region, survey dates should be moved forward 15 days, as follows:

- At least one survey should occur during the period March 15 to April 14.
- At least one survey should occur during the period April 15 to May 14.
- At least one survey should occur during the period May 15 to June 15.

With the exception of this scheduling of survey visits, all other timing, location, and operability requirements (at least 7 days between complete visits, daytime follow-ups, number of complete visits, etc.) remain consistent with the 2011 NSO Protocol.

V. Survey Area

The 2011 NSO Survey Protocol assumes that the entire survey area (0.7 mile) for the redwood portion of the Coast District will be surveyed prior to management activities that may affect suitable NSO habitat. In some cases, access issues related to private property can prevent surveys from being conducted across the entire survey area. At a minimum, surveys should be conducted on the property within which the proposed timber operations will occur, and on any adjacent accessible private or public land and along appurtenant public roads. Current survey data from adjacent landowners may be used to get information about presence/absence of NSO on portions of the survey area not accessible to the project proponent.

Survey documentation for proposed timber operations should include a description, a map of the 0.7 mile survey boundary and, if less than 0.7 mile, a map of the actual surveyed area, and an explanation of any deviation from complete 2011 NSO Survey Protocol. An explanation is especially important when removal or downgrading of suitable NSO habitat is proposed. It should be noted, however, that surveys not covering the entire survey area may require additional Spot Check Surveys to account for incomplete survey area coverage (see 2011 NSO Survey Protocol).

For operations that are anticipated to result only in disturbance to NSO during the breeding season, all suitable NSO habitat within the proposed timber operation plan area should be surveyed, plus an additional 0.25 mile radius outside the plan area.

VI. Post-Harvest Habitat Retention and Typing

Accurate habitat typing is required to determine if habitat quantities will be retained above the habitat thresholds described below. Note that CAL FIRE will need habitat typing to verify that pre-harvest typing is correct and post-harvest retention is feasible.

Inventory data provides the best support for accurate habitat typing. When inventory data is not available, habitat typing using available satellite or aerial imagery is acceptable, provided harvest histories showing any habitat alterations since the imagery was generated are incorporated into

the analysis. Imagery alone can provide reasonably accurate canopy closure estimations, but since stand age and diameter class can be difficult to determine in redwood forests from imagery alone, it is important to conduct ground truthing as well. CAL FIRE maintains timber harvest histories by watershed and that information is available on-line and should be used in conjunction with imagery for off-property habitat typing.

Narrow strips of habitat (retention areas between clearcuts, etc.) may contain the characteristics of Nesting/Roosting habitat. However, when these narrow strips of habitat are surrounded by unsuitable or low quality habitats, they function as Foraging habitat at best.

Watercourse and Lake Protection Zones (WLPZs), typically, have the highest canopy closure and the largest trees on the landscape. However, WLPZs are not wide enough by themselves to provide functional Nesting/Roosting habitat (i.e., not at least 600 feet wide); therefore, if a WLPZ is bordered on both sides by unsuitable habitat, then the WLPZ cannot be typed as Nesting/Roosting habitat, and is functionally Foraging habitat at best. If one or both slopes on either side of a WLPZ can be accurately typed as at least Foraging habitat, then the WLPZ can be functional as Nesting/Roosting habitat if a minimum of 60% canopy closure of trees at least 11" DBH are present.

Priority Ranking of Habitat Retention Acres

- 1) Tree species composition:
 - a) Redwood or mixed conifer stands should be selected over hardwood dominated stands.
- 2) Abiotic considerations to help with priority determinations:
 - a) Distance to nest: Nesting/Roosting and Foraging habitat closest to identified nest trees, or roosting trees if no nest trees identified.
 - b) Contiguity: Nesting/Roosting habitat within the 0.7 mile radius should be as contiguous as possible; and minimize fragmentation of Foraging habitat as much as possible.
 - c) Slope position: Habitats located on the lower 1/3 of slopes provide better microclimate conditions and an increased potential for intermittent or year-round water sources.

If the proposed timber operations retain at least 66% of the pre-harvest basal area and meet the functional definition of Nesting/Roosting or Foraging habitat post-harvest as described above, off-property habitat typing is not necessary, unless needed to display Core Area protections.

Core Area Habitat Protection

Once an Activity Center has been accurately mapped, a 100-acre Core Area polygon must be identified that contains the highest quality habitat (typically Nesting/Roosting) located contiguous with the Activity Center.

When an Activity Center is surrounded by sufficient Nesting/Roosting habitat, the Core Area polygon is typically mapped starting with a 1,000-foot radius circle (72 acres) centered on the

Activity Center, and is connected on one side to a WLPZ and expanded until the Core Area includes 100 acres. Limited timber operations are allowed within the Core Area polygon (see VIII. Timber Operations).

When an Activity Center is closer than 500 feet to the outside edge of the Nesting/Roosting polygon, the acres of non-Nesting/Roosting habitat within 500 feet of the activity center are included, but should be augmented with additional Nesting/Roosting habitat elsewhere in the Core Area polygon to make a total of 100 acres of the highest quality habitat.

When the Activity Center is closer than 1,000 feet to, but not within 500 of, the outside edge of the Nesting/Roosting polygon, the protected Core Area should extend to that most distant edge of the Nesting/Roosting habitat but shall not be less than a 500-foot radius.

Operations conducted outside the Core Area, but within 1,000 feet of an Activity Center should retain the functionality of any NSO habitat present pre-harvest within this area, i.e., operations do not downgrade habitat.

Polygons of Nesting/Roosting habitat contiguous with the Activity Center, which are larger than 100 acres provide the most operational flexibility. If the Nesting/Roosting polygon is 200 acres or greater, and operations in the polygon outside the Core Area have retained functional Nesting/Roosting habitat (i.e., no more than 33% of the basal area removed retaining a minimum of 100 sq. ft. of basal area per acre of trees greater than 11" DBH), then the 100-acre core area can be redrawn in subsequent entries. However, the 500-foot radius should remain unchanged, and the redrawn core area should not include any acres harvested within the previous 5 years.

Within the 0.7 mile radius (985 acres) of each Activity Center please use the following:

- 1) Retain habitat to maximize attributes desirable for NSO.
- 2) Retain at least 500 acres of suitable (Nesting/Roosting/Foraging) NSO habitat, post-harvest, as follows:
 - a) Retain 200 acres of Nesting/roosting Habitat within a 0.7 mile radius of the Activity Center consisting of:
 - i) 100 acres of the 200 acres of Nesting/Roosting habitat retained should be contiguous, or contiguous as possible with the Activity Center.
 - ii) An additional 100 acres of Nesting/Roosting with in the 0.7 mile radius:
 - (1) If the second 100 acres of Nesting/Roosting habitat is also contiguous with the Activity Center, or within the same drainage, operations should retain a minimum of 66% of the pre-harvest basal area per acre of trees at least 11" DBH.
 - (2) If the remaining 100 acres of Nesting/Roosting habitat is not contiguous with the Activity Center, retain at least Nesting/Roosting habitat.
 - b) Retain at least 300 acres of Suitable NSO habitat, post-harvest, of at least Foraging quality.

- 3) Remove no more than 1/3 of the remaining suitable habitat in excess of 500 acres within 0.7 mile of an Activity Center during the life of the timber operations.

VII. Road Use

To avoid take of NSO from noise disturbance (see U.S. Fish and Wildlife Service 2006) road use within 0.25 mile (1,320 feet) of a NSO Activity Center during the breeding season is prohibited until July 10, unless:

- 1) Non-nesting, or nesting failure at the Activity Center has been determined by a Activity Center Search (2011 NSO Protocol) conducted on or after May 15th, or;
- 2) The Activity Center is within 165 feet of major highway that typically has continuous traffic year around (Hwy 1, 36, 101,128, 299, etc.) and the appurtenant road is not within 165 feet of the Activity Center.
- 3) After July 9th until the end of the breeding season road use within the 100-acre core is restricted to existing road use, maintenance and map point work.

VIII. Timber Harvest Operations

A 0.25 mile seasonal restriction on timber operations (except for road use after July 9th) applies to every known NSO Activity Center during the breeding season, unless it is determined via a site monitoring visit, "Activity Center Search" (2011 NSO Protocol), that NSO are not nesting, or nesting failure has occurred. If it cannot be determined whether NSO are nesting, or nesting failure cannot be determined, the 0.25 mile seasonal restriction stays in effect for timber operations until after July 31st.

For all known Activity Centers, timber operations should adhere to the following recommendations:

- 1) Within the 100-acre Core Area polygon of an NSO Activity Center:
 - a) Outside the breeding season, limited timber operations (i.e., road use and maintenance, map point work, tail-hold placements, use of existing skid roads, and loading) may be conducted, provided no trees >11 inches DBH are cut or removed by the operations, and no logs are yarded through the Core Area.
 - b) During the NSO breeding season, timber operations (including use of roads before July 9th), are not allowed within the 100-acre Core Area polygon, except as allowed in subsections 4 and 5, below.
- 2) Timber Operations outside the 100-acre Core Area polygon, but within 0.25 mile of an NSO Activity Center:
 - a) Outside the breeding season, timber operations may be conducted.

- b) During the breeding season, no timber operations should proceed unless protocol surveys do not detect nesting NSOs.
- 3) For all NSO Activity Centers, prior to May 15th (until the required May 15 or later survey is completed):
- a) Timber operations (except helicopter yarding or staging) may be conducted only on those THP areas >0.25 mile from the Activity Center.
 - b) Helicopter yarding and staging may occur only on those THP areas >0.5 mile from the Activity Center.
- 4) For NSO Activity Centers where reproductive status has been determined to be non-nesting or failed nesting:
- a) Limited timber operations (road use and maintenance, map point work, use of existing skid roads, tail-hold placements and loading) may be conducted within the 100-acre Core Area polygon of the Activity Center provided no trees >11 inches DBH are cut or removed by the operations, and no logs are yarded through the Core Area.
 - b) Full timber operations, including helicopter yarding and staging, may be conducted within 0.25 mile but not within the 100-acre core polygon of the Activity Center. Helicopter fly-overs shall not occur within 1000 ft. of the Activity Center
- 5) For NSO Activity Centers, where reproductive status has been determined to be nesting:
- a) For Activity Centers where fledging status has not been determined, timber operations may be conducted only on those THP areas that are >0.25 mile from the Activity Center until the end of the breeding season.
 - b) Helicopter yarding and staging may occur only on those THP areas >0.5 mile from the Activity Center.
- 6) For NSO Activity Centers, where fledging status has been determined (either nest failure or fledglings have left the Core Area):
- a) Full timber operations, including helicopter yarding and staging, may be conducted within 0.25 mile but not within the 100-acre core polygon of the Activity Center. Helicopter fly-overs shall not occur within 1000 feet of the Activity Center.
 - b) Limited timber operations (road use and maintenance, map point work, use of existing skid roads, tail-hold placements and loading) may be conducted within the 100-acre core polygon of the Activity Center, provided no trees >11 inches DBH are removed by the operations, and no logs are yarded through the Core Area.

7) For any NSO Activity Center, regardless of reproductive status:

- a) If NSO move to a new location (>1000 feet from the historical Activity Center) and reproductive behavior is confirmed at the new site, request technical assistance to evaluate the status of the historical Activity Center.

IX. February Extensions for Timber Operations:

There is no allowance for extending on-going timber operations into the breeding season except, as stipulated in the most current USFWS Survey Protocol Spot Survey procedures.

X. CAL FIRE Review

When reviewing information related to NSO Activity Centers, the following outline should be used to check for adequacy and accuracy:

- 1) Location
 - a) Confirm plotted Activity Center location accuracy.
 - i) Review recent surveys.
 - ii) Review CDFG Reports 1, 2, 3.
 - iii) Review data from adjacent landowners.
 - b) Evaluate deviations from CDFG locations.
 - c) Determine if habitat maps and tables have been updated.
- 2) Activity Center and Project Area Habitat Typing.
- 3) Verify pre-harvest habitat typing of project area, survey area and 0.7 mile radius from each Activity Center using aerial photos, equivalent imagery, or field visits.
- 4) Determine if any habitat alterations have occurred which should be reflected in current NSO habitat tables and habitat analysis maps.
- 5) Verify post-harvest habitat typing reflects the silvicultural prescriptions.
- 6) Determine Activity Center status.
- 7) Is it a valid site?
 - i) Review most current protocol to determine if the location is consistent with definition of a site.
 - ii) Report both new sites and non-valid sites (need USFWS approval) to CDFG for next database update.
- 8) Determine current occupancy status.
- 9) Determine current reproductive status, if it was determined.
- 10) Activity Center Habitat and Disturbance Protection Measures.
- 11) Confirm consistency with Attachment A.

XI. Determination

CAL FIRE should use the following list to help with their take avoidance determinations:

- 1) If surveys are inadequate or do not meet the intent of the NSO protocol in effect during the year(s) of survey, take avoidance determination may not be possible.

- 2) If habitat typing is inadequate, incidental take determination may not be possible.
- 3) If NSO home range habitat acres are below desired conditions (Section III. 2, 3, and 4), additional loss of suitable habitat can lead to take.
- 4) If NSO are nesting, use seasonal restriction for all timber operations within 0.25 mile of a nest (February 1 through July 31).
- 5) If effects are limited to noise disturbance (e.g., no suitable habitat in timber harvest units, but suitable habitat within 0.25 mile of units), a modified seasonal restriction may be used from February 1 through July 9, as follows:
 - a. Seasonal restriction applies to unsurveyed suitable habitat within 0.25 mile of unit boundary.
 - b. If protocol surveys were conducted and did not detect reproductive NSO, or barred owls seasonal restrictions may not warranted.
- 6) When multiple THPs are located within a given NSO territory, all habitat conditions should be considered collectively a take avoidance determination may not be possible.

XI. Contents of Technical Assistance Requests

Technical assistance (or “TA”) requests need to be submitted to AFWO by CAL FIRE. Open “Habitat Retention Agreements,” NTMPs, “Spotted Owl Management Plans,” Spotted Owl Recovery Plans,” and THPs that have received previous technical assistance from the AFWO (i.e., have an AFWO TA correspondence number) will continue to receive additional technical assistance from AFWO. Technical assistance will be provided on a case-by-case basis to CAL FIRE, by AFWO, on complex determinations or on points of clarification.

Information to be submitted to CAL FIRE should include:

1. Date of written TA request.
2. Date request received.
3. Assigned TA number (only if previous technical assistance has been provided by AFWO in the past for this project).
4. Number of acres within the THP boundary.
5. Maps indicating types and locations of units with silviculture prescriptions.
6. Map of any know NSO sites within the survey area.
7. Location of THP, including County(s); Meridian(s); and, Townships, Ranges, and Sections.
8. Identify NSO Activity Centers returned by CDFG reports.
9. Results of all surveys conducted and Activity Center status for any known Activity Center.
10. Logic behind the take determination.
 - a. Habitat considerations:
 - i. Acres, quality, and location of suitable habitat pre- and post-harvest,
 - ii. Effects of timber operations on suitable habitat;

1. Degrade: suitable habitat is harvested but still functions in the capacity it did pre-harvest (i.e. Foraging habitat before harvest functions as Foraging habitat post-harvest, Nesting/Roosting habitat pre-harvest functions as Nesting/Roosting habitat post-harvest);
 2. Downgrade: pre-harvest Nesting/Roosting habitat becomes Foraging habitat post-harvest;
 3. Remove: Nesting/Roosting or Foraging habitat is harvested, such that it no longer functions as habitat post-harvest;
- b. Proximity of Activity Center to operations, and;
 - c. Survey data.
11. Sunset date and seasonal restrictions:
- a. If operations are not complete before February 1, surveys are required to determine location and status of NSO prior to operations during each breeding season that operations are ongoing.
 - b. Additional technical assistance may not be required if NSO are not found within 0.7 mile of THP (CDFG reports), if suitable habitat within units are not found within the project area, or if suitable habitat is not identified within 0.25 mile of units.
12. Name of agency person to contact if there questions regarding the technical assistance.

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Enclosure 1. 2011 NSO Survey Protocol – 2012 Revision

PROTOCOL FOR SURVEYING
PROPOSED MANAGEMENT ACTIVITIES
THAT MAY IMPACT
NORTHERN SPOTTED OWLS

Endorsed by the
U.S. Fish and Wildlife Service

February 2, 2011

Revised January 9, 2012

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PROTOCOL FOR SURVEYING PROPOSED MANAGEMENT ACTIVITIES THAT MAY IMPACT NORTHERN SPOTTED OWLS (2011 Protocol)

1.0 INTRODUCTION

The U.S. Fish and Wildlife Service (Service) developed this 2011 NSO Survey Protocol (2011 Protocol) to promote consistent and scientifically rigorous procedures to survey for northern spotted owls (*Strix occidentalis caurina*; spotted owl) in areas where management activities may remove or modify spotted owl nesting, roosting or foraging habitat (excluding areas defined as dispersal habitat). This protocol should also be applied to activities that disrupt essential breeding activities and to activities that may injure or otherwise harm spotted owl other than through habitat modification (e.g., noise disturbance, smoke from prescribed fire). This 2011 version of the survey protocol builds upon the 1992 Protocol and incorporates changes made to the Draft 2010 Protocol.

In recent years, research on spotted owls provided insights that raised concerns regarding the effectiveness of surveys, particularly those which do not result in spotted owl detections. Specifically, the invasion of the Pacific Northwest by the barred owl (*Strix varia*), an aggressive and potentially significant competitor of the spotted owl, has resulted in a suppression effect on spotted owl response rates (Olson et al. 2005, Crozier et al. 2006). Therefore, survey results that do not account for barred owl effects on spotted owl detection rates may provide false or insufficient information about spotted owl presence in the survey area, and lead to forest management activities that may impact spotted owls and be in conflict with the Endangered Species Act.

To address this concern, the Service and cooperators (see list below) conducted analyses of historical survey data during 2009 and 2010, leading to estimates of detection rates for spotted owls that account for the effects of barred owl presence. Information utilized to generate the detection rates came from long-term spotted owl demography studies (Anthony et al. 2006, Olson et al 2005, Dugger et al. 2009, Bailey et al. 2009, Kroll et al. 2010) and spotted owl site and timber-harvest related surveys on private industrial forest lands in Oregon and California (Kroll et al. 2009). These detection rates, along with data on spotted owl site colonization and extinction probabilities, and empirical analysis of spotted owl site occupancy (Olson et al. 2005, Dugger et al. 2009, Kroll et al. 2010a), were utilized in developing this protocol. These analyses provided strong evidence that the 2-year, 3-visits-per-year requirement, as described in the 1992 protocol, was no longer sufficient to provide a reasonable likelihood of detecting territorial spotted owls where barred owls occur. Lastly, to improve the efficiency and practicality of this protocol, the professional opinion of researchers, survey practitioners, and regulators were integrated into this product.

Use of the 2011 Protocol should serve two primary purposes: (1) provide a methodology that results in adequate coverage and assessment of an area for the presence of spotted owls, and (2) ensure a high probability of locating resident spotted owls and identifying owl territories that may be affected by a proposed management activity, thereby minimizing the potential for

unauthorized incidental take. While this protocol utilizes the best available information for conducting project-level surveys, the protocol is not designed to monitor yearly trends of spotted owls or for many other research applications.

This protocol should be implemented across the northern spotted owl's range. However, in some areas local conditions, particularly when supported by appropriate data, may warrant deviations from this protocol. These deviations may occur through mutual cooperation between the landowner or their representative and the appropriate regulatory agency. Spotted owl surveys that are conducted as part of demographic long-term monitoring programs (see areas described in Forsman et al. 2011) can be considered reasonable alternatives to implementation of this protocol.

This document describes the methodology for surveying for spotted owls. It is the Service's expectation that practitioners should read and fully understand the details of the 2011 Protocol as described herein. The development of the Protocol has benefitted from data analysis, input, and reviews by the interagency Barred Owl Work Group (organizations listed below), established pursuant to 16 U.S.C. 1533(f)(2) to assist in implementing recovery plan actions.

Bureau of Land Management
California Department of Fish and Game
Green Diamond Resource Company
Hancock Forest Management
National Audubon Society, Seattle Chapter
National Council for Air and Stream Improvement
Oregon Department of Fish and Wildlife
Oregon Department of Forestry
Oregon State University
Plum Creek Timber Company
Raedeke Associates, Inc.
The Campbell Group
U.S. Fish and Wildlife Service
U.S. Forest Service
Washington Department of Fish and Wildlife
Weyerhaeuser Company

2.0 COORDINATION AND SHARING OF INFORMATION

Spotted owl survey crews, consultants, and their clients are strongly encouraged to coordinate with others doing similar surveys in nearby areas, during all phases of the survey effort.

Appropriate coordination involves:

- pre-season planning, including coordination of commitments by adjacent land managers on the areas to be surveyed by each party in the event that multiple parties are working in the same landscape; this limits unnecessary calling of owls and is a cost-savings for landowners;

- immediate communication of results, positive or negative, that may affect other land managers or regulatory actions; and
- exchange of post-survey season information summaries.

Common inefficiencies, such as overlapping or excessive known spotted owl site visits by more than one survey group, can be avoided through coordinated pre-planning. It is also advisable to inform adjacent land managers of all surveys near their ownership because new survey results may affect their management activities.

To enhance coordination efforts, the Service, through its local field offices, will participate in and, if needed, initiate pre-survey coordination meetings. The purpose of the meetings will be to:

- allow representatives from land management agencies and organizations conducting surveys to share information on the approximate extent of planned survey areas,
- look for ways to reduce potential survey overlap to avoid and minimize harassment of spotted owls,
- discuss opportunities for sharing information throughout the field season,
- provide discussion opportunities related to implementation of the survey protocol, and
- share information on techniques used in surveying spotted owls that will enhance the likelihood of obtaining responses.

The Service *strongly recommends* entities or their representatives conducting spotted owl surveys attend these coordination meetings. Local meeting coordinators should distribute information related to these meetings prior to the breeding season to federal, state, tribal and private landowner organizations. The Service also recommends that both federal and non-federal entities conducting spotted owl surveys provide frequent updates of new data to the state and federal agencies responsible for maintaining spotted owl databases as the information informs evaluation of potential impacts to spotted owls from forest management practices. In addition, the Service recommends that barred owl data also be reported to appropriate state and federal database managers.

3.0 ESTABLISHING THE AREA TO BE SURVEYED

Prior to doing any field survey, the appropriate area to be surveyed should be identified from maps, aerial photos, GIS, or other resources.

3.1 Identifying the Project Area

The first step in conducting surveys for spotted owls is to identify the *PROJECT AREA*¹. This area includes all lands delineated for the proposed project that may be subject to activities potentially impacting spotted owls through habitat modification, direct injury, noise disturbance, or any other means. For the purposes of this protocol, the project area is the polygon (or multiple polygons) that forms the footprint of the proposed project. Examples of project areas include timber harvest units, prescribed fire areas, disposal sites, road rights-of-way, etc. (Figure 1.).

3.2 Delineating the Survey Area

Once the project area is determined, the *SURVEY AREA* can be established and mapped. The survey area is defined as the area extending one provincial median annual home range radius from the perimeter of the project area for projects that will remove or modify nesting, roosting, or foraging habitat (see Section 9.0 for guidelines for disturbance-only projects). Table 1 indicates appropriate home range radii to use for projects within each physiographic Province. Figure 1 provides a hypothetical example of a survey area established around a multi-unit project area, based on a provincial home range radius area established surrounding the multiple project units.

Table 1. Provincial survey radius to apply when determining the survey area around proposed projects that may impact northern spotted owls, by Physiographic Province².

Physiographic Province	Provincial Survey Radius (mi.)
Olympic Peninsula	2.7
Washington Cascades	1.8
Oregon Coast Ranges	1.5
Oregon Klamath	1.3
Oregon Cascades	1.2
California Klamath	1.3
California Cascades	1.3
California Coast Range (Douglas-fir/mixed conifer zone)	1.3
California Coast Range (redwood zone) ³	0.7

3.3 Habitat to Survey

For the purposes of this protocol, the *HABITAT TO SURVEY* includes any habitat within the survey area where protocol surveys may elicit a response from a resident owl or pair of owls (i.e., nesting, roosting, or foraging habitat). The survey effort need not include stands typically characterized as spotted owl dispersal habitat that does not normally function as nesting, roosting, or foraging habitat for territorial spotted owls. Descriptions of spotted owl habitat specific to various regions may be available from state wildlife or forestry agencies, or

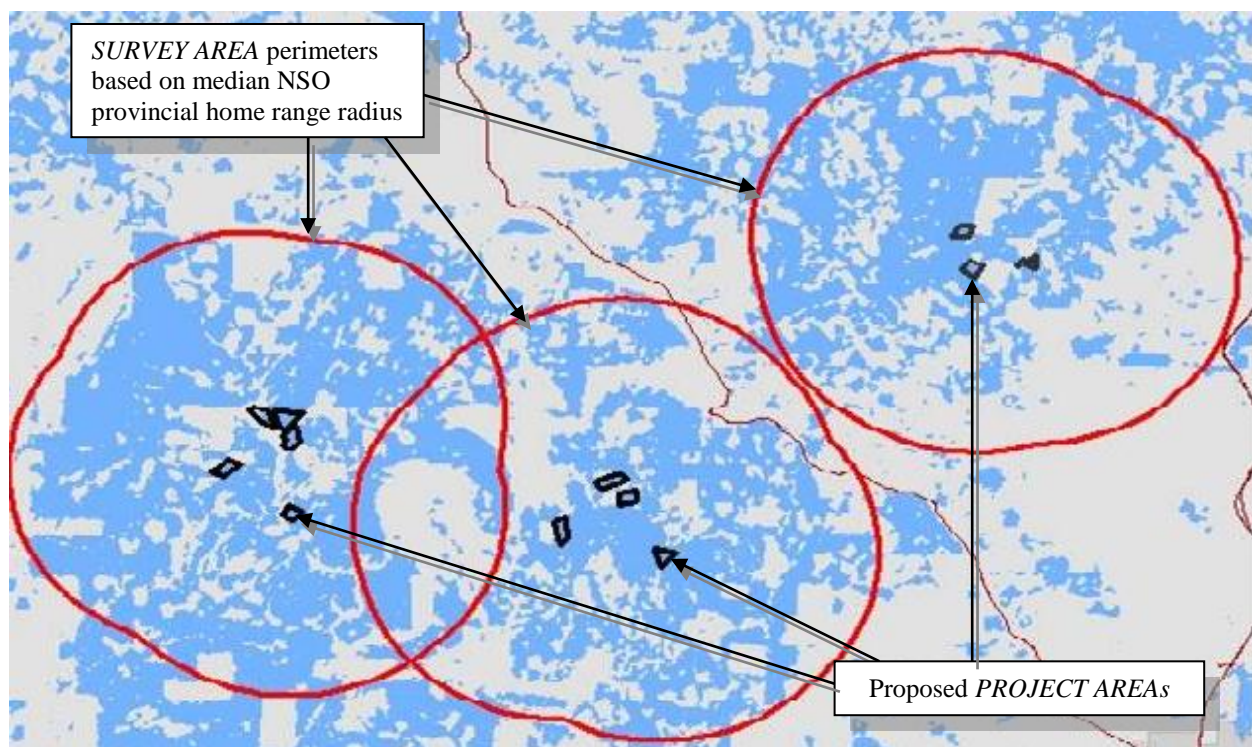
¹ Terms specific to this document appear in *ITALIC CAPITALS* in their first use, and are defined in the Glossary of Terms (Appendix 1). These terms appear in normal font in subsequent use in this document.

² Appendix 7 provides a map of the Physiographic Provinces.

³ The Arcata Fish and Wildlife Office will provide further guidance delineating the “redwood zone”

local Service Field Offices⁴. Habitat descriptions can also be found in these references: Thomas et al. 1990, Courtney et al. 2004, USDI Draft Revised 2010 Northern Spotted Owl Recovery Plan. Regulatory definitions may be of use where appropriate (e.g., definitions within state forest practices regulations; however, recognize that in some areas the Service does not support definitions of habitat used in current state forest practice regulations.) Surveyors should seek out this information from the appropriate regulatory agency prior to implementing surveys.

Figure 1. Hypothetical landscape with spotted owl habitat (darker color) and proposed project areas (project footprint) with the provincial median survey radius indicated by the three larger circular polygons.



4.0 SURVEY PERIOD

The *SURVEY PERIOD* is the time during which survey visits should occur to be counted toward meeting criteria for complete surveys (defined fully in section 11.0). For purposes of this protocol, the following survey periods are prescribed:

1. The *general* survey period throughout the range of the northern spotted owl is specified as March 15 through August 31. Forsman et al. (1984) indicate that courtship behavior

⁴ Appendix 2 provides contact information for Fish and Wildlife Service Field Offices within the range of the northern spotted owl.

usually begins in February or March, with the timing of nesting and fledging varying upon elevation and latitude. April 1 coincides with incubation in most areas (exceptions addressed below). Appendix 3 provides a generalized spotted owl breeding chronology.

2. In the Oregon and California Coast Ranges, local information suggests that spotted owls defend established territories as early as March 1. Therefore, in the Oregon Coast Range Province and California Coast Range Province, the survey period can be initiated on March 1, and survey conducted at that time (and otherwise consistent with this protocol) may be counted toward a complete survey. Please recognize that determinations for nesting and non-nesting status are to be conducted during specific periods of the survey season (Section 17.0). To maximize efficiency, occupancy and nesting status surveys should coincide.
3. Specific to the western Washington Cascades, the fledgling period can extend to September 15. Here, local information has shown that spotted owls return to their established territories later and defend their territory well into September (D. Herter pers. comm. and unpublished data October 2009; R. Pearson pers. comm. and unpublished data, November 2009). Therefore, within the Western Washington Cascades Province, surveys may continue as late as September 15 and count toward meeting a complete survey.

There may be cases where positive responses occur outside the above survey periods. These responses may provide important information, but will require closer evaluation to determine if the responses represent core use areas. Surveys outside the above dates do not count towards the number of visits required for completing the year's survey without seeking concurrence from the Service.

5.0 GENERAL SURVEY DESIGN

The intent of any survey is to obtain complete coverage of spotted owl habitat within the survey area, and in a manner in which spotted owls will be able to hear the surveyor and the surveyor will be able to hear responding owl vocalizations.

5.1 Calling Routes

Establish calling stations and survey routes to achieve complete coverage of all habitat within the survey area. Spacing of calling stations can be determined by the topography and acoustical characteristics (e.g., background noise such as creeks) of the area; stations are typically spaced between 0.25 and 0.5 mile apart. Surveyors should take advantage of prominent points within the survey area when establishing calling stations. Use of prominent points should not be at the cost of not being able to hear distant responding owls. Tips on placing call stations to maximize acoustical coverage can be found on the Service's website (<http://www.fws.gov/species/nso>).

5.2 Known Spotted Owl Sites

Where *KNOWN SPOTTED OWL SITES* exist within the survey area, surveys should be initiated at the *ACTIVITY CENTER* (see section 8.0). Once the occupancy and/or

reproductive status (per your management need) for the year is determined, spotted owl habitat within a 0.5 mile radius of the site center can be excluded from further surveying for the remainder of the season. Adjustments beyond the 0.5 mile area can be made to avoid unnecessary or excessive calling of spotted owls depending on topography. Rationale for this type of exception should be provided on field survey forms.

5.3 Survey Procedures

Both nighttime and daytime surveys are recommended. Research data indicate that nighttime calling remains an efficient way of detecting spotted owls. In addition, some recent research data along with professional opinion by research personnel suggest that strategic daytime surveys are also an effective way for locating spotted owls. Thus, this protocol advises the use of both under certain situations, as described in “Daytime Stand Searches” (see section 13.0) below. Three types of surveys are accepted: spot calling, continuous walking and calling, and leapfrog surveys. Each is described below. Spot calling is the recommended method. Whatever method you use, be sure you cover all spotted owl habitat within the survey area.

5.3.1 Nighttime Spot Calling

Set up a series of fixed calling points approximately 0.25 to 0.5 mile apart or as needed to account for local acoustical conditions, along road, trails and/or transects. When possible, pick prominent points which allow coverage of large areas. Spend at least 10 minutes at each point. Topography with prominent features (e.g., high ridges, road landings situated above large drainages, etc.) may lend itself to more effective coverage. Whatever the topographic situation, be sure that you have sufficient overlap in calling coverage from point to point, whereby you are able to hear responding owls and that all spotted owl habitat within the entire survey area is adequately covered.

5.3.2 Continuous Walking Surveys

Continuous walking surveys occur during the night or day and are utilized when nighttime spot calling from roads or trails cannot be accomplished. Walk the designated route playing the electronic caller and pause at prominent points and at regular intervals throughout the area to conduct informal stations that are at least 3 minutes in duration.

5.3.3 Leapfrog Surveys (Nighttime)

If two people are involved, you may use a leapfrog method along roads (see Forsman 1983).

5.4 Survey Components

Regardless of the procedures used above, implementation of the following components will meet the objectives of the protocol.

5.4.1 Qualifications of Crew Leaders and Surveyors

Information regarding the qualifications, training, and experience of surveyors and crew leaders is presented in Appendix 4.

5.4.2 Digital Wildlife Callers

As of 2011, the Service advises use of high quality digital callers with well recorded spotted owl calls, and **strongly discourages** human mimicking of spotted owls calls. Increasing evidence suggests that use of human mimicking calls has a lower response rate than do quality digital devices, resulting in territorial spotted owls not being detected despite a complete protocol survey. The use of the digital caller ensures more consistent and equitable calling methods. The amplified sound generally should be about as loud as a spotted owl, but must be audible to the distance of 0.25 – 0.5 mile depending on topography. While playing calls and listening for a response, surveyors must be stationed outside their vehicle. In areas of high densities of spotted owls (e.g., California coastal areas), over-amplification may confound survey results by eliciting simultaneous responses from spotted owls representing multiple territories.

1. **Digital Callers.** As policy, the Service cannot recommend or endorse a specific company or device for digital callers. Surveyors are encouraged to use digital callers with quality speakers and digital recordings of high fidelity, as these devices and recordings are more likely to elicit a spotted owl response. Quality devices may also prove to be cost-effective, by reducing the number of survey visits to detect spotted owls, as well as being more durable in typical field conditions. The Service encourages surveyors to seek out others in the surveying business for suggested devices.
2. **Bionic Ears.** Hearing enabling devices such as “bionic ears” should not be used, as these devices generally only “listen” in one direction and may impeded determining response locations.

5.4.3 Spotted Owl Calling Procedures

1. **Calling Methods and Sequencing.** Start the caller and let it run for 3-4 complete calls, listen for 1 to 2 minutes, then play another set of calls. A recommended call sequence includes: standard 4-note hoot, barking calls, contact whistle both normal and agitated, and agitated call (also referred to as the monkey call). Use both male and female examples of all these calls as available but use of calls from both sexes is best. Recorded spotted owl calls can be downloaded from the following website: www.fws.gov/species/nso. These same calls may come with commercial calling devices.
2. **Call Variation.** When conducting the daytime stand searches or activity center searches, use a variety of calls, with some emphasis on the female whistle. Do not broadcast loudly and do not use agitated or barking calls near a potentially active nest – this could agitate the female more than necessary or draw females off the nest.
3. **Varying Call Patterns Between Visits.** If several visits to the area have used the same set of spotted owl calls, the surveyor should consider switching to a different set of calls/recordings of a different individual that had not been used previously at the site or survey area (<http://www.fws.gov/species/nso>). This “new” spotted owl may elicit a stronger reaction (e.g., because it is considered a “stranger” rather than

a known “neighbor”) from a resident but relatively non-vocal spotted owl. It is recommended that surveyors always hold in reserve such calls until late in the survey, as they may be more effective at eliciting a response if the owl has become habituated to the calls earlier in the season. **Optional:** If spotted owls have not been detected in visits 1-4, use barred owl calls for five minutes following the 10-minute calling period on visits 5 and 6. Please note these efforts on your field forms.

4. ***Duration of Calling Effort.*** Continue this process for at least 10 minutes at each calling station. **Discontinue calling once a spotted owl responds.** Allow the spotted owl to respond and listen for the remainder of the 10 minutes to determine if there is more than one spotted owl. See section 14.0 RECORDING DATA for recommendations on recording data and triangulation procedure. Prompt triangulation should occur soon after the first owl starts responding.
5. ***Daily Timing of Surveys.*** Conduct night surveys between official apparent sunset and sunrise (see the NOAA website for area and times: <http://www.srb.noaa.gov/highlights/sunrise/sunrise.html>). Be sure not to call the same section of a survey route at the same time on each survey effort, that is, vary the time you start and the section of the route from which you start.
6. ***Acceptable Weather Conditions.*** Do not survey under inclement weather conditions, such as high wind speed (e.g. > 15 mph), rain, heavy fog, or at high noise levels which would prevent hearing of responses (e.g., stream noise, continuous tree drip after a rain event, machine noise, etc.). If weather conditions or noise levels are in doubt, be conservative. Consider placing call stations away from streams to reduce noise interference. Surveys conducted under marginal conditions will reduce quality of the overall survey effort. Negative results collected under inclement weather conditions may not be adequate for evaluating spotted owl presence/absence. Generally, surveys should be conducted under conditions described as a gentle breeze (wind speed 8-11 mph, or less. Under such conditions, flags may extend, and leaves move. As wind levels reach >12mph (small branches move, dust begins to blow) conditions are not acceptable as background sound level substantially reduces ability of the owl to hear the caller, and vice versa. For additional information, see: <http://www.unc.edu/~rowlett/units/scales/beaufort.html>.
7. ***Systematically survey all spotted owl habitat*** within each survey area until an owl responds or if no response is heard, until the recommended number of survey visits have been completed.
8. ***Characterize and document behavioral observations.*** Make note of agitated calls, continuous responses, movement (toward or away the calling stations), or situations such as when one response is received and the owl is quiet thereafter. Recording

this type of information may assist with the identification of activity centers.

5.5 Complete Visits

The objective of a complete visit is to conduct a thorough survey of the entire area in one field outing; however, in some cases this may not be possible. A complete visit may be a combination of day and night surveys and may include a daytime *FOLLOW-UP OUTING*. If reasonable effort was made to cover the survey area in one outing, but this was not accomplished, then the remaining unsurveyed area should be surveyed as soon as possible but within 7 days for the entire survey area. To reduce the chance of spotted owls moving between portions of the Survey Area and not being detected, complete the visit on consecutive days as much as possible. The entire area should be covered within 7 days to be considered one complete visit.

1. **Subdividing Survey Areas.** If the project area is too large to be surveyed in 7 days, it should be divided into smaller areas based on habitat distribution, topography, road networks, and/or drainages. Survey areas need to be small enough to be completely surveyed within the specified time period.
2. **Daytime Follow-up to a Spotted Owl or Unidentified Strix.** If a surveyor detects a spotted owl or unidentified *Strix* species (including owls that fly-in without calling) at night and conducts a daytime follow-up, the combination of the night outing and the daytime follow-up would be counted toward one complete visit. If a surveyor does not obtain a response during a survey, a daytime follow-up would not be necessary. In that case, the night outing alone would be considered as one complete visit provided all remaining spotted owl habitat within the Survey Area has been called (See section 6.0 for Follow-up visits).
3. **Temporal Spacing of Visits.** Complete visits must be spaced at least 7 calendar days apart. For example, assume a complete visit ends May 1. Using a proper 7 day spacing, the next possible visit date would be begun on May 8.
4. **Three Visits by June 30.** At least 3 of the complete visits should be conducted before 30 June; this includes at least one visit in April, one in May and one in June. Ideally, the survey effort should be spread out over the entire survey season. Concentrating surveys too early or late in the survey season may result in inaccurate conclusions for the survey area.
5. **Documenting Unavoidable Operational Conditions.** Where survey seasons or individual visits are restricted due to snow, landslides, mandatory road closure, or other unavoidable operational and access conditions, the survey period may be adjusted to accommodate such restrictions; documentation should be provided to explain the causes of the modified survey period.
6. **Safety and Night Surveys.** Surveys may be conducted during the day where there are no roads or foot trails to traverse at night, or where there are other safety concerns. Documentation should be provided for specific safety concerns as to why night surveys could not be conducted. Note: while the protocol provides some flexibility to

account for field conditions, it is recommended that adequacy of survey effort be discussed with the appropriate regulatory office.

7. **Number of Complete Visits.** To meet the objectives of this protocol, 2-year surveys with 6 complete visits per year are required to determine the presence or absence of spotted owls.

5.6 Additional Visits

If a single spotted owl responds, and after 6 complete visits resident status has not been determined, then up to 2 additional visits may be necessary in that year. Additional visits are visits conducted beyond six complete visits and are conducted only in the general area of the response (a 0.5-mile radius around the detection location). If resident status is determined at any point during the additional visits, no more visits to that particular site are required that year.

For additional visits, maintain the standards (timing, temporal spacing of visits, weather condition limitations, etc.) outlined elsewhere in this document. If additional visits cannot be completed prior to the end of the survey season (while still maintaining intervals required between visits), they may be conducted as soon as necessary to stay within the normal survey season, or up to as late as September 30.

If the last response occurs on:

- Visits 1 through 4 - no additional visits are required
- Visit 5 - conduct 1 additional visit
- Visit 6 - conduct 2 additional visits

6.0 FOLLOW-UP OUTINGS

The objective of the daytime follow-up outing is to locate spotted owls by conducting an intensive daytime search of spotted owl habitat within the general vicinity (approximately a 0.5-mile radius) of the response location that prompted the follow-up. Daytime locations are very important in determining key nesting and roosting sites, which in turn provides more precise information for management. All spotted owl and barred owl detections should be recorded to the Township, Range, Section, 1/4 and 1/16, and appropriate UTM datum when possible. Daytime follow-up surveys consist of both active calling with a digital device and visual searching.

A review of aerial photos is suggested to assist surveyors in identifying the available habitat in which to focus a search. *Searches should start as close as possible to the owl's mapped response.* Surveys may begin from the road closest to the response area. If owls do not respond to vocalizations given from road survey stations nearest the detection, surveyors should conduct daytime stand searches throughout the 0.5 mile area around the detection. This may take several hours, depending on the terrain. *Do not conduct your follow-up entirely from the road* – spotted owls may be using a patch of habitat at a distance from the road and may not respond unless surveyors are close in proximity. Observers should watch for owls approaching without responding and other evidence of occupancy, such as pellets, whitewash, and molted feathers.

Pellets, whitewash, or feathers alone may not be sufficient to document spotted owl presence or residency. Mobbing jays and other birds may alert the observer to the presence of a spotted owl or other *Strix* species. The follow-up should be completed as soon as possible after presence was detected, as owls are more apt to be located near the previous night's location. A daytime follow-up is the second part of a complete visit if a spotted owl is detected. The follow-up route must be delineated on a map and accompanying outing form and should include the start, end, and total survey time.

Do not hoot any more than is necessary; hoot only as much as needed to identify *Strix* species and determine status. Excessive surveyor vocalization may modify spotted owl behavior and stimulate them to move around more than is typical and possibly increase their risk of predation. Excessive calling near a nest site may cause harassment by bringing the female off the nest. Limit the use of calling, in particular higher stress calls, when calling near a known nest site. Soft contact whistles and “mouse squeaks” sometimes works to elicit responses near nests.

7.0 WHEN BARRED OWLS or *STRIX* UNKNOWN SPECIES ARE DETECTED

Because barred owls now completely overlap the distribution of northern spotted owls in Oregon and Washington and substantially overlap the species in California, and have reduced detection rates (response behavior) of spotted owls, it is important to properly ascertain the species of *Strix* owls detected, either visually or auditory, during the survey.

7.1 When Barred Owls Are Detected

If a barred owl is heard or seen:

1. Continue to call for spotted owls for the entire 10-minute period, or until a spotted owl responds,
2. If a spotted owl responds and the barred owl is in close proximity and/or acting aggressively toward the responding spotted owl, **discontinue calling at that station immediately**. Continue to listen at that station for at least the entire 10-minute period so that any spotted owl or additional barred owl responses will be heard and recorded. Complete the rest of the survey beyond hearing distance to continue calling the route (generally at least 0.5 mi.). This guidance applies to other owls and raptors *that may be acting aggressively toward (or represent a capable predator of) spotted owls*.

7.2 When *Strix* Unknown Species Are Detected

If a *Strix* Unknown Species is heard or seen:

1. Continue to call using spotted owl calls for the entire 10-minute duration, or until the spotted owl or barred owl identification is confirmed.
2. Wait silently for 5 additional minutes after the 10-minute calling period while listening and watching for owls.
3. If the unidentified *Strix* owl detections cannot be identified to species by spending extra time at the station where it was originally detected, a follow-up should be

conducted to increase the probability of identifying which species is present.

4. If follow ups are unsuccessful in establishing the species identity of the owl, additional visits should be conducted. The same procedures as used to determine resident status should be used; up to two additional visits should be conducted (see section 5.6 Additional Visits).
5. If all parameters of the protocol are met and the *Strix* species detection is either attributed to a barred owl or remains uncertain, do not “guess” on the species determinations without reasonably confident visual or audio information; simply record the species as *Strix* unknown. All field observations need to be well documented so that all information associated with the survey can be taken into consideration during technical assistance or consultations with the state and federal regulatory agencies.

8.0 ACTIVITY CENTER SEARCHES WITHIN SURVEY AREA⁵

Objective: *To search habitat and locate spotted owls in known core areas used in previous years for nesting and roosting.*

A minimum of one daytime stand search “Activity Center Search” is to be completed for each activity center within the survey area, each year, as a component of the 2-year survey. This is important because spotted owls commonly utilize the same, or nearby nest and roost stands year after year and searching the activity center and core use area during the day may increase the likelihood of detecting a spotted owl. Research has shown that this is still the case for some spotted owls even with barred owls present.

Use aerial photographs and delineate stands of spotted owl habitat with the likelihood of containing nesting and roosting owls within 0.5 mile of the activity center to focus a thorough visual and auditory search of the identified stands. Similar to follow-up surveys, these searches may take up to several hours to thoroughly search the habitat. In conducting these surveys, the broadcast calling will be at a lower volume than used for nighttime station calling (approximating the volume of an actual spotted owl hoot). Avoid the heat of the day to increase the chances of finding spotted owls. During the daytime search, be sure to look for incidental signs of whitewash, pellets, and feathers indicating potential presence of spotted owls. Also, keep your eyes to the forest canopy because owls may fly in to the surveyor without responding. Investigate jays or other birds giving scolding calls because they often mob roosting owls.

These daytime searches to known spotted owl sites (“Activity Center Search”) should be conducted as part of the initial visit to the survey area (generally late March or early April), prior to the initiation of nighttime routes. If it is possible to locate resident spotted owls without doing station visits, time and effort may be saved because portions of the survey area within hearing distance of that known spotted owl site (generally 0.5-mile radius) can be omitted from surveys to avoid unnecessarily interacting with those owls. If the pair or resident single is located, record the location and go to Section 17, Determining Reproductive Success, if

⁵ Please see Glossary (Appendix 1) for definitions of “known/historical” sites.

this level of information is needed.

This search area may be included as part a complete visit if the daytime search is conducted during the seven days required for a complete visit (Ex: if daytime stand search occurs within the 0.5 mile area on visit one, nighttime calling of that same habitat will not be necessary for that visit). Please note that on subsequent visits, nighttime calling of this 0.5 mile circle should be included in the overall survey area for the remainder of the complete visits if owls were not detected during the Activity Center Search.

IF Activity Center Searches are being conducted to locate NSOs adjacent to project activities and determine nesting status for projects operating in the breeding season of years 3 and 4, follow methodology for determining nesting status (this may include more than one visit).

9.0 SURVEYS FOR DISTURBANCE-ONLY PROJECTS

Activities that do not modify spotted owl habitat but will result in disturbance to spotted owls usually represent short-term effects compared to the long-term effects of habitat modification, especially when such projects are limited to one season. Therefore, a one-year six visit survey can apply to smoke or noise-disturbance only actions. Six visits that cover all spotted owl habitat within 0.25 mile from the project area will be effective until the beginning of the following breeding season. If operations are not completed by year two, three spot check survey visits each year should occur in years two and three OR project proponents can choose to utilize the 2-year, six visit survey protocol. Field forms should indicate that these are disturbance-only projects.

10.0 SPOT CHECK SURVEYS

With the invasion of the barred owl, spotted owls have shown increasing tendency to move from established, activity centers and establish, or attempt to establish, alternate activity centers or core use areas to avoid agonistic encounters with barred owls. Spotted owls establish activity centers in stands that have not previously been documented more frequently than typically occurred prior to the barred owl invasion. Because of this movement, there is an increased risk that spotted owls may establish activity centers and core use areas within or near project areas subsequent to completion of protocol surveys. If gone undetected, spotted owls at these new site centers are at risk of direct harm, injury, or harassment from project activities that result in direct physical modification (e.g., tree felling, prescribed fire, cable yarding, helicopter downdraft, etc.) or biological modification (e.g., noise exceeding ambient conditions).

The 2-year, 6-visits per year, surveys establish a reasonably high likelihood of detecting spotted owls in occupied activity centers within the survey area. However, the Service believes it prudent that project proponents to do *SPOT CHECK SURVEYS* of the project area and immediate vicinity (i.e., within 0.25 mile) prior to conducting activities in years 3 and 4. Spot checks are prescribed to detect spotted owls that may have moved into the project area subsequent to completion of general surveys. A new site center could be established in the project area by (a) known territorial individuals within the survey area; (b) undetected spotted owls from known sites within the survey area; or (c) dispersing juveniles, floaters, or territorial

spotted owls displaced from outside the survey area. These factors, plus the history of barred owl detections in the survey area, are taken into account when determining the need for spot checks. Spot checks are intended to supplement the general project-level surveys and avoid the potential direct take of spotted owls from project implementation.

Adjustments to project timing or other project modifications may be required under some circumstances where spotted owls initiate breeding activities within or immediately adjacent to a project area (See 10.3 below).

10.1 Design of Spot Check Surveys

Spot check surveys include the following components:

1. Spot checks supplement the full 2-year, 6 visits-per-year protocol surveys and are conducted during years 3 and/or 4 of the survey cycle.
2. Spot check surveys will cover all spotted owl habitat within the project footprint and within 0.25 mile of the project footprint (hereafter referred to as the *SPOT CHECK AREA*).
3. Spot check surveys consist of three nighttime surveys spaced a minimum of 7 days apart.
4. Spot checks may begin on the appropriate Survey Period date for the physiographic province (see section 4.0), and should be completed prior to or concurrent with project activities (see conditions described in 10.2.2. below) on or before April 15, or as soon as feasible during the early portion of the breeding season (See Appendix 4) if there are conditions of limited accessibility, such as due to snow or seasonal road closures. If spot checks cannot be completed by April 15, reasons for delayed completion should be documented in the survey record.
5. Should the project continue into the year 4 breeding season, spot checks should be repeated, with similar consideration of spotted owl nesting status and consideration of take avoidance measures.
6. Any detection of spotted owls during a spot check survey should be followed up as soon as possible, but not later than 7 days after the nighttime detection, by a daytime follow-up visit to confirm the location and status of detected owls.

10.2 Circumstances Establishing the Need for Spot Checks.

Not all projects need spot check surveys. The surveyor should apply the circumstance that best describes actual history of known spotted owl sites and survey data for the project and survey area, as described below. Figure 2 provides a flow chart to assist in determining cases where spot checks are needed.

10.2.1 Circumstances Precluding the Need to Conduct Spot Check Surveys

For project areas meeting *ALL* of the following conditions, the likelihood of territorial

spotted owls occupying the project area is discountable. The action may occur in years 3 and 4 without additional surveys.

1. No resident single owls, territorial owl pairs, or pairs/two owls of unknown status are detected during protocol survey visits, including any additional visits, in the survey area (i.e., survey area not occupied by a territorial pair or single detected during year 1 and/or year 2 surveys); and
2. No activity centers are known to occur in the survey area; and
3. No barred owls are detected in the survey area during protocol surveys or are otherwise known to occur in the survey area; and
4. All spotted owl habitat within the survey area has been **completely** covered during protocol surveys (i.e. there is no habitat that was omitted due to inaccessibility, landowner restrictions, incomplete surveys, or other constraints).

10.2.2 Situations Where Spot Checks Are Necessary

The following bullets describe situations when spot check surveys **are** necessary. The project proponent should complete spot checks and schedule/implement projects as appropriate:

1. If no resident single owls, territorial owl pairs, or pairs/two owls of unknown status are detected within the survey area (project footprint plus one home range for projects that will modify habitat; 0.25 mile footprint for disturbance-only surveys) during year 1 or 2 of protocol surveys, and no known spotted owl sites are known from the survey area, BUT barred owls are known to occur within the survey area (through project surveys or other scientifically credible methods), spot checks are necessary. In this case, projects may be initiated during the breeding season (or continue if ongoing) concurrent with spot checks.
2. If no resident single owls, territorial owl pairs, or pairs/two owls of unknown status are detected within the survey area during year 1 or 2 protocol surveys, but known spotted owl sites are known to occur in the survey area, spot checks are necessary. In this case, projects may be initiated during the breeding season (or continue if ongoing) concurrent with spot checks.
3. If no resident single owls, territorial owl pairs, or pairs/two owls of unknown status are detected within the survey area during year 1 or 2 protocol surveys, and no known spotted owl sites are known to occur in the survey area, BUT portions of spotted owl habitat within the survey area is unsurveyed during protocol surveys due to inaccessibility, landowner restrictions, or other constraints, spot checks are necessary. Under these circumstances, spot checks must be completed prior to operations occurring after February 1.

4. If resident single owls, territorial owl pairs, or pairs/two owls of unknown status are detected within the survey area during years 1 and/or 2 protocol surveys, spot checks are necessary. Under these circumstances, spot checks must be completed prior to operations occurring after February 1.

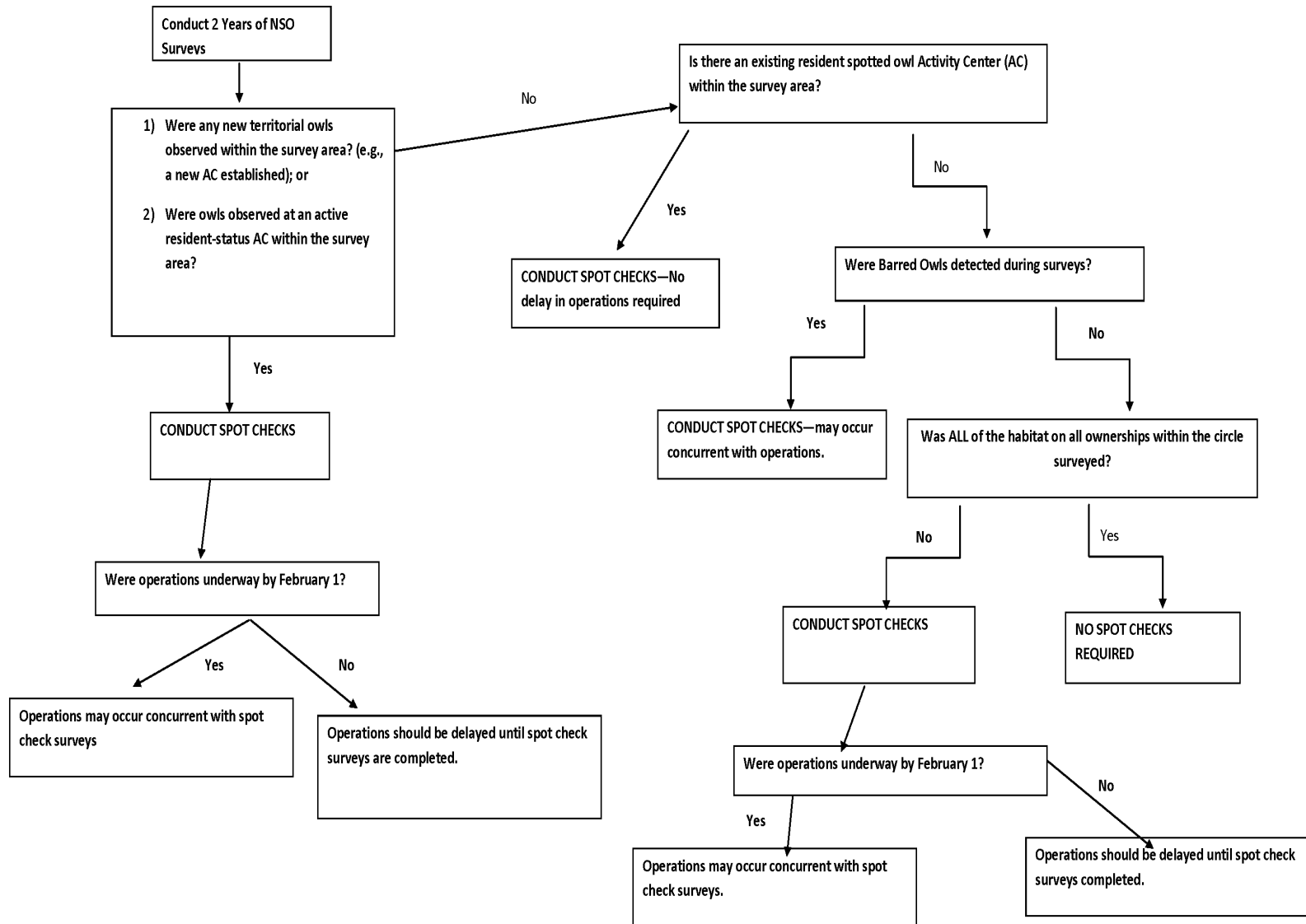
10.3 If Spotted Owls Are Detected in the Spot Check Area

If spotted owls are detected in the spot check area, ALL ongoing operations that have a likelihood of direct harm to a spotted owl and/or creating above-ambient noise shall be postponed. Conduct follow-up outings to determine location and pair/nesting status, as described in Section 16.0-17.0 of this document. Location data should be reviewed by the appropriate regulatory office to ensure that appropriate protection measures that avoid incidental take are implemented.

10.4 If Spotted Owls Are Not Detected in the Spot Check Area

If spotted owls are not detected, the project may continue through that breeding season. Should the project continue into the following breeding season, spot checks should be repeated.

Figure 2. Flow Chart to determine when spot check surveys are required.



11.0 COMPLETE SURVEY

A COMPLETE SURVEY includes:

- Two years of six visits per year, including activity center searches, and, if appropriate;
- Spot Checks and activity center searches, as described in section 10.0 and 8.0 respectively.

12.0 DURATION AND EXPIRATION OF SURVEYS

Based on the data analyzed and professional opinion, 2-year surveys are expected to provide more accurate results for a survey area because of annual variation in occupancy and detection probabilities between years across most of the range of the spotted owl. As described above, two years of spot checks may be necessary in years 3 and 4 depending on the results of two years of survey. If spot checks have not been completed, full protocol surveys are recommended beginning in year 5. If spot checks have been completed in years 3 and 4, technical assistance with appropriate regulatory agency will be required to evaluate scope of remaining harvest and appropriate survey needs in year 5 for remaining harvest areas.

13.0 DAYTIME STAND SEARCHES (OPTIONAL)

Objective: *To search habitats most likely to contain roosting or nesting spotted owls.* Optional daytime stand searches are intended to provide an extra level of assurance that non-responsive spotted owls are not residing in a project area by searching nesting/roosting habitat within the project area using methodologies used for follow-up surveys. Examples of situations when daytime stands searches might be warranted include projects near known activity centers without recent verified owl use, projects near activity centers that have been taken over by barred owls, or project areas proposed in high-quality nesting or roosting habitat.

14.0 RECORDING DATA

For each visit, whether results are positive or negative, record the following information on the survey form:

- Brief description of survey route, with accompanying topographic map of route.
- Survey start and stop time at stations (total amount of time spent calling) and total time of survey if calling between stations.
- Weather conditions (including estimated wind speed and precipitation). Note stop and restart times if weather during your survey momentarily exceeds recommended conditions.
- Clearly document areas of overlap on survey area maps indicating years of surveys for each area.

If raptors are detected during a survey, all sightings or responses by spotted owls, barred owls, spotted-barred owl hybrids, great horned owls, northern goshawks, or any other large raptor species should be recorded. The presence of barred owls, great horned owls, goshawks, or other large raptors may affect spotted owl responses.

Note on map and on data form (both should have survey date recorded):

- Compass bearing and approximate distance to spotted owl or other raptor;
- Sex and age if known (adult and subadult spotted owls cannot be distinguished based solely on vocals);
- Time of first response;
- Type of detection (e.g., audio, visual or both). For multiple or moving owls, map and list information and number of each response or observation. This will allow for more accurate determination of activity centers.

Estimate and indicate on a map the bird's original and final location. One method is to triangulate on the location from which the owl's call originated, taking compass bearings from 2-3 identifiable positions (e.g., at road junctions; or record GPS coordinates at each triangulation point) along the road or trail. Make sure compass bearings are taken in as short a time-frame as possible and recorded on the survey form. Do not force the spotted owl to call again if bearings cannot be completed before the spotted owl stops calling. Simply use the best compass bearing(s) you have. The intent of the triangulation and mapping is to provide a means to find the location in a subsequent survey effort (e.g., follow-up; see below). Triangulation efforts should begin soon after the owl's first response.

Once a spotted owl responds at night, discontinue calling at the station, but keep listening for the remainder of the station visit; consider listening for a few minutes beyond the 10 minutes to ascertain if other owls are present. Once the station visit at which the detection was obtained has been completed, continue to survey the remainder of the survey route. However, to avoid 'leading' a spotted owl across the survey area through continued calling nearby, we recommend that once an owl responds, the surveyor should go to other parts of the survey route and complete the rest of the survey visit, omitting the area within 0.5 mile around the detection location. If that is not practical, survey only the remaining points that are *beyond hearing distance of the responding bird*. The range of hearing distance is generally any distance beyond a ridge or about 0.5 mile straight-line distance from the owl. Completing the route will provide an opportunity to detect other owls that may be present.

If no response is heard, proceed to the next calling point. Continue until the survey area is completely covered.

If a spotted owl (or an unidentified *Strix* owl) is detected during the survey, return to the area during the day as soon as possible (preferably within 48 hours) and conduct a follow-up outing to verify status as needed, unless reproductive status has already been determined. Diurnal surveys should be interrupted to accomplish the follow-up immediately after the detection.

15.0 MOUSING

The purpose of mousing is to determine if spotted owls are nesting and reproducing. By offering one or more mice to spotted owls, their nesting status can be determined based on the behavior of the adult. Mousing will also be used to locate nests (and brooding females) by inducing the male to lead the surveyor to the nest tree and, later in the nesting season, can be used to locate and count young recently out of the nest. Mousing consists of the following steps.

1. Locate one or both members of a pair during the day and offer to them at least two mice or other small prey items.
2. Once the owl(s) take prey, or are found with natural prey, record the 'fate' of each prey item (e.g., eaten, cached, given to female or young) along with the sex of the owl that captured the prey. The fate of the prey is used to classify nesting status.
3. If the owl eats the prey item, continue to offer additional prey items until the owl caches the prey, sits on it for an extended period of time (30-60 minutes), refuses to take additional prey, or carries the prey away. If the bird flies with the prey, follow and try to determine the final disposition of the prey. For more details on mousing procedures, see Forsman (1983) Methods and Materials for Locating and Studying Spotted Owls. USDA Forest Service, Gen. Tech Rept. PNW-162.
4. Field personnel should make a concerted effort to get the owl(s) to take mice. Be creative in placing a mouse where the owl can easily see and capture it and offer mice to the mate of an owl that has refused mice on that visit. A long pole or stick can be used to place mice higher in a tree where an owl may more likely take it.

The known spotted owl site will be classified as nesting, non-nesting, or unknown nesting status (see section 17. Determining Nesting & Reproductive Status) based on your observations.

16.0. DETERMINING ACTIVITY CENTER STATUS

Depending on the use for which the survey data will be applied, determining the occupancy/reproductive status of sites may be necessary. This section provides guidance on the appropriate techniques to collect necessary information, and in correctly interpreting that information, to make the relevant determination. Verify the activity center status according to the following definitions (status visits can be day or night). The definitions may be somewhat different from the status definitions outlined in the density/demography survey guidelines, due to the different objectives of the guidelines for surveying proposed management activities.

16.1 Determining Resident/Territorial Spotted Owl Pairs or Singles

The following subsections for determining if an activity center is occupied by a territorial pair, and pair with status unknown, a resident single, or status unknown.

16.1.1 Territorial Pair Status.

Any one of the following criteria establishes *TERRITORIAL PAIR* status:

1. A male and female are heard and/or observed (either initially or through their movement) in close proximity (< ¼ mile apart) to each other on the same visit; or
2. A male takes a mouse to a female (see "mousing" clarification under section 15.0 or REPRODUCTIVE SUCCESS SURVEYS 17.5); or
3. A female is detected (seen or heard) on a nest; or
4. One or both adults are observed with young; or
5. Young identifiable based on plumage characteristics observed late in the season by knowledgeable surveyors or young identifiable based on molecular data.

16.1.2 Two Birds/Pair Status Unknown.

The presence or response of 2 birds of the opposite sex where pair status cannot be determined and where at least 1 of the owls meets the resident single requirements establishes *TWO BIRDS, PAIR STATUS UNKNOWN*.

16.1.3 Resident Single Status

RESIDENT SINGLE STATUS is established by any one of the following criteria:

1. The presence or response of a single owl within the same general area on 3 or more occasions within the breeding season, with no response by an owl of the opposite sex after a complete survey; or
2. Multiple responses over several years (e.g., 2 responses in year 1 and 1 response in year 2) from the same general area.

A resident single may represent a succession of single owls of either sex within the same general area in a single or multiple years. Determining if the responses occur within the same general area should be based on topography and the location of any other owls known for the surrounding area. This should be determined by the wildlife biologist for the particular area.

16.1.4 Status Unknown

STATUS UNKNOWN is the appropriate determination, following a complete survey, whenever the response of a male and/or female does not meet any of the above site status definitions.

17.0 DETERMINING NESTING & REPRODUCTIVE STATUS

Reproductive surveys are usually conducted to determine if breeding season restrictions intended to protect nesting owls can be lifted.

Reproduction surveys include two stages: nesting status and reproductive success. The following is the recommended protocol for determining reproductive status of spotted owls. Reproduction surveys may provide information on nest tree locations which provide the most relevant management (activity) center locations.

17.1 Nesting Status Surveys

Nesting Status Surveys should be done whenever it is necessary to determine if spotted owl may be nesting. The following criteria determine appropriate timing and procedures for

conducting such surveys:

1. Conduct nesting status surveys between 1 April and 1 June. The start date is based on nest initiation dates. If local data suggests a different date for nest initiation, adjust the start date accordingly. Young identified after 1 June would still confirm nesting.
2. Spread the surveys throughout the months of April and May. Avoid collecting all nesting status surveys early in the breeding season.
3. Use a standard "mousing" procedure as described above to determine nesting status. However, do not mouse birds any more than is necessary to determine nesting status. Stimulating the owl to move around excessively during the day, may increase their risk of predation. Similarly, excessive calling near a nest site may cause harassment and endanger eggs or young by bringing the female off the nest. Also, do not cause owls to unnecessarily become more habituated to humans by using more mice than necessary.
4. Two observations, at least one week apart, are required to determine nesting status if the first observation occurs before 1 May. This is necessary because the owls may show signs of initiating nesting early in the season without actually laying eggs and their behavior could easily be mistaken for nesting behavior. After 1 May, a single observation is sufficient.

17.2 Determining Nesting Status

Nesting is confirmed if, on 2 visits before 1 May, or 1 visit after 1 May, any of the following conditions are observed:

1. The female is detected (seen) on the nest; or
2. Either member of a pair carries natural or observer-provided prey to the nest; or
3. A female possesses a brood patch when examined in hand during mid-April to mid-June (only one observation is required). Dates may vary with the particular areas. Be careful not to confuse the normal small area of bare skin (i.e., apteria) on the abdomen with the much larger brood patch. A fully developed brood patch covers most of the lower abdomen, extending to the base of the wings. Describe the brood patch on the field form, including length, width, color, and texture of the skin, and any evidence of regenerating feathers around the edge (NOTE - while a scientific research permit is not required by the Service for calling spotted owls, any capture or handling of spotted owls requires such a permit); or
4. Young identifiable as spotted owls or young detected in the presence of one or both adults.

17.3 Non-Nesting Status

The activity center is classified as non-nesting if any of the following are observed. Again,

except for brood patch information, two observations are required during the nest survey period (April 1-June 1), with at least 3 weeks separating these observations to ensure that late nesting attempts are not missed. The second observation should occur after 1 May. Because nesting attempts may fail before surveys are conducted, the non-nesting status includes owls that did not attempt to nest as well as those that have failed. Non-nesting is inferred if any of the following conditions is met:

1. The female is observed roosting and away from the nest for at least 60 minutes on two occasions, more than 3 weeks apart between 1 April and 1 May. (Be aware that nesting females with large nestlings often roost outside the nest during warm weather. If in doubt, be sure to schedule one or more visits in mid-June to check for fledglings);
2. The female does not possess a brood patch when examined in-hand between mid-April and mid-June; or
3. Prey is offered to 1 or both members of the pair and they cache the prey, sit with prey for an extended period of time (60 minutes), or refuse to take additional prey beyond the minimum of 2 prey items. To be considered a valid nesting survey, an owl must take at least 2 prey items.

Surveys where the bird(s) leaves the area with prey and it is not possible to determine the fate of the prey do not count toward the required 2 visits because nesting status could not be classified. Some spotted owls may be reluctant to take prey at all. If in doubt, be sure to schedule 1 or more visits in mid-June to check for fledglings.

17.4 Nesting Status Unknown

If nesting status is not determined before 1 June, it is not possible to classify the owls as non-nesting using the criteria listed above.

1. If owls are found after 1 June, without young, nesting status is unknown.
2. If no owls are found after 1 June (at those sites where owls were present prior to 1 June), nesting status is unknown.

17.5 Reproductive Success Surveys (Number of Young Fledged)

Once a pair is classified as nesting, conduct reproductive success surveys after the time the young leave the nest (fledge), usually from late May to late June depending on latitude or elevation. If local fledging times are available you may adjust the dates accordingly. The following methods should be adopted to detect fledged young.

1. Schedule at least 2 visits to the site to locate and count fledged young, timing the visits so that the fledged young are observed as soon after leaving the nest as possible to avoid missing young that may be lost to predation later in the season.
2. Attempt to locate fledged young. Use visual searches and/or mousing of adults. If young are present, the adults should take at least some of the prey to the young. The

sight of an adult with prey will usually stimulate the young to beg, revealing their number and location.

3. If the birds take at least 2 prey items and eventually cache, sit with, or refuse further prey without ever taking prey to fledged young; on at least 2 occasions, separated by at least 3 days, 0 young are recorded.

To determine the true number of fledged young, do the following:

4. On the first reproductive success visit, count the number of fledged young seen or heard.
5. Conduct a minimum of 1 additional visit, 3 to 10 days after the first fledged young is seen. This is necessary because it is possible to miss some owlets on a single visit.
6. If no response is elicited on a minimum of 2 visits, separated by at least 1 week during the fledging period, then classify the production of young as unknown.
7. If young are counted on 1 visit but a second visit is not conducted, or find no owls were found on the second visit, classify the number of young as 1+ or 2+ etc., based on the results of the initial visit.
8. Opportunistic mousing late in the season (after July 30) may be useful for providing supplemental information about site productivity.

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Appendix 1. Glossary of Terms

Many of these terms have a long history and various meanings in regard to spotted owl biology and management. This glossary defines the context in which they are used in this document.

Abandoned Activity Centers: Activity centers that have been determined through appropriate analyses with state or federal agencies, as no longer likely to be supporting territorial owls due to habitat changes and/or long-term surveys with negative responses. Synonymous with abandoned historical spotted owl site.

Activity Center: Spotted owls have been characterized as central-place foragers, where individuals forage over a wide area and subsequently return to a nest or roost location that is often centrally-located within the home range (Rosenberg and McKelvey 1999). Activity centers are a location or point representing ‘the best of’ detections” such as nest stands, stands used by roosting pairs or territorial singles, or concentrated nighttime detections. Activity centers are within the core use area and are represented by this central location.

Activity Center Search: Stand searches of any known or historical core use areas that are within the survey area perimeter. (See Section 8.0 for specific guidance on methods to conduct these searches).

Additional Visits: Supplemental visits needed to locate and determine spotted owl pair status or reproductive status. May also be necessary to determine species of unknown Strix owl responses.

Adult: A northern spotted owl ≥ 2 years old.

Breeding Season: The time period from 1 February through 31 August that includes courtships, nesting, nestling and fledgling dependency periods. This time period may vary by geographic locale.

Calling Route: An established route within a survey area where recorded calls of northern spotted owls are used to elicit a response.

Calling Stations: Point locations used to conduct surveys, distributed throughout an area so as to attain complete coverage of spotted owl habitat within the survey area.

Complete Coverage: Complete coverage of suitable owl habitat is obtained when the calling stations have been located within a survey area so that a northern spotted owl anywhere in the survey area would be able to hear surveyors and vice-versa.

Complete Visit: A complete visit occurs when all calling stations or calling routes within a survey area have been called with the seven day period, including daytime follow-up surveys for all spotted owl responses. See Section 5.5 for specifics.

Complete Survey: Complete coverage of suitable habitat throughout the survey area that

consists of two years of six visits per year, including activity center searches, and, if appropriate, spot checks and additional activity center searches in years 3 and 4, as described in section 10.0 and 8.0 respectively.

Core Use Area: An area of concentrated use within a home range that receives disproportionately high use (Bingham and Noon 1993), and commonly includes nest sites, roost sites, and foraging areas close to the activity center. Core use areas vary geographically, and in relation to habitat conditions. This is a biological definition of core use area and is not the same as a 70-acre core as defined by the Oregon Forest Practices Act nor is it equivalent to the 100-acre LSRs referred to as NSO cores on federal lands.

Daytime Stand Searches: Optional. *The objective is to search habitats most likely to contain roosting or nesting spotted owls.* A daytime stand search should cover nesting/roosting habitat within the project area.

Dispersal Habitat: Juvenile owls often must disperse through a range of forest types prior to finding habitat on which to establish a territory. These forest types include nesting, roosting, and foraging habitat in addition to other forest stand types that provide minimum diameter and canopy closure of trees. Definition of this habitat type vary by physiographic province.

Fledgling: Young of the year that are off of the nest.

Follow-up Outing: Follow-ups are conducted with an intensive search of spotted owl habitat within the general vicinity (approximately a 0.5-mile radius) of the response location -that prompted the follow-up. (See Section 6.0 for recommended methodology for conducting these searches).

Foraging Habitat: Foraging habitat is defined as habitat that provides foraging opportunities for spotted owls, but without the structure to support nesting and roosting (USFWS 1992b). Owls often forage in forest conditions that meet the definition of nesting/roosting habitat, but also use a broader range of forest types for foraging. This definition identifies habitat that functions as foraging habitat, but does not meet requirements for nesting /roosting

Habitat-capable area: Forests below the elevation limits of occupancy by territorial spotted owls that are capable of growing and sustaining structural (Davis and Lint 2005:30) and ecological conditions of spotted owl habitat.

Habitat Modification: Activities that occur in spotted owl nesting, roosting, or foraging habitat that reduce the canopy or other elements of spotted owl habitat at the stand-level. Wildlife biologists with the appropriate federal and state agencies may be able to provide technical assistance assessing these types of effects.

Historical Site: Spotted owl sites that contained territorial spotted owls in the past. For the purposes of this protocol, these spotted owl sites are considered a subset of known spotted owl sites (see glossary below).

Home Range: The area in which a spotted owl conducts its activities during a defined period of time (USFWS 1992b) that provides important habitat elements for nesting, roosting, and foraging. Home range sizes vary generally increase from south to north and vary in relation to habitat conditions and prey availability and composition

Juvenile: A northern spotted owl is considered as juvenile age class in the first 5 months after hatching. Juveniles 1 to 3 months old are very white with downy plumage over all of the body or evident on breast and head; at 4 to 5 months old, juvenile begin losing downy plumage.

Known Spotted Owl Site: Includes both owl sites found during the current survey period and owl sites identified in previous years ('historical site). Known spotted owl sites include both the activity center and the area surrounding concentrations of 'the best of' detections such as nest stands, stands used by roosting pairs or territorial singles, or areas of concentrated nighttime detections.

Mousing: Mousing describes the act of offering prey items to spotted owls. The purpose of mousing spotted owls is to determine pair status and/or reproductive status. A male spotted owl may take a prey item to an unseen female; likewise, adult owls may take prey items to unseen young.

Nest: Northern spotted owls use broken-topped trees, old raptor nests, witches brooms, cliff ledges, mistletoe brooms, and tree cavities for nests. A spotted owl must be observed using the structure or have mice taken to a nesting female positively identified in the structure to designate a nest tree.

Nesting and Roosting Habitat: Habitat that provides nesting and roosting opportunities for spotted owls. Important stand elements may include high canopy closure, a multi-layered, multi-species canopy with large overstory trees and a presence of broken-topped trees or other nesting platforms (*e.g.*, mistletoe clumps (USFWS 1992b)). The appearance and structure of these forests will vary across the range of the spotted owl, particularly in the dry-forest provinces.

Nestling: A young owl that is still in the nest.

Northern Spotted Owl (*Strix occidentalis caurina*): One of three subspecies of spotted owl that ranges from southern British Columbia, Canada, through western Washington and Oregon, and into northwestern California. Listed as a threatened species by the U.S. Fish and Wildlife Service.

Physiographic Province: a geographic area having a similar set of biophysical characteristics and processes because of the effects of climate and geology that result in patterns of soils and broad-scale plant communities. Habitat patterns, wildlife distributions, and historical land use patterns may differ significantly from adjacent provinces.

Project Area: The polygon that forms the perimeter (footprint) of the proposed project. (Refer to Section 3.1 for specifics on determining the polygon).

Provincial: This is a qualifying term used with home range and core use area to reflect the fact that both vary in size according to latitude, amount of available habitat, prey availability, and forest structure and composition. Typically, home range and core use area sizes increase from south to north, and decrease as amount of high quality habitat available to owls increases.

Roost: Typically a tree used by a spotted owl for extended daytime rest periods. A roost site consists of the roost itself and the immediate vicinity. Roost areas are identified by observations of spotted owls, and/or the presence of pellets, white-wash and other evidence.

Spot Check Area: All suitable spotted owl habitat within the project area, plus suitable spotted owl habitat within 0.25 mile of the perimeter of the project area.

Spot Check Surveys: Conducted in years 3 and 4, consisting of 3 nighttime surveys spaced a minimum of 7 days apart, covering the spot check area (see section 10.0).

Spotted Owl Habitat: For purposes of surveying, spotted owl habitat is any habitat (i.e., nesting, roosting or foraging quality) where you may expect to elicit a response from a resident owl or pair of owls. This does not include younger or more open stands typically characterized as spotted owl dispersal habitat. Descriptions of spotted owl habitat for the various areas may be available from state wildlife and forestry agencies, or through technical assistance with local Service Field Offices (Appendix 3). Habitat descriptions can also be found in these references: Thomas et al. 1990, Courtney et al. 2004, USDI 2008. Regulatory definitions should be used where appropriate (e.g., definitions embedded within state forest practices regulations).

Subadult: A spotted owl in the first or second years of life. Identified by characteristic tail feathers with white tips tapering to sharp points (i.e., triangular shape). For more information on identifying subadult spotted owls, please see Moen et. al. 1991.

Survey Area: All suitable spotted owl habitat within one spotted owl provincial median home range radius from the perimeter of the proposed project area should be surveyed for projects that will modify spotted owl nesting, roosting, or foraging habitat. Table 1 provides appropriate survey area radius values, by physiographic province. (See Section 3.2 for additional specific guidance). For disturbance-only projects that will not modify habitat but will result in disturbance to spotted owls (short-term effects compared to the long-term effects of habitat modification), surveys should be conducted within 0.25 miles of the project area (see Section 9.0 for specific guidance).

Survey Period: All surveys of proposed project areas must take place between March 15 and August 31, with some exceptions. (See Section 4.0 for specifics related to province differences and weather related exceptions).

Appendix 2: U.S. Fish & Wildlife Service Field Office Contact Information.

U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, 2800 Cottage Way, Room W-2605, Sacramento, CA 95825-1846. Telephone: 916-414-6000.

U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office, 1655 Heindon Road, Arcata, CA 95521-5582. Telephone: 707-822-7201.

U.S. Fish and Wildlife Service, Red Bluff Fish and Wildlife Office, 10950 Tyler Road, Red Bluff, CA 96080. Telephone: 530-527-3043.

U.S. Fish and Wildlife Service, Yreka Fish and Wildlife Office, 1829 South Oregon Street, Yreka, CA 96097. Telephone: 530-842-5763.

U.S. Fish and Wildlife Service, Klamath Falls Office, 1936 California Ave, Klamath Falls, OR 97601. Telephone: 541 885-2525

U.S. Fish and Wildlife Service, Roseburg Field Office, 2900 NW Stewart Parkway, Roseburg, OR 97471. Telephone: 541-957-3470.

U.S. Fish and Wildlife Service, Bend Field Office, 20310 Empire Avenue, Suite A100, Bend, OR 97701. Telephone: 541-383-7146.

U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office, 2600 SE 98th Avenue, Suite 100, Portland, OR 97266. Telephone: 503-231-6179.

U.S. Fish and Wildlife Service, Washington Fish and Wildlife Office, 510 Desmond Drive, SE, Suite 102, Lacey, WA 98503. Telephone: 360-753-9440.

U.S. Fish and Wildlife Service, Central Washington Field Office, 215 Melody Lane, Suite 119, Wenatchee, WA 98801. Telephone: 509-665-3508.

Appendix 3. Generalized Northern Spotted owl Breeding Season Chronology⁶.

Prelaying												
Laying												
Incubation												
Nestling												
Fledgling												
Initial dispersal												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Prelaying Stage (duration variable)

Beginning about a week before laying, the female spends most of her time near the nest. Because the prelaying stage has no clearly definable beginning, we have arbitrarily designated the first several weeks prior to laying of the first age as the prelaying stage.

Laying Stage (1-6 days; Forsman et al. 1984)

When egg laying begins, the female spotted owl typically spends almost all of her time in the nest, her mate provides nearly all of her food. Copulation continues on a daily basis throughout the egg-laying stage and for up to about 4 days after incubation begins.

Incubation Stage (30 plus or minus 2 day; Forsman et al. 1984)

Incubation begins shortly after laying of the first egg and is done solely by the female, who may leave the nest at night for up to 2 hours during the first couple of days of incubation. Thereafter, she only occasionally leaves the nest for periods of 10 to 20 minutes at night to regurgitate pellets, defecate, preen, or accept food from her mate.

Nestling Stage (normally 34-36 days; Forsman et al. 1984)

The female broods the new hatchlings almost continuously for 8-10 days, still depending on her mate to provide food for herself, and now for the young. By the time her young are 2-3 weeks old, the female begins to forage for increasingly longer periods at night, typically 1-4 hours. The male continues to bring food to the nest, but the female passes the food to the young. Most young observed by Forsman et al. (1984) fledged (left the nest) when 34-36 days old, occasionally moving off the nest to perch on nearby limbs for a few days before leaving the nest permanently. Occasionally young leave their nest earlier than normal. Because such young are less developed physically, they may spend more time on the ground than young that remain in the nest for the full nestling period. This may increase their mortality rate compared to that of later-fledged young.

⁶ This information is intended to depict the generalized breeding chronology, recognizing slight variations in all stages may occur depending on individual owls, elevation, in-season weather conditions, and/or latitude.

Fledgling Stage (80-120 days; Forsman et al. 1984)

The fledgling stage covers the period after the young leave the nest until they become independent of their parents. Within about 3 days after fledging (assuming a normal nestling period of 34-36 days), most young can flutter or climb to elevated perches; usually in a week they can fly clumsily between trees. Within about 3 weeks after fledging, they can hold and tear meat from prey brought by their parents. Both parents regularly bring food to the fledgling and generally continue to do so until mid- to late September, apparently regardless of the age or capabilities of the young. Because of this, the fledgling stage may be relatively long or short, depending upon when a given nest was begun and on variations in the age of the young at fledging.

Appendix 4. Recommended Credentials and Qualifications for Crew Leaders and Surveyors.

RECOMMENDATIONS FOR SPOTTED OWL SURVEYORS CREDENTIALS and QUALIFICATIONS

Surveyor qualifications are provided as recommendations for evaluation of personnel that are proposed to be involved in spotted owl surveys. *These recommendations are advisory but highly encouraged.*

Crew Leader:

- Responsibilities: Supervises survey crew, data collection, prepares basic data summary, and coordinates with other surveyors. Additional responsibilities include supervision of: 1) survey route layout, and 2) determination of area coverage requirements.
- Minimum requirements:
 - Normal hearing abilities are requisite. A crew leader must be able to hear the owl(s) if they were calling (a hearing test is advised); AND
 - One year (one field season) of spotted owl survey experience, plus training in spotted owl survey techniques, including identifying the various calls of northern spotted owls, barred owls, and NSO-barred owl hybrids as attested to by letters of reference;
 - OR-
 - At least 2 field seasons conducting spotted owl calling surveys, preferably under the guidance of another biologist with experience in conducting successful spotted owl surveys.

Owl Caller or Surveyor:

- Responsibilities: conducts owl surveys and collects data.
- Minimum requirements:
 - Normal hearing abilities are requisite (a hearing test is advised). An owl caller must be able to hear the owl(s) if they were calling; AND
 - Training in spotted owl survey techniques, including identifying the various calls of northern spotted owls, barred owls, and NSO-barred owl hybrids as attested to by letters of reference;
 - OR-
 - At least one field season of spotted owl survey experience, preferably working closely with other biologists experienced in conducting successful spotted owl surveys.

Both Crew Leader and Owl Surveyor must have the physical ability to work in mountainous terrain and willingness to work during nighttime conditions. In some cases, Crews Leads and Surveyors may be asked to conduct both day and nighttime work. Orienting skills, including the use of map and compass is essential. Surveyor safety should be of primary importance.

Appendix 5. Suggested but Necessary Equipment to Conduct Surveys

- **Digital caller.** An example of this would be an MP3 player and a chip containing the spotted owl calls identified for use in this protocol (page XX).
- **Call recordings of other owl species.** This would include the range of barred owl calls along with other owl species from the Pacific Northwest. Surveyors should become familiar with the vocalizations of all of the owls they might hear. Part of this familiarization is to distinguish the difference between spotted owl and barred owl female contact calls or whistles. Identification of unknown calls should be attempted to in the field with the recorded calls on hand.
- **Binoculars.** Many times, spotted and barred owls fly in to surveyors and will not vocalize. The potential of identification increases with the use of binoculars with sufficient magnification.
- **Lighting.** Have a good flashlight to help with spotlighting and identification of individuals at night. Owls may perch for only a short time and having this lighting available will increase your chances of positive identification and save on subsequent survey effort. Have a good headlamp to assist with getting around. For safety, as well as to avoid wasted surveys, remember to carry spare, fully charged batteries in your vehicle.

Field Data Form - Data Dictionary

Age – Age is verifiable only upon visual detections.

AD=Adult

IMM = Immature (adult plumage but white tipped tail feathers observed)

F1=young; all downy **F2** = young, partial adult/partial down feathers **F3** = Young of the year with almost all adult feathers; may see a few downy feathers sticking through

UNK=Age unknown

Detection Time – Record in military time

Location Name – Enter name of survey area (i.e., Jackson Timber Sale)

Master Site Number - Enter state-identified activity center number

Physiographic Province – e.g., CA or OR Klamath, OR Coast, WA Cascades, etc.

SEX – **M**= Male **F**=Female **Unk** = Unknown. Contact whistles can be made by male or female.

SPP – **NSO** = Northern spotted owl **BAOW** – Barred Owl

Appendix B: NRM 2019 Survey Data



NSO Night Calling Survey Form

Date: 3/8/2019	Surveyor: Ivonne Romero	Landowner: McKay Community Forest
Sunset: 1816	Visit No: 1	NSO AC No: HUM
(24 hour)	Six Pass or Spot Surveys: Six Pass	(Note if survey associated with an AC)
Weather		
Temperature (F): 39	Moon: Waning Crescent (full, half, quarter, new)	% Cloud Cover: 90 (increments of 10)
Wind: Calm (calm, light, moderate, strong)	Precipitation: None (none, mist, fog, drizzle, rain)	NOTE: inclement weather and/or wind >10 mph that inhibits surveyor's ability to hear responses will invalidate survey

Station	Time Start	Time Stop	Total Time	No Response (write NR)	Owl Response and Notes				
					Species	Response time (24hr)	Sex/age	Distance (ft)	Bearing (0-360)
M17	1828	1838	10	NR					
M18	1918	1928	10	NR					
M22	2000	2019	19		NSOW	2008	F/A	1320	118
					NSOW	2009	F/A	1320	118
					NSOW	2010	F/A	1320	118
					NSOW	2012	U/A	1320	118
					NSOW	2016	F/A	300	162
					NSOW	2017	F/A	300	162
					NSOW	2019	F/A	300	162
M13	2025	2036	11	NR					
M21	2045	2055	10	NR					
M14	2110	2120	10	NR					
M19	2137	2147	10	NR					

4-letter Code	Species
NSO or NSOW	northern spotted owl
BADO	barred owl
BANO	barn owl
FLOW	flamulated owl
GHOW	great horned owl
NOPO	northern pygmy owl
NSWO	northern saw whet owl
WESO	western screech owl



NSO Night Calling Survey Form

Date: 3/15/2019	Surveyor: Adam Webster	Landowner: McKay Community Forest
Sunset: 1922	Visit No: 2	NSO AC No: HUM
(24 hour)	Six Pass or Spot Surveys: Six Pass	(Note if survey associated with an AC)
Weather		
Temperature (F): 55	Moon: Half (full, half, quarter, new)	% Cloud Cover: 80 (increments of 10)
Wind: Calm (calm, light, moderate, strong)	Precipitation: None (none, mist, fog, drizzle, rain)	NOTE: inclement weather and/or wind >10 mph that inhibits surveyor's ability to hear responses will invalidate survey

Station	Time Start	Time Stop	Total Time	No Response (write NR)	Owl Response and Notes				
					Species	Response time (24hr)	Sex/age	Distance (ft)	Bearing (0-360)
M18	2002	2013	11	NR					
M19	2029	2040	11	NR					
M14	2047	2058	11	NR					
M21	2142	2153	11	NR					
M13	2125	2136	11	NR					
M22	2107	2118	11	NR					
M17	2231	2243	12	NR					

4-letter Code	Species
NSO or NSOW	northern spotted owl
BADO	barred owl
BANO	barn owl
FLOW	flammulated owl
GHOW	great horned owl
NOPO	northern pygmy owl
NSWO	northern saw whet owl
WESO	western screech owl



NSO Night Calling Survey Form

Date: 3/29/2019	Surveyor: Adam Webster	Landowner: McKay Community Forest
Sunset: 1938	Visit No: 3	NSO AC No: HUM
(24 hour)	Six Pass or Spot Surveys:	(Note if survey associated with an AC)
Weather		
Temperature (F): 53	Moon: New (full, half, quarter, new)	% Cloud Cover: 80 (increments of 10)
Wind: Calm (calm, light, moderate, strong)	Precipitation: None (none, mist, fog, drizzle, rain)	NOTE: inclement weather and/or wind >10 mph that inhibits surveyor's ability to hear responses will invalidate survey

Station	Time Start	Time Stop	Total Time	No Response (write NR)	Owl Response and Notes				
					Species	Response time (24hr)	Sex/age	Distance (ft)	Bearing (0-360)
M17	2016	2029	13	N R					
M18	2102	2113	11	NR					
M14	2121	2132	11	NR					
M21	2139	2150	11	NR					
M13	2203	2214	11	NR					
M19	2217	2229	12		BAOW	2229	M/A	150	180

4-letter Code	Species
NSO or NSOW	northern spotted owl
BADO	barred owl
BANO	barn owl
FLOW	flamulated owl
GHOW	great horned owl
NOPO	northern pygmy owl
NSWO	northern saw whet owl
WESO	western screech owl



NSO Night Calling Survey Form

Date: 4/13/2019	Surveyor: Ivonne Romero	Landowner: McKay Tract
Sunset: 1954	Visit No: 4/6	NSO AC No:
(24 hour)	Six Pass or Spot Surveys:	(Note if survey associated with an AC)
Weather		
Temperature (F): 57	Moon: Quarter	% Cloud Cover: 100
	(full, half, quarter, new)	(increments of 10)
Wind: Calm	Precipitation: None	NOTE: inclement weather and/or wind >10 mph that inhibits surveyor's ability to hear responses will invalidate survey
(calm, light, moderate, strong)	(none, mist, fog, drizzle, rain)	

Station	Time Start	Time Stop	Total Time	No Response (write NR)	Owl Response and Notes				
					Species	Response time (24hr)	Sex/age	Distance (ft)	Bearing (0-360)
M18	1954	2004	10	NR					
M19	2009	2020	11	NR					
M14	2026	2036		NR					
M21	2043	2053	10	NR	*Dogs barking next to surveyor				
M13	2059	2110	11	NR					
M22	2117	2127	10	NR					

4-letter Code	Species
NSO or NSOW	northern spotted owl
BADO	barred owl
BANO	barn owl
FLOW	flammulated owl
GHOW	great horned owl
NOPO	northern pygmy owl
NSWO	northern saw whet owl
WESO	western screech owl



NSO Night Calling Survey Form

Date: 06/01/2019	Surveyor: Ivonne Romero	Landowner: McKay Community Forest
Sunset: 2042 (24 hour)	Visit No: 5/6 Six Pass or Spot Surveys:	NSO AC No: (Note if survey associated with an AC)
Weather		
Temperature (F): 55	Moon: Waning Crescent (full, half, quarter, new)	% Cloud Cover: 100 (increments of 10)
Wind: Calm (calm, light, moderate, strong)	Precipitation: None (none, mist, fog, drizzle, rain)	NOTE: inclement weather and/or wind >10 mph that inhibits surveyor's ability to hear responses will invalidate survey

Station	Time Start	Time Stop	Total Time	No Response (write NR)	Owl Response and Notes				
					Species	Response time (24hr)	Sex/age	Distance (ft)	Bearing (0-360)
M17	2044	2054	10	NR					
M19	2128	2138	10	NR					
M14	2153	2203	10	NR					
M21	2209	2219	10	NSOW female responded to cat-like howl with her own cat-like howl for about 2 minutes.	NSOW	2213	F/A	1320-2640	62
“ “	“ “	“ “	“ “		NSOW	2215	F/A	1320-2640	62
M22	2225	2235	10	NR					
M13	2242	2252	10	NR					
M18	2309	2319	10	NR					

4-letter Code	Species
NSO or NSOW	northern spotted owl
BADO	barred owl
BANO	barn owl
FLOW	flammulated owl
GHOW	great horned owl
NOPO	northern pygmy owl
NSWO	northern saw whet owl
WESO	western screech owl



NSO Night Calling Survey Form

Date: 06/20/2019	Surveyor: Ivonne Romero	Landowner: McKay Community Forest
Sunset: 2051 (24 hour)	Visit No: 6/6 Six Pass or Spot Surveys:	NSO AC No: (Note if survey associated with an AC)
Weather		
Temperature (F): 60	Moon: Waning Gibbous (full, half, quarter, new)	% Cloud Cover: 0 (increments of 10)
Wind: Light (calm, light, moderate, strong)	Precipitation: None (none, mist, fog, drizzle, rain)	NOTE: inclement weather and/or wind >10 mph that inhibits surveyor's ability to hear responses will invalidate survey

Station	Time Start	Time Stop	Total Time	No Response (write NR)	Owl Response and Notes				
					Species	Response time (24hr)	Sex/age	Distance (ft)	Bearing (0-360)
17	2051	2101	10	NR					
21	2135	2150	15	Female responded to cat-like howl with her own howl. Responded with howl for remainder of survey.	NSOW	2035	F/A	1000	62
21				“ “	NSOW	2036	F/A	500-800	64
21				“ “	NSOW	2037	F/A	500-800	64
21				“ “	NSOW	2038	F/A	500-800	64
21				“ “	NSOW	2039	F/A	500-800	64
21				“ “	NSOW	2043	F/A	500-800	64
21				“ “	NSOW	2044	F/A	500-800	64
21				“ “	NSOW	2047	F/A	500-800	64
22	2157	2207	10	NR					
13	2212	2222	10	NR					
14	2230	2240	10	NR					
19	2249	2250	10	NR					
18	2306	2316	10	NR					

4-letter Code	Species
NSO or NSOW	northern spotted owl
BADO	barred owl
BANO	barn owl
FLOW	flammulated owl
GHOW	great horned owl
NOPO	northern pygmy owl
NSWO	northern saw whet owl
WESO	western screech owl



NSO Night Calling Survey Form

Date: 7/15/2019	Surveyor: Ivonne Romero	Landowner: McKay Community Forest
Sunset: 2047	Visit No: 1-Additional Visits	NSO AC No: HUM
(24 hour)	Six Pass or Spot Surveys:	(Note if survey associated with an AC)
Weather		
Temperature (F): 60	Moon: Waxing Gibbous (full, half, quarter, new)	% Cloud Cover: 80 (increments of 10)
Wind: Light (calm, light, moderate, strong)	Precipitation: Heavy Fog (none, mist, fog, drizzle, rain)	NOTE: inclement weather and/or wind >10 mph that inhibits surveyor's ability to hear responses will invalidate survey

Station	Time Start	Time Stop	Total Time	No Response (write NR)	Owl Response and Notes				
					Species	Response time (24hr)	Sex/age	Distance (ft)	Bearing (0-360)
M21	2236	2252	15	NR	*Heavy fog, dogs barking				
M19-1	2302	2317	15	NR	*Heavy fog, dogs barking				

4-letter Code	Species
NSO or NSOW	northern spotted owl
BADO	barred owl
BANO	barn owl
FLOW	flammulated owl
GHOW	great horned owl
NOPO	northern pygmy owl
NSWO	northern saw whet owl
WESO	western screech owl



NSO Night Calling Survey Form

Date: 7/22/2019	Surveyor: Ivonne Romero	Landowner: McKay Community Forest
Sunset: 2041	Visit No: 2-Additional Visits	NSO AC No: HUM
(24 hour)	Six Pass or Spot Surveys:	(Note if survey associated with an AC)
Weather		
Temperature (F): 58	Moon: Waning Gibbous (full, half, quarter, new)	% Cloud Cover: 20 (increments of 10)
Wind: Calm (calm, light, moderate, strong)	Precipitation: None (none, mist, fog, drizzle, rain)	NOTE: inclement weather and/or wind >10 mph that inhibits surveyor's ability to hear responses will invalidate survey

Station	Time Start	Time Stop	Total Time	No Response (write NR)	Owl Response and Notes				
					Species	Response time (24hr)	Sex/age	Distance (ft)	Bearing (0-360)
M22	2041	2156	15	NR	*Dogs barking				
M19-1	2101	2116	15	NR	*Heavy fog, dogs barking				
M21*	2122	2146	18		NSOW	2135	F/A	400	210°
“ “	“ “	“ “	“ “	“ “	NSOW	2137	F/A	200	158°
“ “	“ “	“ “	“ “	“ “	NSOW	2137	M/A	550	195°
“ “	“ “	“ “	“ “	“ “	NSOW	2140	M/A	550	195°

Female NSOW detected from NRM point 21 at 2135 at end of my call sequence. She responded with high pitched squeal (bird's call was especially high pitched). I walked over to closest point to her (Lat/Lon:-124.1431, 40.7406) and called one more time. She responded again at 2137 with high pitched squeal from about 200 ft behind a high fence surrounding a residence. She continued calling from same point for about when I heard male "monkey call" (sustained hoot, not 4-note signature call) from 195° at about 550 ft in the forest. I heard her use her high-pitched squeal from a slightly farther location in his direction, then quickly return to her original spot. She continued calling every minute or so. Male called one more time from same location, same call at 2140. Female called 3 more times before end of survey.

4-letter Code	Species
NSO or NSOW	northern spotted owl
BADO	barred owl
BANO	barn owl
FLOW	flammulated owl
GHOW	great horned owl
NOPO	northern pygmy owl
NSWO	northern saw whet owl
WESO	western screech owl



NSO AC and Follow Up (FO) Survey Form

Date: 7/24/2019	Surveyor: Ivonne Romero	Landowner/Property: McKay Community Forest
Survey Start: 1508	Survey Finish: 1638	Total Survey Duration: 1 hr. 30 min.
NSO AC No: HUM	If FO, response from Station #: M21	Sunset: 2039
Weather		
Temperature (F): 74	Moon: Last Quarter (full, half, quarter, new)	% Cloud Cover: 15 (increments of 10)
Wind: Calm (calm, light, moderate, strong)	Precipitation: None (none, mist, fog, drizzle, rain)	NOTE: inclement weather and/or wind >10 mph that inhibits surveyor's ability to hear responses will invalidate survey

Detection and Location					
Species Code (NSO or BADO)	Time Detected	How Detected (Visual or Auditory)	Sex (M, F, U)	Age Class (Adult, Juv, Fledgling, Unknown)	UTMs

Mousing Report Record					
Mouse	Outcome	Start Time	End Time		Notes
M1					
M2					
M3					
M4					
M5					
M6					
M7					
M8					

Mousing Key	Designate Male or Female
E	Eats mouse
T	Takes mouse to other owl
H	Holds mouse until surveyor leaves
C	Caches mouse
I	Ignores mouse until surveyor leaves
X	Leaves with mouse and is not relocated
L	Leaves with mouse and is relocated without mouse



NOTES: Including accumulations of whitewash, feathers, pellets	NEST TREE INFERRED: (UTMs)
---	--------------------------------------

Attempted follow up near stand closest to where I heard the pair the night before, however, due to access restrictions I ended survey. Follow-up visit was aborted.

Correspondence with Dan Hansen, CDFW. August 7, 2019

Ivonne,

Thank you for contacting me regarding Northern Spotted Owl (NSO) Activity Center (AC) placement in your survey area in the McKay Tract (no Timber Harvest Plan number or name provided). I reviewed the materials you sent. I also reviewed the historical NSO survey information in CNDDDB and talked with CDFW's NSO database manager, Kate Keiser.

Based only on the partial survey information provided to me (e.g., you did not provide follow-up data forms or maps or the full set of nocturnal survey forms), it appears you do not need to identify and protect a new AC at or near the cluster of 2019 detections. I'm basing this on (1) there is an unusually strong set of location information for the nearby AC HUM0063, which appears to be a Green Diamond long-term study site with multiple known nest locations—see attached—the 2019 detections did not occur on a landscape with limited or intermittent survey information, (2) the 2019 detection locations are not far enough away from AC HUM0063 to suggest they represent a new territory (e.g., based on median territory sizes reported by Franklin et al. 2000 in the Willow Creek Demographic Study Area), (3) the detections are not on the other side of a major ridge or body of water from the AC, further suggesting they occurred in the HUM0063 territory, and (4) the 2019 detections were clustered and were somewhat distant from AC HUM0063 (~0.4 mi), suggesting the pair may have roosted in that general area this year, but none of the 2019 detections were during the daytime or near sunset or sunrise (i.e., suggesting a daytime roost is located nearby). This assessment is specific to these detections and landscape. In some cases, AC designation and protection may be warranted at/near clusters of nocturnal detection locations.

Please note that, if NRM or others continue to survey this area, and if additional detections occur in the same area, an AC designation may be needed at that time. If additional survey information is available for 2019, it could also affect my recommendation regarding the need for AC designation and protection.

Please feel free to contact me again if you would like to discuss this further.

Thank you,

Dan Hansen
Environmental Scientist
Timberland Conservation Program
California Department of Fish and Wildlife
619 Second Street, Eureka, CA 95501
(707) 441-5788 | dan.hansen@wildlife.ca.gov

Appendix C: GDRC 2019 Survey Data

Correspondence with Ian Holl, GDRC. September 5, 2019.

Hello Ivonne:

I have attached all of our survey information for the McKay tract for this survey season. That first document is an overview map of the THPs that we surveyed, the NSO sites in the tract and the locations of our property wide points that cover the tract.

I updated the THP calling spreadsheet with the additional dates that we surveyed each THP unit and included maps of each of the THPs with the survey points. R13 Thin (GDRCo #19-1601) had a detection at station #1 (5/14/2019) but was determined to be the male NSO from R13 (HUM1018) based on band resight information. R13 Thin (GDRCo #19-1601) had a second detection from station #2 (5/14/2019), this detection was assigned to Ryan Creek (HUM0921) based on proximity to site and follow up stand searches. R13 Thin (GDRCo #19-1601) had a third detection from station #4 (7/18/2019) of an unknown strix, the surveyor heard fledgling begging calls at the point but was not able to identify the species. We have complete the follow up stand searches for this detection and did not find anything. Ryan Creek Thin (GDRCo #19-1602) had no detections.

In addition to our THP night calling data, I included a spreadsheet with all of our property wide survey data which we use to survey for both spotted owls and barred owls. The locations of these points are represented by red arrows on the overview map and we had no NSO detections from these points this year. Each of these points is called for a minimum of 18 minutes with 9 minutes of spotted owl calling followed by 9 minutes of barred owl calling.

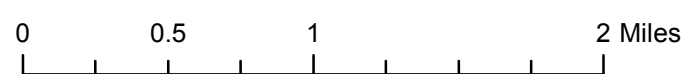
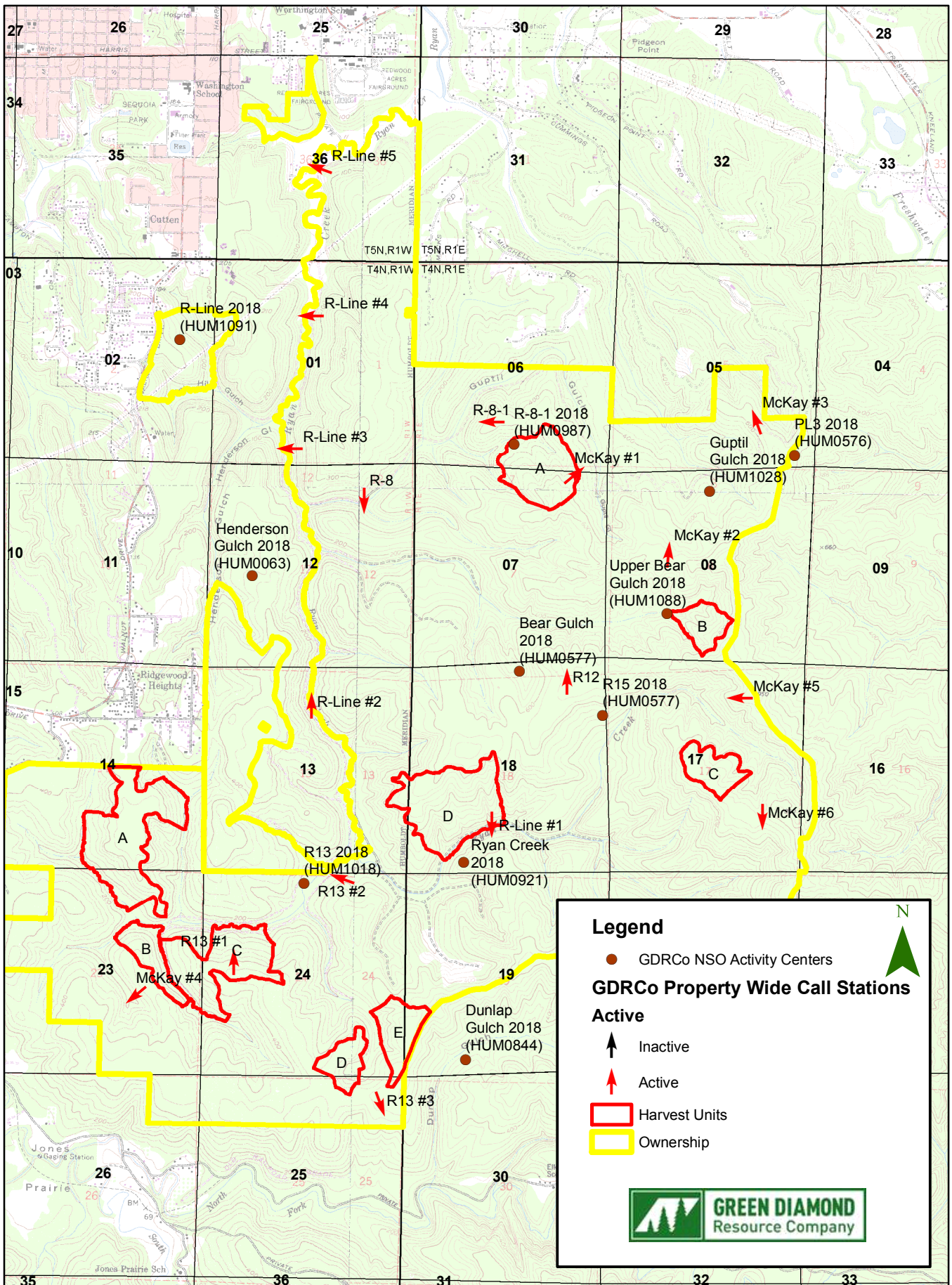
We have two sites in the tract that are occupied this year R13 (HUM1018) and Ryan Creek (HUM0921). R13 (HUM1018) has been occupied by a single male and Ryan Creek (HUM0921) has been occupied by a pair. You can see the locations of the birds on the attached map of the sites. The dots on the survey maps do not represent new activity centers as Ashley has not made a final determination on status or activity center location. Henderson Gulch (HUM0063) had one detection that you guys got but again Ashley has not made a final determination on whether we will consider this site occupied based on that detection. All of the other sites on the overview map were unoccupied this year.

I hope that this information proves useful and I apologize for not getting this to you earlier. I know your reporting deadline is tomorrow so if you have any questions feel free to call me at (510) 590-7136.

Ian Michael Holl
Wildlife Biologist I, Korb Office
Green Diamond Resource Company
900 Riverside Rd., Korb, California 95550
<http://www.greendiamond.com>



McKay Tract Overview Map



GDRC Property-Wide Survey Data

Point Name	Date	Species	Sex	Azimuth	Distance
McKay #1	06/11/19	BAOW	U	75	1/2 mile
McKay #1	06/03/19	None	NA	NA	NA
McKay #1	05/21/19	None	NA	NA	NA
McKay #2	06/11/19	None	NA	NA	NA
McKay #2	06/03/19	None	NA	NA	NA
McKay #2	05/21/19	None	NA	NA	NA
McKay #3	08/27/19	BAOW	M	206	200m
McKay #3	08/27/19	BAOW	F	NA	NA
McKay #3	07/23/19	None	NA	NA	NA
McKay #4	06/17/19	None	NA	NA	NA
McKay #4	05/14/19	None	NA	NA	NA
McKay #5	07/23/19	None	NA	NA	NA
McKay #5	05/09/19	None	NA	NA	NA
McKay #6	08/28/19	None	NA	NA	NA
McKay #6	05/09/19	None	NA	NA	NA
R12	08/08/19	None	NA	NA	NA
R12	06/06/19	None	NA	NA	NA
R13 #1	08/12/19	None	NA	NA	NA
R13 #1	07/18/19	None	NA	NA	NA
R13 #2	08/12/19	None	NA	NA	NA
R13 #2	07/01/19	None	NA	NA	NA
R13 #3	06/17/19	None	NA	NA	NA
R13 #3	05/14/19	None	NA	NA	NA
R-8	07/01/19	None	NA	NA	NA
R-8	05/01/19	None	NA	NA	NA
R-8-1	06/03/19	None	NA	NA	NA
R-8-1	05/09/19	None	NA	NA	NA
R-Line #1	08/08/19	None	NA	NA	NA
R-Line #1	07/01/19	None	NA	NA	NA
R-Line #2	07/18/19	BAOW	M	NA	NA
R-Line #2	05/01/19	None	NA	NA	NA
R-Line #3	07/19/19	BAOW	F	NA	NA
R-Line #3	04/23/19	None	NA	NA	NA
R-Line #4	08/08/19	None	NA	NA	NA
R-Line #4	07/18/19	None	NA	NA	NA
R-Line #5	08/08/19	None	NA	NA	NA
R-Line #5	04/23/19	None	NA	NA	NA

Site Visit	<input checked="" type="checkbox"/>
Follow-Up (map)	<input type="checkbox"/>
Night Call	<input type="checkbox"/>

GREEN DIAMOND RESOURCE COMPANY

Met Protocol?	Yes
(Circle one)	No

Spotted Owl Site Visit/Follow-up/Night Call Form

Region: McKay Site: Henderson Gulch THP#: _____
 Date: 06/02/19 Start: 16:46 End: 18:16 Duration: 01:30
 Observer (s): AMC Call Method (V,R): V;R Calls Used: SPOW 4N; CC 1 BAOW 78N; S
 Weather: Ø Precipitation: N Wind: 0-1 Temp: 60
 (% Cloud Cover) (F, H, L, M, N, S) (0-6) (F°)

Detection:

Male

Female

Reproductive Status:

Type of call:
(4N, 3N, S, C, A, AC, B)

Time to Response:

Time to Visual:

Age: (S₁, S₂, A)

Band Status:

Unknown (U):

Unbanded (UB):

Newly Banded (NB):

Resight (RS):

Unconfirmed (UC):

Courting:

Incubating:

Brooding:

Nestlings:

Fledglings:

(Development)

Not Nesting*:

Failed:

Not Reproductive:

Unknown:

*Use only during nesting season (April 1-May 31).

Mouse Fate: (FC, FD, FE, FM, F01, F02, FU, MC, MD, ME, MF, MF01, MF02, M01, M02, MU, 01, 02)

M1 _____ M2 _____ M3 _____ M4 _____ M5 _____ M6 _____ M7 _____ M8 _____ M9 _____ M10 _____

Summary: (Describe survey route, location, habitat, owl behavior, whitewash, pellets, feathers, nest tree, etc.)

Began by walking west uphill to historic AC calling along the way (.25 miles away) Arrived at AC & looted there for ~10 min before heading southeast into gulch & contouring slope ~200 ft from western creek drainage. Excellent habitat. Large mature redwoods w/ open understory. Continued north following before looping back to AC & continued south before heading back to truck. Called for BAOW for last 10 min.

No Owls or sign detected.

Location (UTM): _____

Historic Nest Tree Location (UTM and year): _____

Precip: None, Light, Mod, Heavy, Fog, Snow

Wind: 0- No wind/calm (0 mph) 1-Smoke drifts slightly(1-3) 2-Leaves rustle (4-7) 3-Leaves small twigs in constant motion (8-12) 4-Dust raised, small branches in motion (13-18) 5-Small trees sway (19-24) 6-Large branches trees sway (25-30+)

Call Method: Voice or Recording

Type of Call: 4-Note, 3-Note, Series, Contact, Agitated, Agitated Contact, Bark

Time to Response: Time from first entry

Time to Visual: Time from first entry

Location: UTM location where owls were found

Newly Banded: Juvenile or Adult owl banded during visit

Resight: GDRCO color band positively identified

Unknown: Unable to detect leg band

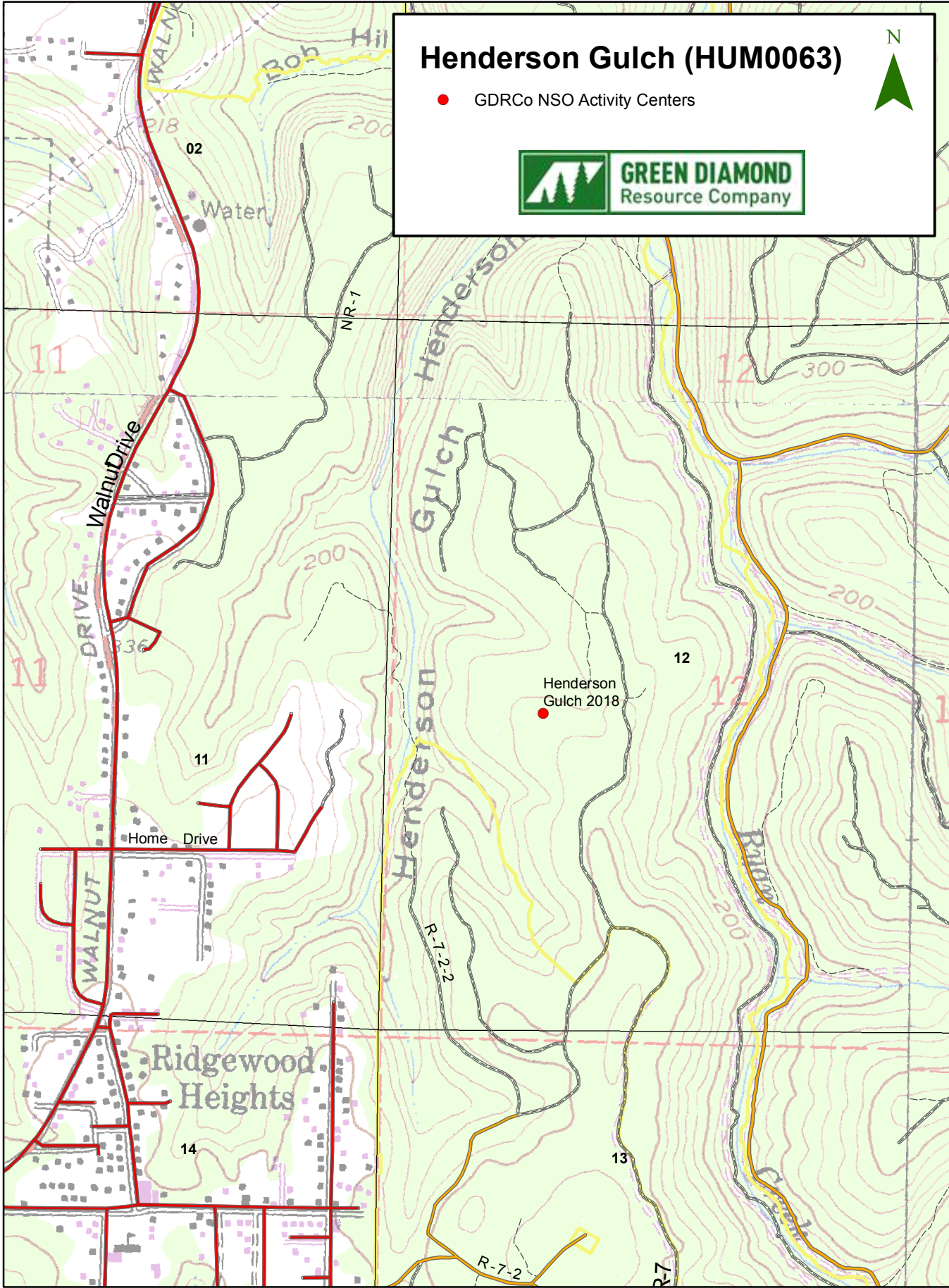
Unbanded: No color band visually detected

Unconfirmed: Color band visible, but indiscernible

Mouse Fate: FC-Female Cached, FD-Female Dropped, FE- Female Eaten, FM-Female to Male, F01-Female to Owlet1, F02-Female to Owlet2, FU-Female Unknown, MC-Male Cached, MD-Male Dropped, MF-Male to Female, MF01-Male to Female to Owlet1, MF02-Male to Female to Owlet2, M01-Male to Owlet1, M02-Male to Owlet2, MU-Male Unknown, 01-Owlet1, 02-Owlet2

Henderson Gulch (HUM0063)

● GDRCo NSO Activity Centers



0 0.1 0.2 0.4 Miles

1 inch = 1,000 feet

Site Visit	<input checked="" type="checkbox"/>
Follow-Up (map)	<input type="checkbox"/>
Night Call	<input type="checkbox"/>

GREEN DIAMOND RESOURCE COMPANY

Met Protocol?	Yes
(Circle one)	No

Spotted Owl Site Visit/Follow-up/Night Call Form

Region: Mckay Site: ~~S-Line~~ R-Line THP#: _____
 Date: 6/9/19 Start: 17:28 End: 18:50 Duration: 01:21
 Observer (s): NML Call Method (V,R): V Calls Used: 4N, 3N, C
 Weather: _____ Precipitation: _____ Wind: _____ Temp: _____
 (% Cloud Cover) 0 (F, H, L, M, N, S) N (0-6) 0 (F°) 74°

Detection:

Male

Female

Reproductive Status:

Type of call:
(4N, 3N, S, C, A, AC, B)

Time to Response:

Time to Visual:

Age: (S₁, S₂, A)

Band Status:

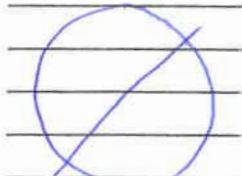
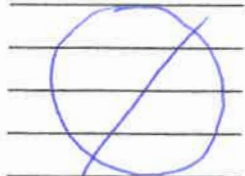
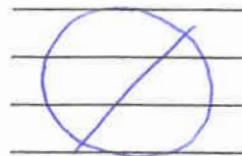
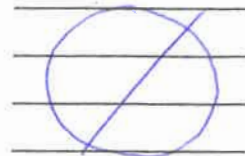
Unknown (U):

Unbanded (UB):

Newly Banded (NB):

Resight (RS):

Unconfirmed (UC):



Courting:

Incubating:

Brooding:

Nestlings:

Fledglings:

(Development)

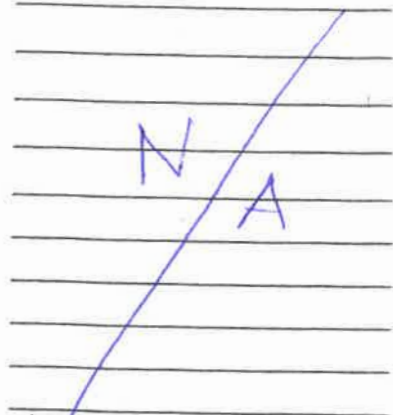
Not Nesting*:

Failed:

Not Reproductive:

Unknown:

*Use only during nesting season (April 1-May 31)



Mouse Fate: (FC, FD, FE, FM, F01, F02, FU, MC, MD, ME, MF, MF01, MF02, M01, M02, MU, 01, 02)

M1 _____ M2 _____ M3 _____ M4 _____ M5 _____ M6 _____ M7 _____ M8 _____ M9 _____ M10 _____

Summary: (Describe survey route, location, habitat, owl behavior, whitewash, pellets, feathers, nest tree, etc.)

Hiked to the end of the WD-1 & continued to the S. fork of Freshwater Creek (Bob Hill Gulch). I followed Freshwater Creek north to the old clearcut / powerline strip. I then made my way west / North-west & back to the WD-1 via an old tractor road. On my way N-W a mobbing group of Jays got my attention, some flew in to me & some did not. I hiked back to where the other jays were calling from & spent several minutes calling w/ a mouse out. I got no response. After returning to the WD-1, I looped through the activity center area and then left. No detections. It was a hot day with daytime temps in the 80's. The temp @ my truck at 7pm was 73°.

Location (UTM): _____

Historic Nest Tree Location (UTM and year): _____

Precip: None, Light, Mod, Heavy, Fog, Snow
Wind: 0- No wind/calm (0 mph) 1-Smoke drifts slightly(1-3) 2-Leaves rustle (4-7) 3-Leaves small twigs in constant motion (8-12) 4-Dust raised, small branches in motion (13-18) 5-Small trees sway (19-24) 6-Large branches trees sway (25-30+)
Call Method: Voice or Recording
Type of Call: 4-Note, 3-Note, Series, Contact, Agitated, Agitated Contact, Bark
Time to Response: Time from first entry
Time to Visual: Time from first entry
Location: UTM location where owls were found

Newly Banded: Juvenile or Adult owl banded during visit
Resight: GDRCO color band positively identified
Unknown: Unable to detect leg band
Unbanded: No color band visually detected
Unconfirmed: Color band visible, but indiscernible
Mouse Fate: FC-Female Cached, FD-Female Dropped, FE- Female Eaten, FM-Female to Male, F01-Female to Owlet1, F02-Female to Owlet2, FU-Female Unknown, MC-Male Cached, MD-Male Dropped, MF-Male to Female, MF01-Male to Female to Owlet1, MF02-Male to Female to Owlet2, M01-Male to Owlet1, M02-Male to Owlet2, MU-Male Unknown, 01-Owlet1, 02-Owlet2

Site Visit	<input checked="" type="checkbox"/>
Follow-Up (map)	<input type="checkbox"/>
Night Call	<input type="checkbox"/>

GREEN DIAMOND RESOURCE COMPANY

Met Protocol?	Yes
(Circle one)	No

Spotted Owl Site Visit/Follow-up/Night Call Form

Region: McKay Site: R-Line THP#: _____
 Date: 7/18/2019 Start: 17:00 End: 18:00 Duration: 01:00
 Observer (s): AMC Call Method (v,r): ✓R Calls Used: SPWU 4N; CC 1BAOW 2MS;
 Weather: _____ Precipitation: _____ Wind: _____ Temp: _____
 (% Cloud Cover) ∅ (F, H, L, M, N, S) N (0-6) 0-1 (F °) 65

Detection:

Male

Female

Reproductive Status:

Type of call:
(4N, 3N, S, C, A, AC, B)

Time to Response:

Time to Visual:

Age: (S₁, S₂, A)

Band Status:

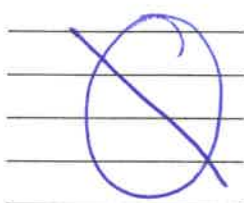
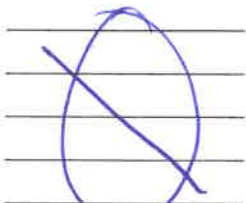
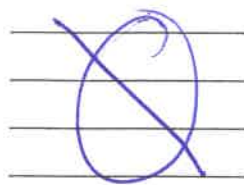
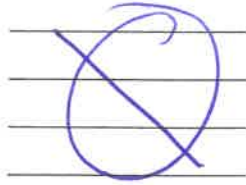
Unknown (U):

Unbanded (UB):

Newly Banded (NB):

Resight (RS):

Unconfirmed (UC):



Courting: _____

Incubating: _____

Brooding: _____

Nestlings: _____

Fledglings: _____

(Development) _____

Not Nesting*: _____

Failed: _____

Not Reproductive: _____

Unknown: _____

*Use only during nesting season (April 1-May 31)

Mouse Fate: (FC, FD, FE, FM, F01, F02, FU, MC, MD, ME, MF, MF01, MF02, M01, M02, MU, 01, 02)

M1 _____ M2 _____ M3 _____ M4 _____ M5 _____ M6 _____ M7 _____ M8 _____ M9 _____ M10 _____

Summary: (Describe survey route, location, habitat, owl behavior, whitewash, pellets, feathers, nest tree, etc.)

Began by heading towards the 2017 AC; hoisted
 there for ~5 min before heading NE towards creek
 X Zigzagged from east to west heading southward
 using eastern creek as a boundary. Habitat was
 extremely open w/ canopy cover between 50-70% tracks
 except for riparian zone which was much more
 covered ~90% redwoods that were young to mid-mature
 w/ excellent amount of woody debris
 No owls detected or observed.

Location (UTM): _____

Historic Nest Tree Location (UTM and year): _____

Precip: None, Light, Mod, Heavy, Fog, Snow

Wind: 0- No wind/calm (0 mph) 1-Smoke drifts slightly(1-3) 2-
Leaves rustle (4-7) 3-Leaves small twigs in constant motion
(8-12) 4-Dust raised, small branches in motion (13-18) 5-
Small trees sway (19-24) 6-Large branches trees sway (25-
30+)

Call Method: Voice or Recording

Type of Call: 4-Note, 3-Note, Series, Contact, Agitated,
Agitated Contact, Bark

Time to Response: Time from first entry

Time to Visual: Time from first entry

Location: UTM location where owls were found

Newly Banded: Juvenile or Adult owl banded during visit

Resight: GDRCO color band positively identified

Unknown: Unable to detect leg band

Unbanded: No color band visually detected

Unconfirmed: Color band visible, but indiscernible

Mouse Fate: FC-Female Cached, FD-Female Dropped, FE- Female Eaten,
FM-Female to Male, F01-Female to Owlet1, F02-Female to Owlet2, FU-
Female Unknown, MC-Male Cached, MD-Male Dropped, MF-Male to Female,
MF01-Male to Female to Owlet1, MF02-Male to Female to Owlet2, M01-Male
to Owlet1, M02-Male to Owlet2, MU-Male Unknown, 01-Owlet1, 02-Owlet2

Site Visit	<input checked="" type="checkbox"/>
Follow-Up (map)	<input type="checkbox"/>
Night Call	<input type="checkbox"/>

GREEN DIAMOND RESOURCE COMPANY

Met Protocol?	Yes
(Circle one)	No

Spotted Owl Site Visit/Follow-up/Night Call Form

Region: McKay Site: R-Line THP#: _____
 Date: 08/12/2019 Start: 17:11 End: 18:16 Duration: 01:05
 Observer(s): IMJ Call Method (V,R): Both Calls Used: 4N, 3N, S, 3CC + BAOW 8N, S
 Weather: _____ Precipitation: _____ Wind: _____ Temp: _____
 (% Cloud Cover) 0 (F, H, L, M, N, S) N (0-6) 2 (F°) 60

Detection:

Male

Female

Reproductive Status:

Type of call:
(4N, 3N, S, C, A, AC, B)

Time to Response:

Time to Visual:

Age: (S₁, S₂, A)

Band Status:

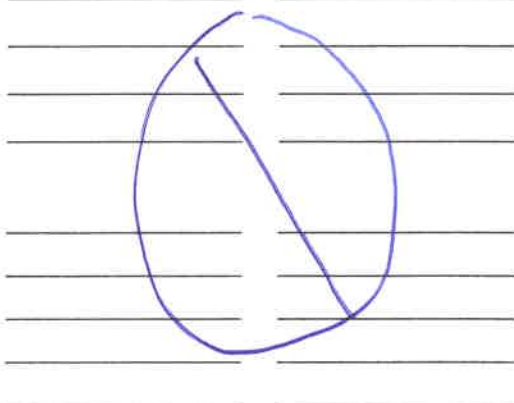
Unknown (U):

Unbanded (UB):

Newly Banded (NB):

Resight (RS):

Unconfirmed (UC):



Courting:

Incubating:

Brooding:

Nestlings:

Fledglings:

(Development)

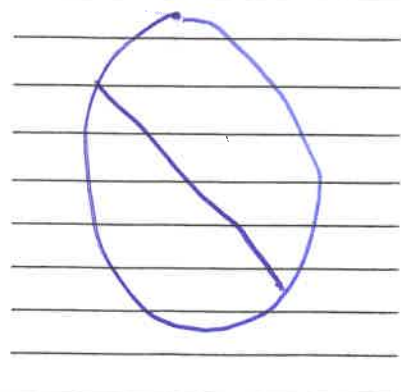
Not Nesting*:

Failed:

Not Reproductive:

Unknown:

*Use only during nesting season (April 1-May 31)



Mouse Fate: (FC, FD, FE, FM, F01, F02, FU, MC, MD, ME, MF, MF01, MF02, M01, M02, MU, 01, 02)

M1 _____ M2 _____ M3 _____ M4 _____ M5 _____ M6 _____ M7 _____ M8 _____ M9 _____ M10 _____

Summary: (Describe survey route, location, habitat, owl behavior, whitewash, pellets, feathers, nest tree, etc.)

I parked my truck off the WD-1 and began calling along the road as I went South-East. At the end of the road I went East for about 300 meters before cutting North. Then I looked the stand west → South-west and called through the 2015-2018 activity centers. Then I went South until I reached my start point. I called for BAOWs for the last 10 minutes of survey. No w.w. or pellets were found.

Location (UTM): Start: 403406 4512685

Historic Nest Tree Location (UTM and year): _____

<p>Precip: None, Light, Mod, Heavy, Fog, Snow Wind: 0- No wind/calm (0 mph) 1-Smoke drifts slightly(1-3) 2- Leaves rustle (4-7) 3-Leaves small twigs in constant motion (8-12) 4-Dust raised, small branches in motion (13-18) 5- Small trees sway (19-24) 6-Large branches trees sway (25-30+) Call Method: Voice or Recording Type of Call: 4-Note, 3-Note, Series, Contact, Agitated, Agitated Contact, Bark Time to Response: Time from first entry Time to Visual: Time from first entry Location: UTM location where owls were found</p>	<p>Newly Banded: Juvenile or Adult owl banded during visit Resight: GDRCO color band positively identified Unknown: Unable to detect leg band Unbanded: No color band visually detected Unconfirmed: Color band visible, but indiscernible Mouse Fate: FC-Female Cached, FD-Female Dropped, FE- Female Eaten, FM-Female to Male, F01-Female to Owlet1, F02-Female to Owlet2, FU-Female Unknown, MC-Male Cached, MD-Male Dropped, MF-Male to Female, MF01-Male to Female to Owlet1, MF02-Male to Female to Owlet2, M01-Male to Owlet1, M02-Male to Owlet2, MU-Male Unknown, 01-Owlet1, 02-Owlet2</p>
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Site Visit	<input checked="" type="checkbox"/>
Follow-Up (map)	<input type="checkbox"/>
Night Call	<input type="checkbox"/>



GREEN DIAMOND RESOURCE COMPANY

Met Protocol? (Circle one)	<input checked="" type="radio"/> Yes <input type="radio"/> No
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Spotted Owl Site Visit/Follow-up/Night Call Form

Region: Mckay Site: R13 THP#: _____
 Date: 3/11/19 Start: 17:30 End: 18:32 Duration: 1:02
 Observer (s): JNL Call Method (v,r): V Calls Used: 4N, CC
 Weather: _____ Precipitation: _____ Wind: _____ Temp: _____
 (% Cloud Cover) 0 (F, H, L, M, N, S) N (0-6) 2 (F°) 60

<u>Detection:</u>	<u>Male</u>	<u>Female</u>	<u>Reproductive Status:</u>
Type of call: (4N, 3N, S, C, A, AC, B)	<u>4N</u>		Courting: _____
Time to Response:	<u>4 min (17:34)</u>	<input checked="" type="checkbox"/>	Incubating: _____
Time to Visual:	<u>7 min (17:37)</u>		Brooding: _____
Age: (S ₁ , S ₂ , A)	<u>A</u>		Nestlings: _____
<u>Band Status:</u>			Fledglings: _____
Unknown (U):			(Development) _____
Unbanded (UB):			Not Nesting*: _____
Newly Banded (NB):			Failed: _____
Resight (RS):	<u>Ⓛ Red/white Bic</u>		Not Reproductive: _____
Unconfirmed (UC):			Unknown: <input checked="" type="checkbox"/>

*Use only during nesting season (April 1-May 31)

Mouse Fate: (FC, FD, FE, FM, F01, F02, FU, MC, MD, ME, MF, MF01, MF02, M01, M02, MU, 01, 02)

M1 ME M2 MC M3 ME M4 MC M5 _____ M6 _____ M7 _____ M8 _____ M9 _____ M10 _____

Summary: (Describe survey route, location, habitat, owl behavior, whitewash, pellets, feathers, nest tree, etc.)

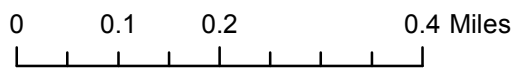
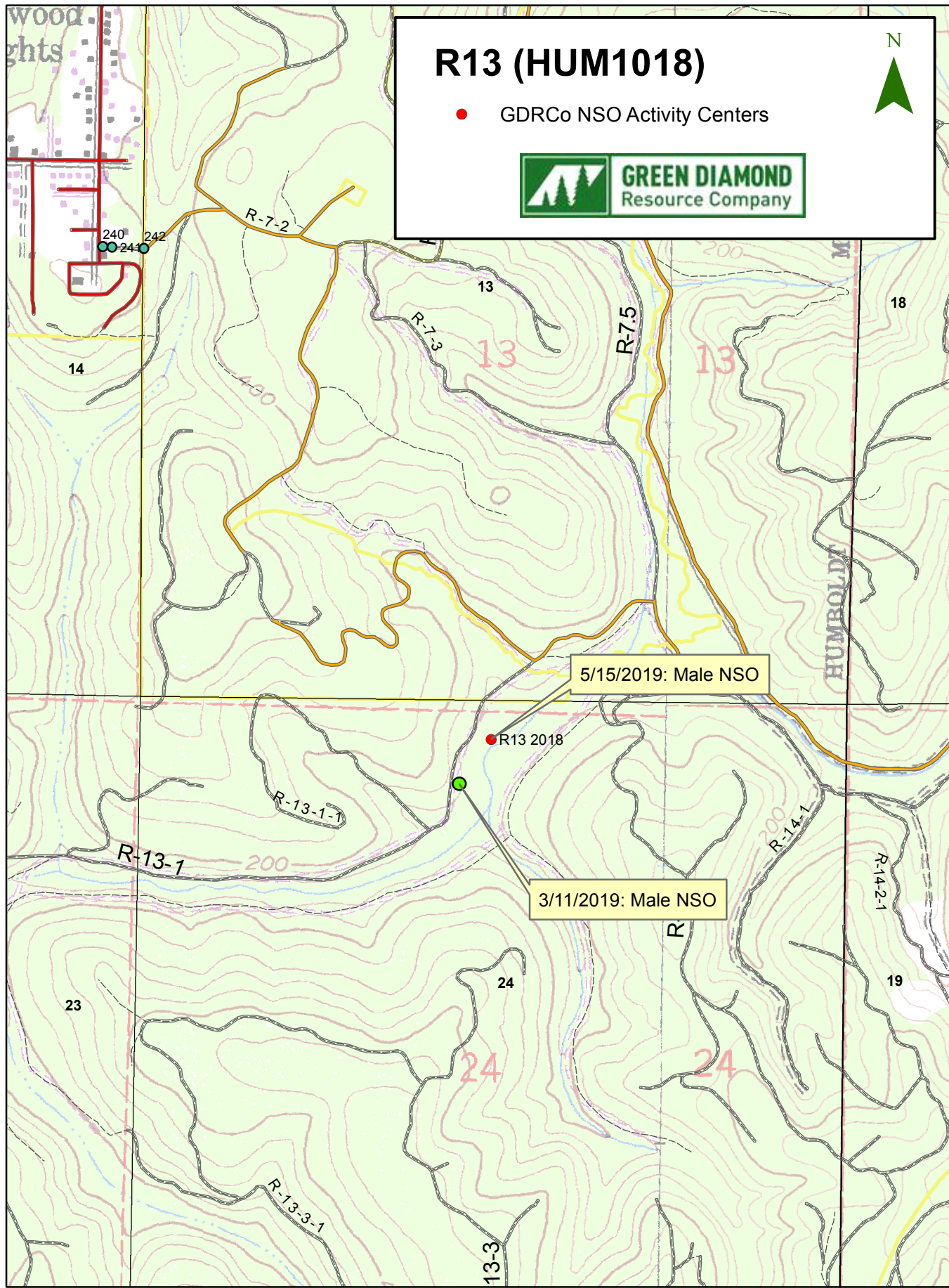
Parked on the R-13 and walked up the road (R-13-1?). I began hooting as I passed the 2010 AC, and got a ♂ 4N response ~150 meters SE of the 2018 AC. He moused eagerly, caching his mice in different spots. I searched the area for wash/pellets but found none. I returned to truck via previous ACs softly hooting for ♀ but got no response.

Location (UTM): 404426, 4508381 = mousing ♂
 Historic Nest Tree Location (UTM and year): 2018 = 404498, 4508481

<p><u>Precip:</u> None, Light, Mod, Heavy, Fog, Snow <u>Wind:</u> 0- No wind/calm (0 mph) 1-Smoke drifts slightly(1-3) 2- Leaves rustle (4-7) 3-Leaves small twigs in constant motion (8-12) 4-Dust raised, small branches in motion (13-18) 5- Small trees sway (19-24) 6-Large branches trees sway (25-30+) <u>Call Method:</u> Voice or Recording <u>Type of Call:</u> 4-Note, 3-Note, Series, Contact, Agitated, Agitated Contact, Bark <u>Time to Response:</u> Time from first entry <u>Time to Visual:</u> Time from first entry <u>Location:</u> UTM location where owls were found</p>	<p><u>Newly Banded:</u> Juvenile or Adult owl banded during visit <u>Resight:</u> GDRCO color band positively identified <u>Unknown:</u> Unable to detect leg band <u>Unbanded:</u> No color band visually detected <u>Unconfirmed:</u> Color band visible, but indiscernible <u>Mouse Fate:</u> FC-Female Cached, FD-Female Dropped, FE- Female Eaten, FM-Female to Male, F01-Female to Owlet1, F02-Female to Owlet2, FU-Female Unknown, MC-Male Cached, MD-Male Dropped, MF-Male to Female, MF01-Male to Female to Owlet1, MF02-Male to Female to Owlet2, M01-Male to Owlet1, M02-Male to Owlet2, MU-Male Unknown, 01-Owlet1, 02-Owlet2</p>
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R13 (HUM1018)

● GDRCo NSO Activity Centers



1 inch = 1,000 feet

Site Visit	<input checked="" type="checkbox"/>
Follow-Up (map)	<input type="checkbox"/>
Night Call	<input type="checkbox"/>



Met Protocol? (Circle one)	Yes
	No

Spotted Owl Site Visit/Follow-up/Night Call Form

Region: McKay Site: Ryan Creek THP#: _____
 Date: 4/20/19 Start: 16:59 End: 18:39 Duration: 1:40
 Observer (s): JML Call Method (V,R): V Calls Used: 4N,CC
 Weather: _____ Precipitation: _____ Wind: 2 Temp: 50
 (% Cloud Cover) 100 (F, H, L, M, N, S) N (0-6) (F°)

<u>Detection:</u>	<u>Male</u>	<u>Female</u>	<u>Reproductive Status:</u>
Type of call: (4N, 3N, S, C, A, AC, B)		<u>n/a</u>	Courting: _____
Time to Response:		<u>n/a</u>	Incubating: _____
Time to Visual:		<u>27min</u>	Brooding: _____
Age: (S ₁ , S ₂ , A)		<u>A</u>	Nestlings: _____
<u>Band Status:</u>			Fledglings: _____
Unknown (U):			(Development) _____
Unbanded (UB):			Not Nesting*: <u>X</u>
Newly Banded (NB):			Failed: _____
Resight (RS):		<u>Ⓡ Red/Yellow Diag</u>	Not Reproductive: _____
Unconfirmed (UC):			Unknown: _____

*Use only during nesting season (April 1-May 31)

Mouse Fate: (FC, FD, FE, FM, F01, F02, FU, MC, MD, ME, MF, MF01, MF02, M01, M02, MU, 01, 02)

M1 FE M2 FE M3 FC M4 FU M5 FU M6 FC M7 _____ M8 _____ M9 _____ M10 _____

Summary: (Describe survey route, location, habitat, owl behavior, whitewash, pellets, feathers, nest tree, etc.)
-Started search at end of R-Line drive, where I moused female twice last year. Crossed creek and eventually found her silently @ 406402, 4508766. She took first 3 mice there and I had a visual of her for 41mins. M3 was cached on a visible small branch. M4 was taken ~100m west. By the time I got to her the mouse was gone. Lost visual for 2-3min. Moused her from this new location and she took M5 another 75m west. Followed her again but didn't get mouse fate. This final location was 406248, 4508806. She cached last mouse on an open branch. All caches and unknowns seemed to go to different trees but could not 100% confirm. Had visual on bird for 1h 13min with the exception of about 6mins total.

Location (UTM): Mousing 406402, 4508766 and 406248, 4508806

Historic Nest Tree Location (UTM and year): _____

<p><u>Precip:</u> None, Light, Mod, Heavy, Fog, Snow <u>Wind:</u> 0- No wind/calm (0 mph) 1-Smoke drifts slightly(1-3) 2- Leaves rustle (4-7) 3-Leaves small twigs in constant motion (8-12) 4-Dust raised, small branches in motion (13-18) 5- Small trees sway (19-24) 6-Large branches trees sway (25-30+) <u>Call Method:</u> Voice or Recording <u>Type of Call:</u> 4-Note, 3-Note, Series, Contact, Agitated, Agitated Contact, Bark <u>Time to Response:</u> Time from first entry <u>Time to Visual:</u> Time from first entry <u>Location:</u> UTM location where owls were found</p>	<p><u>Newly Banded:</u> Juvenile or Adult owl banded during visit <u>Resight:</u> GDRCO color band positively identified <u>Unknown:</u> Unable to detect leg band <u>Unbanded:</u> No color band visually detected <u>Unconfirmed:</u> Color band visible, but indiscernible <u>Mouse Fate:</u> FC-Female Cached, FD-Female Dropped, FE- Female Eaten, FM-Female to Male, F01-Female to Owlet1, F02-Female to Owlet2, FU-Female Unknown, MC-Male Cached, MD-Male Dropped, MF-Male to Female, MF01-Male to Female to Owlet1, MF02-Male to Female to Owlet2, M01-Male to Owlet1, M02-Male to Owlet2, MU-Male Unknown, 01-Owlet1, 02-Owlet2</p>
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Site Visit	<input checked="" type="checkbox"/>
Follow-Up (map)	<input type="checkbox"/>
Night Call	<input type="checkbox"/>

GREEN DIAMOND RESOURCE COMPANY

Met Protocol?	Yes
(Circle one)	No

Spotted Owl Site Visit/Follow-up/Night Call Form

Region: McKay Site: Ryan Creek THP#: _____
 Date: 5/12/19 Start: 18:39 End: 19:39 Duration: 1:00
 Observer (s): KLP Call Method (V,R): R Calls Used: Various
 Weather: _____ Precipitation: _____ Wind: _____ Temp: _____
 (% Cloud Cover) 100 (F, H, L, M, N, S) N (0-6) 1 (F°) 50'

Detection:

Male

Female

Reproductive Status:

Type of call:
(4N, 3N, S, C, A, AC, B)

Time to Response:

Time to Visual:

Age: (S₁, S₂, A)

Band Status:

Unknown (U):

Unbanded (UB):

Newly Banded (NB):

Resight (RS):

Unconfirmed (UC):

Courting:

Incubating:

Brooding:

Nestlings:

Fledglings:

(Development)

Not Nesting*:

Failed:

Not Reproductive:

Unknown:

*Use only during nesting season (April 1-May 31)

Mouse Fate: (FC, FD, FE, FM, F01, F02, FU, MC, MD, ME, MF, MF01, MF02, M01, M02, MU, 01, 02)

M1 _____ M2 _____ M3 _____ M4 _____ M5 _____ M6 _____ M7 _____ M8 _____ M9 _____ M10 _____

Summary: (Describe survey route, location, habitat, owl behavior, whitewash, pellets, feathers, nest tree, etc.)

I was instructed to search the areas JML got his last detecting at this year, so I parked my truck just north of one of his detections, started calling from the road and hiked in, crossed the creek and hiked straight to detection site #1 (406402 4508766). Moving south then southwest towards detection site #2 (406248 4508806) moving west. There isn't much ideal habitat, a lot of shrubs on steep slopes so I made my way further NW after spending a significant the majority of my time looking for ww & pellets near the 2019 detection areas. I paralleled the creek/road and crossed when I found a good spot then called along the road on my walk back to truck.

Location (UTM): _____

Historic Nest Tree Location (UTM and year): _____

Precip: None, Light, Mod, Heavy, Fog, Snow
Wind: 0- No wind/calm (0 mph) 1-Smoke drifts slightly(1-3) 2- Leaves rustle (4-7) 3-Leaves small twigs in constant motion (8-12) 4-Dust raised, small branches in motion (13-18) 5- Small trees sway (19-24) 6-Large branches trees sway (25-30+)
Call Method: Voice or Recording
Type of Call: 4-Note, 3-Note, Series, Contact, Agitated, Agitated Contact, Bark
Time to Response: Time from first entry
Time to Visual: Time from first entry
Location: UTM location where owls were found

Newly Banded: Juvenile or Adult owl banded during visit
Resight: GDRCO color band positively identified
Unknown: Unable to detect leg band
Unbanded: No color band visually detected
Unconfirmed: Color band visible, but indiscernible
Mouse Fate: FC-Female Cached, FD-Female Dropped, FE- Female Eaten, FM-Female to Male, F01-Female to Owlet1, F02-Female to Owlet2, FU- Female Unknown, MC-Male Cached, MD-Male Dropped, MF-Male to Female, MF01-Male to Female to Owlet1, MF02-Male to Female to Owlet2, M01-Male to Owlet1, M02-Male to Owlet2, MU-Male Unknown, 01-Owlet1, 02-Owlet2

Site Visit	X
Follow-Up (map)	
Night Call	

GREEN DIAMOND RESOURCE COMPANY

Met Protocol?	Yes
(Circle one)	No

Spotted Owl Site Visit/Follow-up/Night Call Form

Region: McKay Site: Ryan Creek THP#: _____
 Date: 5/15/19 Start: 18 : 02 End: 18 : 40 Duration: 0 : 38
 Observer (s): JNL Call Method (v,r): V Calls Used: 4N,C
 Weather: _____ Precipitation: _____ Wind: 3 Temp: 55
 (% Cloud Cover) 100 (F, H, L, M, N, S) L (0-6) (F °)

Detection:	<u>Male</u>	<u>Female</u>	Reproductive Status:
Type of call: (4N, 3N, S, C, A, AC, B)	<u> </u>	<u> </u>	Courting: _____
Time to Response:	<u> </u>	<u> </u>	Incubating: _____
Time to Visual:	<u> </u>	<u> </u>	Brooding: _____
Age: (S ₁ , S ₂ , A)	<u> </u>	<u> </u>	Nestlings: _____
Band Status:			Fledglings: _____
Unknown (U):	<u> </u>	<u> </u>	(Development) _____
Unbanded (UB):	<u> </u>	<u> </u>	Not Nesting*: _____
Newly Banded (NB):	<u> </u>	<u> </u>	Failed: _____
Resight (RS):	<u> </u>	<u> </u>	Not Reproductive: _____
Unconfirmed (UC):	<u> </u>	<u> </u>	Unknown: _____

*Use only during nesting season (April 1-May 31)

Mouse Fate: (FC, FD, FE, FM, F01, F02, FU, MC, MD, ME, MF, MF01, MF02, M01, M02, MU, 01, 02)

M1 _____ M2 _____ M3 _____ M4 _____ M5 _____ M6 _____ M7 _____ M8 _____ M9 _____ M10 _____

Summary: (Describe survey route, location, habitat, owl behavior, whitewash, pellets, feathers, nest tree, etc.)

Parked my quad near where R-13-7-1 intersects with PL-1000 where TLB had a Ryan Creek
♂ flyin and entered stand to north. I hooted a clockwise loop to about R-14-2.1
and back (roadbeds are long gone); no detections of any kind.
Visit is short because I intended to search Ryan Creek proper afterwards.

Location (UTM): _____
 Historic Nest Tree Location (UTM and year): _____

<p>Precip: None, Light, Mod, Heavy, Fog, Snow Wind: 0- No wind/calm (0 mph) 1-Smoke drifts slightly(1-3) 2- Leaves rustle (4-7) 3-Leaves small twigs in constant motion (8-12) 4-Dust raised, small branches in motion (13-18) 5- Small trees sway (19-24) 6-Large branches trees sway (25-30+) Call Method: Voice or Recording Type of Call: 4-Note, 3-Note, Series, Contact, Agitated, Agitated Contact, Bark Time to Response: Time from first entry Time to Visual: Time from first entry Location: UTM location where owls were found</p>	<p>Newly Banded: Juvenile or Adult owl banded during visit Resight: GDRCO color band positively identified Unknown: Unable to detect leg band Unbanded: No color band visually detected Unconfirmed: Color band visible, but indiscernible Mouse Fate: FC-Female Cached, FD-Female Dropped, FE- Female Eaten, FM-Female to Male, F01-Female to Owlet1, F02-Female to Owlet2, FU-Female Unknown, MC-Male Cached, MD-Male Dropped, MF-Male to Female, MF01-Male to Female to Owlet1, MF02-Male to Female to Owlet2, M01-Male to Owlet1, M02-Male to Owlet2, MU-Male Unknown, 01-Owlet1, 02-Owlet2</p>
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Site Visit	<input checked="" type="checkbox"/>
Follow-Up (map)	<input type="checkbox"/>
Night Call	<input type="checkbox"/>

GREEN DIAMOND RESOURCE COMPANY

Met Protocol? (Circle one)	<input checked="" type="radio"/> Yes <input type="radio"/> No
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Spotted Owl Site Visit/Follow-up/Night Call Form

Region: McKey Site: Ryan Creek THP#: _____
 Date: 5/30/19 Start: 18:55 End: 19:55 Duration: 1:00
 Observer (s): JML Call Method (V,R): Calls Used: CC
 Weather: _____ Precipitation: _____ Wind: _____ Temp: _____
 (% Cloud Cover) 100 (F, H, L, M, N, S) N (0-6) 1 (F°) 55

<u>Detection:</u>	<u>Male</u>	<u>Female</u>	<u>Reproductive Status:</u>
Type of call: (4N, 3N, S, C, A, AC, B)	<u>Silent</u>	<u>Silent</u>	Courting: _____
Time to Response:	<u>—</u>	<u>—</u>	Incubating: _____
Time to Visual:	<u>0 min</u>	<u>0 min</u>	Brooding: _____
Age: (S ₁ , S ₂ , A)	<u>A</u>	<u>A</u>	Nestlings: _____
Band Status:			Fledglings: _____
Unknown (U):			(Development) _____
Unbanded (UB):			Not Nesting*: <input checked="" type="checkbox"/>
Newly Banded (NB):			Failed: _____
Resight (RS):	<u>(R) Yellow Solid</u>	<u>(R) Red/Yellow Drag</u>	Not Reproductive: _____
Unconfirmed (UC):			Unknown: _____

*Use only during nesting season (April 1-May 31)

Mouse Fate: (FC, FD, FE, FM, F01, F02, FU, MC, MD, ME, MF, MF01, MF02, M01, M02, MU, 01, 02)

M1 FE M2 ME M3 FE M4 FC M5 FE M6 ME M7 _____ M8 _____ M9 _____ M10 _____

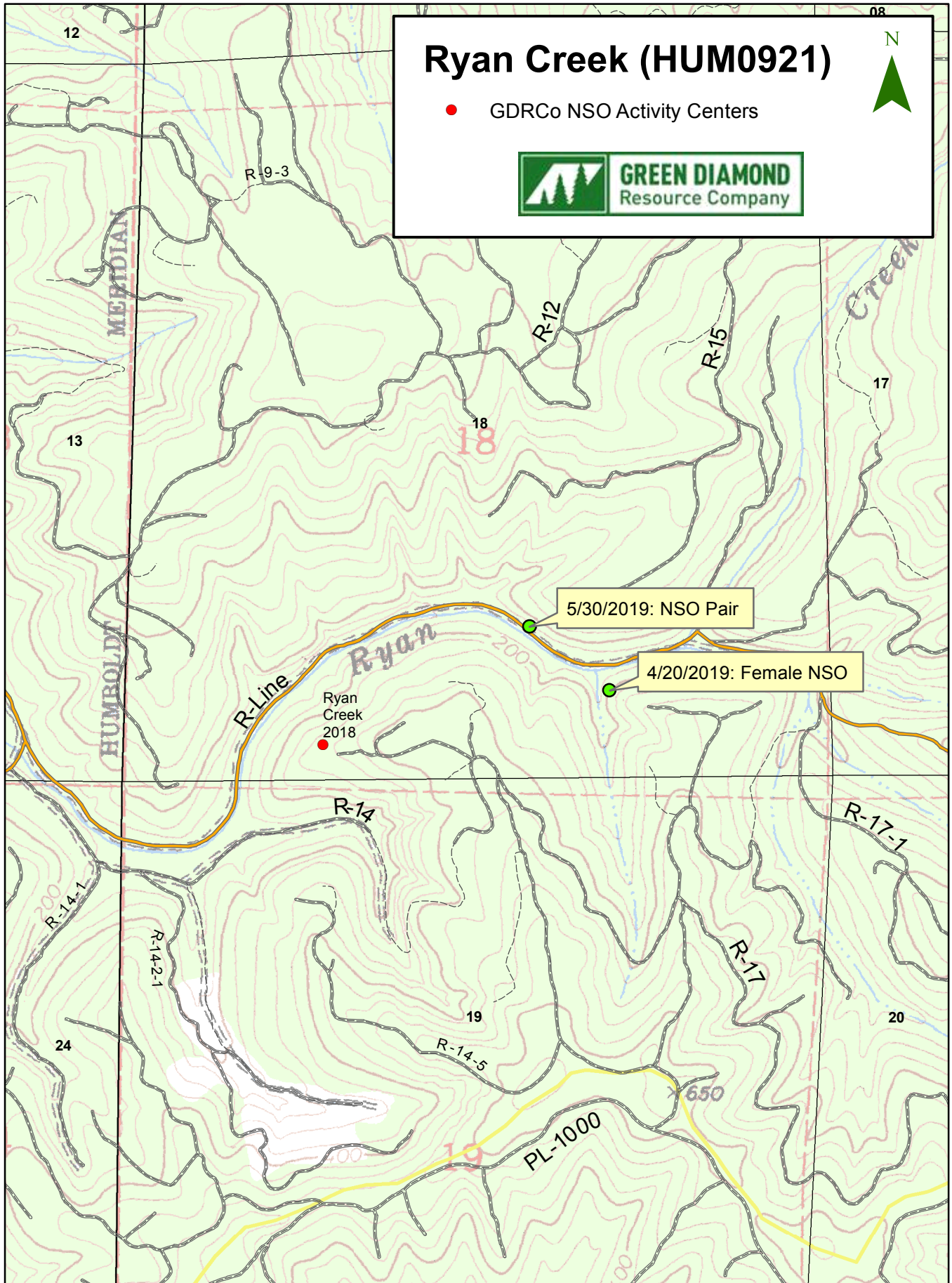
Summary: (Describe survey route, location, habitat, owl behavior, whitewash, pellets, feathers, nest tree, etc.)
- Parked @ 406221, 4508910. Got out of truck, contact called once and two birds flew into me. Gave first two mice on road then led them south into stand where they came from. Wanted to see their habits in the stand and look for pellets. M3-M6 were given in same area I moused 9 earlier in year. M4 was cached in a clump of needles and duff against the trunk of a redwood. 9 was only on it for 10 seconds and no other activity was conducted there. No wash or pellets around that tree. No pellets found in stand.

Location (UTM): 406221, 4508910 mousing
 Historic Nest Tree Location (UTM and year): _____

<p>Precip: None, Light, Mod, Heavy, Fog, Snow Wind: 0- No wind/calm (0 mph) 1-Smoke drifts slightly(1-3) 2- Leaves rustle (4-7) 3-Leaves small twigs in constant motion (8-12) 4-Dust raised, small branches in motion (13-18) 5- Small trees sway (19-24) 6-Large branches trees sway (25-30+) Call Method: Voice or Recording Type of Call: 4-Note, 3-Note, Series, Contact, Agitated, Agitated Contact, Bark Time to Response: Time from first entry Time to Visual: Time from first entry Location: UTM location where owls were found</p>	<p>Newly Banded: Juvenile or Adult owl banded during visit Resight: GDRCO color band positively identified Unknown: Unable to detect leg band Unbanded: No color band visually detected Unconfirmed: Color band visible, but indiscernible Mouse Fate: FC-Female Cached, FD-Female Dropped, FE- Female Eaten, FM-Female to Male, F01-Female to Owlet1, F02-Female to Owlet2, FU-Female Unknown, MC-Male Cached, MD-Male Dropped, MF-Male to Female, MF01-Male to Female to Owlet1, MF02-Male to Female to Owlet2, M01-Male to Owlet1, M02-Male to Owlet2, MU-Male Unknown, 01-Owlet1, 02-Owlet2</p>
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Ryan Creek (HUM0921)

● GDRCo NSO Activity Centers



0 0.1 0.2 0.4 Miles

1 inch = 1,000 feet