

# **2<sup>ND</sup> ANNUAL REPORT**

**submitted to  
The United States Fish and  
Wildlife Service  
&  
The California Department of Fish and Wildlife  
  
by  
Green Diamond Resource Company**

**in fulfillment of requirements specified in condition  
G. of permit # TE43702D-0, incidental take  
permit for northern spotted owls,  
under section 10(a)(1)(B) of  
the Endangered Species Act  
and the state consistency determination**

**01 March 2022**

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# I. Introduction

On June 13, 2019, the United States Fish and Wildlife Service (the ‘Service’) accepted Green Diamond Resource Company’s Forest Habitat Conservation Plan (FHCP) for the Covered Species, Northern spotted owl, fisher, red and Sonoma tree voles, and issued Green Diamond a section 10(a)(1)(B) incidental take permit under the Endangered Species Act (ESA). The signing of the permit by the Service allowed Green Diamond to harvest habitat that could result in the incidental take of the Northern spotted owl and would authorize take of fisher and tree voles should they become listed under the ESA in the future. Incidental take of Northern spotted owl over the 50-year permit term is anticipated to result primarily from modification of owl habitat that could displace owls, i.e., causing them to move to new areas and impairing their essential behavioral patterns. On July 31, 2019, Green Diamond requested a Consistency Determination (CD) from the California Department of Fish and Wildlife (CDFW) pursuant to Fish and Game Code Section 2080.1 that CDFW determine that the Biological Opinion (BO) issued by the Service, including its Incidental Take Statement (ITS) and incidental Take Permit (ITP), is consistent with the California Endangered Species Act (CESA). On August 30, 2019, the CDFW determined that the BO, ITS, and the FHCP are consistent with CESA and issued a CD to Green Diamond.

The key elements of the FHCP include:

- Promoting habitat heterogeneity across the Green Diamond landscape including the adoption of the Aquatic Habitat Conservation Plan riparian and geological management measures
- Protecting the 44 most productive Northern spotted owl sites through the Dynamic Core Area (DCA) strategy where sites are managed on a ‘no-take’ basis and harvest is prohibited within the core area for the site.
- Retaining and recruiting habitat elements important to the Covered Species by implementing the Terrestrial Retention of Ecosystem Elements (TREE) guidelines within harvest units
- Providing protection for the Covered Species
- A 7,741-acre special management area (“Peripheral Area”) where the Northern spotted owl would be managed on a “no-take” basis
- Research and monitoring commitments for the Covered Species
- Compliance monitoring and adaptive management

The following report documents the first full year of implementing the FHCP and includes details specified to comply with the FHCP. Included are sections about Covered Species surveys, habitat retention in timber harvest plans, levels of take, amount of habitat for the Covered Species, studies for the Covered Species, conservation areas, and other information required for annual reports as described in the Implementation Commitments Section 5.3.7 of the FHCP.

The reporting period of this report is from Sept. 1, 2020 to Sept. 1, 2021.

## II. Northern Spotted Owl Surveys

As noted in the FHCP, all stands of trees scheduled for timber harvest or areas of potential habitat that may be modified by Covered Activities, must be surveyed for spotted owls prior to operations. The following describes the survey procedures and the results of the surveys.

### A. Methods

To protect nesting owls and their young from direct harm due to Covered Activities during the breeding season and to identify owl activity centers, all stands scheduled to be harvested or modified by Covered Activities in 2021 were surveyed for spotted owls during the breeding season, March 1 - August 31, 2021. All timber harvest plans (THPs) initiated between Sept. 1, 2020, and February 21, 2021, were surveyed in 2020 and those initiated after February 21, 2021, were surveyed in 2021, prior to start of operations. Second year surveys were conducted for THPs that had been surveyed the previous year.

#### 1. FHCP protocol surveys

Spotted owl surveys were conducted by Green Diamond wildlife biologists, and, in some cases, by other employees meeting the following qualifications recommended for spotted owl surveyors by the U.S. Fish and Wildlife Service (Protocol for surveying proposed management activities that may impact northern spotted owls, revised January 9, 2012):

Normal hearing abilities are requisite. An owl caller must be able to hear the owl(s) if they were calling AND

- Have training in spotted owl survey techniques OR
- Have 1 year/season of spotted owl survey experience

Green Diamond's THPs were often comprised of multiple units. The number of units surveyed was typically referenced regarding owl surveys because owl surveys were conducted on a unit-by-unit basis, and not all units surveyed were eventually incorporated into THPs.

The surveys provided coverage of each THP unit and at least a 0.5-mile buffer around the unit, with some calling points established at least 1000 feet from the plan boundary. The calling points were strategically placed to ensure complete coverage of the survey area. Each calling point was called for a minimum of 10 minutes unless an owl responded sooner. If an owl site was known to be occupied in any portion of the survey area, a maximum 0.5-mile radius around the owl site was not called to avoid harassing the owls. Daytime site visits of such sites were conducted to establish activity centers.

A statistical analysis of THP detections was conducted in 2012. The purpose of the analysis was to determine the number of THP surveys necessary to achieve a 95% detection probability of territorial spotted owls within approximately 0.5 miles of a harvest unit. This analysis utilized ownership specific THP survey data and site occupancy data. THP detection data collected from 1994-2011 were analyzed in conjunction with spotted owl site occupancy of each corresponding year. Results from the analysis indicated 4 to 6 surveys of each THP unit were necessary to achieve a 95% detection probability of a territorial owl. More surveys (up to 6) were needed in the earlier part of the breeding season to achieve 95% probability because the probability of detection increases throughout the season. Four surveys were needed later in the season to reach the same probability. To capture the variation in probability throughout the season, a calculator was formulated from the analysis. The calculator assigns a detection probability to each Julian date and was used to determine the number of surveys required to achieve a 95% probability of detection. Surveys were conducted until the cumulative probability of the surveys was greater than or equal to 0.95. In 2021, surveys were conducted for each unit until an owl was located or until the surveys required to achieve a 95% detection probability were completed.

Each survey for an individual THP unit was spaced at least one week apart. In areas where no owls were detected, at least one survey was conducted after April 1. In areas where resident owls were found, at least one follow-up visit was conducted after May 1 to determine that the owls were not nesting.

Historic spotted owl sites within the influence of barred owls received one stand search on or after June 1 to increase the probability of locating evidence of roost sites or elicit the begging calls of juvenile spotted owls.

Each survey response was followed up with a daytime visit by Green Diamond biologists to locate the owl and determine its pair status, activity center, or nest site. If three complete follow-up visits were conducted and an owl was not located, it was concluded that the initial response was from an owl that did not have an activity center in the THP area. If follow-up visits were successful in locating spotted owls early in the nesting season (March to early April), at least one follow-up visit was conducted after May 1 (if a nest site was not located). A 0.25-mile buffer was maintained around the owl pair's activity center until its nesting status was determined. If the pair was still not nesting by May 1, after a minimum of 3 visits, then the radius of protection was no longer maintained and the whole plan became available for timber falling.

If a nest was found, the nest tree was marked, and the THP was immediately available for harvest providing that no timber falling or yarding was allowed within a 0.25-mile radius of the nest tree until it was determined that the owlets had fledged or that the nest had failed. After the owlets fledged, the radius of protection was 500 feet from the owlets and connectivity to continuous habitat was maintained. When owlets dispersed or were capable of dispersing, or it was determined that the nest had failed, falling and yarding was allowed within the 500-foot radius buffer that was being maintained for the owlets.

To protect nesting owls from potential impacts of spring slash burns, Green Diamond biologists reviewed a list of THP units to be burned after March 1. If it was determined that the fire or smoke generated from a burn would likely disturb a nesting pair, then appropriate measures were taken to prevent the disturbance (canceling or postponing the burn).

### **Barred Owls**

Because barred owls reduce the probability of detecting spotted owls, and as a result of increased barred owl presence within the Green Diamond study area, survey effort at spotted owl territories invaded by barred owls included measures to increase the likelihood that resident spotted owls were detected. If a site was influenced by barred owls, surveys were conducted until a spotted owl was detected or the surveys required to achieve a 95% detection probability (determined by Green Diamond's site visit detection probability calculator) were completed with at least one survey occurring on or after June 1<sup>st</sup>.

## **2. Additional spot calling and second year surveys**

Sites identified in surveys conducted from March 1 - August 31 in 2020 were considered valid until February 21, 2021, and surveys conducted during the same period in 2021 were considered valid until February 21, 2022. However, timber harvest in some plans spanned two owl survey years. For example, several 2021 THP units were surveyed during the 2020 breeding season and were found to be free of owls. The plans were initiated before February 21, 2021, but harvest had not been completed by February 21, 2021. Although the likelihood of owls establishing a territory in such plans is considered low, it is possible. Depending on the status of the THP, it may have required additional calling. In addition, due to the scheduling of contractors, continuous timber falling within a THP unit often does not occur. Contractors temporarily stop falling in a unit and return later, or different contractors move in to the THP area and resume falling. As a result, small portions of a plan area can be felled, and a THP unit can remain virtually unharvested for an extended period until harvest resumes. Because this could occur near the owl-breeding season, a greater likelihood of owls moving into the area would exist than if continuous timber operations occurred in the THP unit. Finally, in many cases, low priority THP areas that are surveyed in one year are not harvested until the next year. If a given area was surveyed with the 95% detection probability protocol in 2020 and no timber was harvested before February 21, 2021 of the following year, a possibility existed that owls may have moved into the area. However, because the area was previously surveyed, the probability of new owls moving into the area was considered low.

To detect the possibility that owls moved into a THP unit under the circumstances described above, Green Diamond implemented the following spot calling procedures on February 21 of each year and second year protocol procedures on March 1 of each year:

- If more than 10 acres of contiguous timber remained in the unit and falling was not continuous, then timber harvest was temporarily deferred until a second year or

detection probability survey was conducted. This second-year protocol consisted of a minimum of four nighttime surveys spaced at least five days apart, with at least one survey on or after April 1.

- If more than 10 acres of contiguous timber remained in the unit, and falling was continuous from on or before February 21, timber harvest continued with spot calling. The spot calls were concurrent with operations and occurred once a week until less than 10 acres of contiguous timber remained, or for a maximum of five weeks.
- If less than 10 acres of contiguous timber remained in the unit, then harvest continued with no special provisions.
- If less than 10 acres of contiguous timber remained in the unit, and harvest was deferred until the following breeding season, a possibility existed that owls may have moved into the area. Therefore, before resuming cutting activity after March 1, a biologist conducted two nighttime surveys at least five days apart. If no owls were detected, operations commenced.

For spot calling, qualified employees called the remaining timber in the plan from one or several locations to ensure adequate coverage of the area. The calling was done, weather permitting, at least once a week until less than 10 acres of contiguous standing timber remained, or for a maximum of five weeks. The spot calling was concurrent with timber operations, i.e., conducted before or after actual falling activity on a given survey day.

If an owl was detected during one of the surveys, operations were stopped until Green Diamond biologists determined if an owl activity center existed. If an owl was found, timber falling was suspended within 0.25 mile of its activity center until it was determined that the owl was not nesting.

## **B. Survey Results**

### **1. FHCP protocol surveys**

One-hundred nineteen THPs comprised of 482 units (Appendix I) were surveyed for spotted owls in 2021. Of these THP units, 296 had been surveyed in the previous year. Spotted owl responses were heard during surveys of 27 THPs, and 25 plans required follow-up surveys. Thirty-two THPs surveyed during the reporting period had owl activity centers located within 0.5 mile. Fifty-eight unique owl sites were associated with these THPs. Two new activity centers were found within 0.5 mile of a THP unit that was previously surveyed. Both activity centers were associated with perennial sites.

A total of 222 THP units were initiated through timber falling or road construction during the reporting period. Timber operations were delayed on one THP unit due to a nesting pair in 2021. In compliance with the FHCP protocol, if a pair was found to be nesting, operations were not conducted within 0.25 miles of the nest until it was determined that the owlets had fledged or the nest had failed. Once the owlet(s) fledged, no operations would be conducted within 500 feet of the owlet(s) until the owlet(s) dispersed or were capable of dispersing. Nine unoccupied spotted owl sites influenced by barred owls and located within 0.5 mile of a harvest unit where falling had been initiated between March 1 and August 31 of the current reporting period received a stand search on or after June 1. These nine spotted owl sites were associated with seven THPs and eight unique harvest units. No slash burns were delayed due to the proximity of nesting spotted owls.

## **2. Additional spot calling and second year surveys**

Forty-seven THP units initiated before February 21, 2021 and having more than 10 contiguous acres remaining at that date were spot called for owls. There were no spotted owl detections during these surveys.

## **C. Discussion**

There were no instances where unknown spotted owl sites were found near initiated THPs that were protocol surveyed. The FHCP survey protocol appears to be effective in locating owl sites prior to harvest operations and ensuring that owl sites are not unknowingly harvested below displacement thresholds. Furthermore, about 61% of THP units were resurveyed during 2021. All known spotted owl sites influenced by barred owls and with planned harvest operations received additional survey effort to account for the lower detection rates for spotted owls when barred owls are present. Additional survey effort was provided through spot calling, which increases the probability that owls within the THPs will be detected prior to THP initiation. Resurveys, spot calling, and surveys in response to barred owl occupancy provide an increased level of survey effort prior to timber operations.

## III. THP Conservation Measures

### A. Methods

The Terrestrial Retention of Ecosystem Elements (TREE) guidelines described in the FHCP govern the spatial distribution, type, and amount of retained structures across the Plan Area. The TREE is focused on habitat areas and habitat elements that are essential to specific behaviors of the Covered Species as well as other vertebrate species that reside in the Plan Area. The TREE provides primary consideration for live trees, snags, and coarse woody debris that currently provide or are most likely to become critical habitat elements on the landscape. The concept of ‘critical habitat element’ refers to something that is relatively rare on a managed landscape, takes a long time to develop (greater than a single rotation), and is linked to some behavior (reproduction, foraging) of a vertebrate species in such a way that the loss of the habitat element would likely result in a substantial population reduction of the species on the landscape. The FHCP also includes Riparian Management Zone (RMZ) prescriptions and protection of geologically unstable areas beneficial to the Covered Species as a landscape management commitment to promote retention and development of late seral habitat in a dendritic network across the Plan Area. Although initially created through Green Diamond’s Aquatic Habitat Conservation Plan (AHCP), these prescriptions are also incorporated as enforceable commitments of the FHCP. Prescriptions for RMZs and geologically unstable areas provide a substantial benefit to the Covered Species and encumber over 25% of the Plan Area through extremely limited or no timber harvest. The following summarizes site-specific habitat retention measures identified before and after timber harvest for each THP with completions during the reporting period.

#### 1. Pre-harvest habitat retention planning

The major habitat management measures quantified were:

- habitat retention areas (HRAs) planned (number),
- habitat retained as a result of AHCP Riparian Management Zones (RMZ),
- retention of all non-merchantable downed coarse woody debris (CWD)
- retention of green wildlife trees outside of RMZs, (planned number of trees to be retained per acre individually, in HRAs, or in clumps),
- retention of Wildlife Scorecard Trees
- snag retention (estimated number per acre present before and after harvest)

General guidelines for green wildlife tree retention are outlined below.

#### **General Candidate Tree Selection:**

- Retain defective or poorly formed trees (i.e., animal damaged, forked top, broken top, etc.).
- Retain a mix of conifers and hardwoods (approximately 50/50 mix where possible).
- Species preference: Douglas-fir, hemlock, white fir, cedar, spruce, redwood, tanoak, madrone, California laurel, chinquapin.
- Consider protection from wind throw and site preparation burning when designating HRA and tree clump locations.
- Retain trees with the average diameter equal to or greater than average diameter of trees in the THP unit.
- Green wildlife tree retention is in addition to snag and RMZ retention.

#### **Tree Retention Guidelines**

##### *Conifer Dominated Harvest Areas with RMZ Retention:*

- Retain all scorecard trees  $\geq 7$ .
- Retain other evergreen hardwoods at a rate of two trees per clearcut acre where they exist

##### *Conifer Dominated Harvest Areas without RMZ retention:*

- Retain all scorecard trees  $\geq 7$ .
- Retain other conifer at a minimum rate of one tree per clearcut acre.
- Retain other evergreen hardwoods at a rate of two trees per clearcut acre where they exist
- If unit lacks hardwoods ( $< 2$  per acre) and is located within a tract considered impaired for wildlife (i.e., a tract requiring retention of at least two trees per clearcut acre "Two Trees Per Acre Tract"), then retain additional conifers to achieve total retention of two trees per acre.
- If the unit lacks hardwoods ( $< 2$  per acre) and is not located within a tract considered impaired for wildlife (i.e., a tract requiring retention of at least one tree per clearcut acre "One Tree Per Acre Tract"), then no additional conifer retention is required above the minimum one conifer per clearcut acre

##### *Hardwood Dominated Harvest Areas with RMZ Retention:*

- Retain all scorecard trees  $\geq 7$ .
- Retain evergreen hardwoods at a rate of two trees per clearcut acre.

##### *Hardwood Dominated Harvest Areas without RMZ Retention:*

- Retain all scorecard trees  $\geq 7$ .
- Retain a minimum 0.5-acre HRA or clumps totaling 0.5 acres and additional scattered evergreen hardwood trees at a rate of two trees per clearcut acre.

## **2. Post-harvest habitat retention**

Post-harvest completion data were collected for harvested units that received company harvest plan completions during the reporting period or for plans in which logging activity had terminated. For plan completions, the number of green wildlife trees retained was estimated as the number of remaining trees > 12" dbh per acre. If the THP was to be burned for site preparation, the completion data was also collected after the plan was burned. It was noted for each completion whether site preparation, burning, windthrow or some other form of forest management damaged the retained habitat features.

## **3. Commercial Thinning**

Commercial thinning involves removing selected trees that may contain commercial value in order to create additional growing space for crop trees. Commercial thinning on Green Diamond's forest lands is typically an intermediate treatment applied to younger stands that allows for the release of the selected crop trees by providing more light, and in some cases, more nutrients and soil moisture when they are limiting factors. The log size of these younger thinned stands is inherently smaller than those of an older stand ready for the final harvest stage of even-aged management (i.e., clearcut harvest). The protection measures and mitigations included in a final clearcut harvest, such as TREE, also apply to these intermediate thinning harvests. Given the goal of thinning harvests and the amount of post-harvest habitat retention associated with this type of silviculture, habitat for the Covered Species is at a minimum maintained, but this type of harvest should advance the development of habitat. Therefore, these units meet or exceed post-harvest habitat retention standards of the FHCP and are excluded from the pre-harvest and post-harvest retention summaries in the annual report.

## **B. Results**

Forty-one THPs comprised of 107 clearcut harvest units (2323.29 total clearcut acres) and 12 commercially thinned harvest units (559.44 total acres) approved after June 13, 2019, received company completions during the reporting period. The completed units ranged in size from 4.07 acres to 43.4 acres with an average of 21.71 acres. As described above, the 12 commercially thinned units were not included in the pre-harvest or post-harvest retention summaries (for clearcut harvest unit retention details see Appendix II and Tables 1, 2, 3, and 4)

### **1. Pre-harvest conservation measures**

Among the 107 clearcut harvest units, all were conifer dominated and 88 had RMZ retention requiring no additional green tree retention beyond two hardwoods per clearcut acre where they existed. The average green trees per acre prescribed for the 88 units with RMZ retention was 2.07 per clearcut acre (Table 1). Fourteen units without

RMZ retention were in 'two trees per acre (TPA) tracts' and retained an average of 1.50 green trees per clearcut acre. The remaining five units without RMZ retention were located within one TPA tracts and retained an average of 1.50 green trees per clearcut acre. Twenty of the 107 units prescribed a total of 31 HRAs. The average number of snags prior to harvest was estimated to be 0.59 per clearcut acre. The average number of wildlife scorecard trees (scorecard trees) was 0.52 per clearcut acre.

Table 1. Summary of planned pre-harvest THP conservation measures for completed THP units (n=107 Units)

	GT/acre* with RMZ	GT/acre without RMZ (1 TPA Tract)	GT/acre without RMZ (2 TPA tract)	Snags/ acre	HRAs (#)	Scorecard Trees (#)	Scorecard Trees /acre
Min.	0.60	1.00	2.00	0.00	0.00	0.00	0.00
Max.	5.00	2.28	4.00	5.00	5.00	89.00	3.20
Avg.	2.07	1.50	2.14	0.59	0.29	11.23	0.52

\*all acres are clearcut acres

GT= green tree

HRA = habitat retention area

TPA = tree per acre

THP = timber harvest plan

## 2. Post-harvest habitat retention

The 88 units with RMZ retention retained an average of 2.22 green trees per clearcut acre. Although two units experienced a loss of green trees due to operational and safety constraints, overall post-harvest retention remained greater than the minimum requirements. Among the 19 units without RMZ retention, all units met the minimum green tree retention requirements. The five units without RMZ retention located in one TPA tracts retained at least one green tree per clearcut acre with an average of 1.50 per clearcut acre. The 14 units without RMZ retention and located within two TPA tracts retained at least two green trees per clearcut acre with an average of 2.14 per clearcut acre (Table 2). Among the total 107 units, an average of 0.51 wildlife scorecard trees per clearcut acre was retained. Twenty units retained a total of 31 HRAs that averaged 1.22 acres in size. An average of 0.64 snags per acre and an average of 1.74 pieces of coarse woody debris per clearcut acre were retained post-harvest.

Within the 107 units, 633.39 acres (27.26%) were retained in RMZs with an average of 5.92 acres per unit. Harvest within class I and II RMZs during the reporting period represented the first and only entry allowed during the life of the Aquatic Habitat Conservation Plan and FHCP. None of the THPs were burned during the current reporting period.

Table 2. Summary of post-harvest THP conservation measures for completed THP units (n=107 Units).

	GT/acre* with RMZ	GT/acre without RMZ (1TPA)	GT/acre without RMZ (2 TPA)	Snags/ acre	HRAs (#)	Scorecard trees (#)	Scorecard trees/acre	LWD/ acre
Min.	0.50	1.00	2.00	0.00	0.00	0.00	0.00	0.00
Max.	5.00	2.28	4.00	5.00	5.00	89.00	3.20	15.00
Avg.	2.22	1.50	2.14	0.64	0.29	11.07	0.51	1.74

\*all acres are clearcut acres

GT= green tree

HRA = habitat retention area

LWD = Large woody debris

THP = timber harvest plan

### 3. Comparison of pre- and post-harvest wildlife retention measures

The prescribed pre-harvest and post-harvest data were compared for the 107 THP units that were completed during the reporting period (Table 3 and Table 4). At times, trees were left for unanticipated reasons and as long as they satisfied the criteria for a green tree, they were counted as additional trees in the post-harvest evaluation. However, they were not counted towards the green tree tallies unless previously marked during plan layout. In some cases, additional tree clumps were retained to comply with the Forest Stewardship Council (FSC) standards. This additional retention was not counted towards green tree or HRA tallies unless it satisfied green tree or HRA criteria.

Average post-harvest retention of green trees was equal to or greater than pre-harvest prescriptions during the reporting period. Increase of green trees in harvest plans may occur due to additional marking of trees prior to operations. These trees are counted post-harvest because they were marked, however, they were not reported on during pre-harvest because they had not been marked nor were they recorded on the pre-harvest form. Average post-harvest retention of wildlife scorecard trees was slightly less than pre-harvest prescriptions. In 2021, five units reported a loss of wildlife scorecard trees due to a combination of operational and safety constraints and windthrow. The post-harvest estimate of retained snags was slightly higher than the pre-harvest estimate. Discrepancies between estimates of pre- and post-harvest snags are common. Since snags are not marked and tallied individually, inaccurate ocular estimates are often made on the number per acre, particularly during the pre-harvest phase when they are less obvious in the unharvested stand. Total post-harvest number and acreage of HRAs did not change from pre-harvest prescriptions.

Table 3. Comparisons of pre- and post-harvest green tree retention for THP units (n = 107 Units).

	Pre GT/acre* with RMZ	Post GT/acre* with RMZ	Pre GT/acre without RMZ (1TPA)	Post GT/acre without RMZ (1TPA)	Pre GT/acre without RMZ (2 TPA)	Post GT/acre without RMZ (2 TPA)
Average	2.07	2.22	1.50	1.50	2.14	2.14
Average change/unit	0.15		0.00		0.00	

\*All acres are clearcut acres

THP = timber harvest plan

GT = green tree

RMZ = riparian management zone

Table 4. Comparisons of pre- and post-harvest snag, HRA, and scorecard tree retention for THP units (n = 107 Units).

	Pre Snag/ acre*	Post Snag/ acre	Pre HRA (#)	Post HRA (#)	Pre Scorecard Trees (#)	Post Scorecard Trees (#)	Pre Scorecard Trees/acre	Post Scorecard Trees/acre
Average	0.59	0.64	0.29	0.29	11.23	11.07	0.52	0.51
Average change/unit	0.05		0.00		-0.16		-0.01	

\*All acres are clearcut acres

THP = timber harvest plan

HRA = habitat retention area

## C. Discussion

FHCP retention measures were implemented in compliance with the FHCP, and all required habitat retention features were successfully retained. Areas of habitat retained compared to the planned level of retention were equal to or greater in acreage for all but five units that experienced a loss in wildlife scorecard trees and two units that experienced a loss in green trees due to a combination of operational and safety constraints and windthrow. The two units that reported a loss of green trees retained equal to or greater than the minimum requirements. The loss of green trees included trees being retained for FSC purposes that required more scattered retention throughout the units. Prior to becoming FSC certified, Green Diamond worked to minimize tree loss from wind throw by planning the retention of fewer wildlife tree groups or clusters and instead designated more HRAs and larger RMZs. Subsequent retention efforts have placed more emphasis on scattered and clumped tree retention throughout the units. However, planned individual tree or clump retention is placed in a topographic location that will minimize wind throw where possible while still meeting FSC standards. Individual wind firm trees from the original stand can often be more successfully retained than second growth. RPFs noted the additional incidental retention of scattered and clumped sub merchantable trees. These habitat features are not quantified in this report. In many instances, this incidental structure is likely to add another element of structural diversity to future forest stands.

The greatest amount of habitat retention in THPs occurred in RMZs. Because Class I or II watercourses are given canopy retention that exceeds the standard Forest Practice Rules, this represents a significant amount of retention for future wildlife habitat. Because owls and fishers often occupy areas near streams lower on the slope, these areas are anticipated to provide excellent future core habitat for owls and fishers.

## IV. Habitat for the Covered Species

A major premise of the FHCP is that habitat suitable for the Covered Species would increase throughout the life of the plan. Prior to model development and validation, habitat will be quantified by categorizing Green Diamond's land base into age classes according to their value to the Covered Species. The distribution of acres in each of the age classes changes through time as stands age and enter older age classes and as stands are harvested and enter the younger age classes. Another factor that could affect this distribution is land acquisition and disposal.

It should be noted that land exchanges, harvest, and growth of stands are not the only factors that affect age-class distribution. Other factors, such as improved cruise data, can also cause changes. However, given the extent of the ownership, the acreage involved should be insignificant.

### A. Methods

#### 1. Overall habitat

For tree voles, suitable habitat was defined in terms of suitable nesting habitat defined as stands 20 years or older with at least 20% basal area of Douglas-fir. The acreage of the following age classes, categorized according to their value to spotted owls and fishers, was also quantified.

Age in years	Importance to spotted owls and fishers
0-7	Recently regenerated stands, no direct value to owls or fishers
8-30	Potential foraging and woodrat habitat
31-45	Foraging, roosting/resting, and occasional nesting/denning habitat
46+	Prime nesting/denning and roosting/resting habitat and also foraging habitat
NF	Non-forested land, no direct value to owls or fishers

These acreages were estimated using GIS and falling initiation dates to determine the change in total habitat, i.e., change in acreage of stands greater than 30 years old for spotted owls and fishers. If falling was initiated, then it was assumed that the entire harvest unit was felled even if portions of the unit were harvested during a different reporting period or portions of the unit were retained. Therefore, utilizing falling initiation dates overestimates the acres harvested but allows for a more accurate assessment of the

potential for displacement of an owl or fisher. Additionally, the change in habitat composition between January 1, 2021 and January 1, 2022 was reported to provide an objective measure for comparison. Although this does not coincide with the dates of the reporting period, it more accurately reflects habitat changes from one year to the next.

For tree voles, acreages were estimated using harvest depletion data to determine the change in the proportion of nesting habitat, i.e., change in the proportion of stands 20 years or older with at least 20% basal area of Douglas-fir. Harvest depletion data are derived from post-harvest aerial imagery that accounts for retention acres in addition to acres removed. The depletion data allows for a more accurate measure of the changes in the proportion of vole habitat from one year to the next (growth and harvest) and follows the methods described in Chapter V for this Covered Species. The harvest depletion data is available at the end of each calendar year, and analyses are conducted over several months. Therefore, the change in proportion of habitat between January 1, 2020 and January 1, 2021 was reported. Although this does not coincide with the dates of the reporting period or the dates utilized for owls and fishers, it more accurately reflects changes in the proportion of nesting habitat for tree voles from one year to the next.

## **2. Land acquisition and disposal**

Land transactions were summarized based on the type of transaction and the total number of acres acquired or disposed January 1, 2021 – January 1, 2022. Since land transactions may affect age-class distributions important to the Covered Species, the change in total habitat (stands greater than 30 years old for spotted owls and fishers and stands 20 years or older with at least 20% basal area of Douglas-fir for tree voles) as a result of land transactions was also quantified.

## **3. Proportion of Northern Spotted Owl habitat harvested**

The total change in spotted owl habitat due to timber harvest was also quantified around owl sites. Each THP initiated (trees harvested) during the reporting period was evaluated to determine if it was located within 500 feet or 0.5 mile of an owl's activity center. If so, a GIS exercise was conducted to determine the amount of habitat harvested around the owl sites. Circles with radii of 500 feet (18 acres) and 0.5 mile (502 acres) were centered on owl sites affected by timber harvest. The amount of habitat within each of these circles was determined for both before and after harvest. In most cases, the amount of habitat harvested was based on the total acreage of THPs that had been initiated during the reporting period, whether or not harvest of the plans had been completed. However, multi-unit THPs were an exception to this. For these plans, certain individual units may have been deferred from harvest to avoid a potential owl displacement or for other operational reasons. Thus, for determining decrease in owl habitat, it was appropriate to evaluate harvest of THPs on a unit-by-unit basis to better document the timing of habitat loss.

To produce a standard for comparison, the percentage of owl habitat (stands > 30 years) originally present is reported for each area of interest. The percent change reflects the change in owl habitat through timber harvest relative to the total amount of owl habitat present prior to harvest. The results of the stand age distribution for the owl circles determined by the GIS were verified by examining aerial imagery and light detection and ranging (LiDAR) imagery. If stand ages were not quantified in the GIS, then stand age typing was based on aerial and LiDAR imagery interpretation. Imagery typing was done primarily for owl site circles that encompassed land outside of Green Diamond's ownership. In some cases, the exact age of the stand could not be discerned by examining the imagery so that habitat was classified into "habitat" (suitable roosting and nesting) and "non-habitat" categories.

## **B. Results**

### **1. Overall habitat**

Table 5 summarizes the change in age class distribution for owls and fishers between January 1, 2021 and January 1, 2022. A total of 236,692 acres of potential spotted owl and fisher habitat was estimated to occur within the Plan Area. The total amount of habitat ( $\geq 31$  years) within the Plan Area increased by approximately 954 acres after accounting for land exchanges, harvest, growth, or reclassification of forest into different age classes (Figure 1). The amount of 31-45 age class decreased by 1,662 acres, and the amount of 46+ age class increased by 2,616 acres.

Table 6 summarizes the change in the proportion of vole nesting habitat between January 1, 2020 and January 1, 2021. The proportion of vole nesting habitat within the Plan Area as of January 1, 2020 was 55.8%, and the overall change in vole nesting habitat during the current reporting period was -1.8%.

### **2. Land acquisition and disposal**

Zero acres of potential owl and fisher habitat and zero acres of potential vole nesting habitat was acquired in the permit area between January 1, 2021 and January 1, 2022. A total of 50 acres of potential owl and fisher habitat was removed from the permit area for a net decrease of 50 acres of spotted owl and fisher habitat. A total of four acres of potential vole nesting habitat was removed from the permit area for a net decrease of four acres of vole nesting habitat.

No land transactions occurred within the Peripheral Area during the reporting period.

### **3. Proportion of Northern Spotted Owl habitat harvested**

The percentage of habitat decrease due to timber harvest within 500-foot and 0.5-mile radius circles centered on 32 owl sites are presented in Table 7. Of the 32 sites evaluated,

5 sites were the subject of a report of potential owl displacement resulting from timber harvest in this or previous reporting periods.

Potential displacement sites had an average of 1.7% and 8.2% of habitat harvested within 500-foot and 0.5-mile circles, respectively. Non-displacement sites had an average of 0.0% and 5.4% of habitat harvested within 500-foot and 0.5-mile circles, respectively.

Table 5. Acreage of Green Diamond timberlands within the Plan Area by age or habitat class for owls and fishers at beginning and end of the FHCP reporting period based on acreage as of Jan. 1, 2021 and Jan. 1, 2022.

Age or Habitat Class	Acres as of Jan. 1, 2021	Acres as of Jan. 1, 2022	Change in Acreage
Non-forest	5,310	5,277	-33
0-7 yrs	31,115	34,522	3,407
8-30 yrs	83,452	79,839	-3,613
31-45 yrs	79,828	78,165	-1,663
46+ yrs	155,911	158,527	2,616
Total	355,615	356,330	715

Table 6. The change in the proportion of vole nesting habitat within the Plan Area between January 1, 2020 and January 1, 2021.

Proportion of Nesting Habitat as of Jan. 1, 2020	Proportion of Nesting habitat as of Jan. 1, 2021	Change in proportion of Nesting habitat
55.8%	53.9%	-1.8%

Figure 1. Change in spotted owl and fisher habitat (stands > 30 years old) on Green Diamond Resource Company lands since approval of the FHCP.

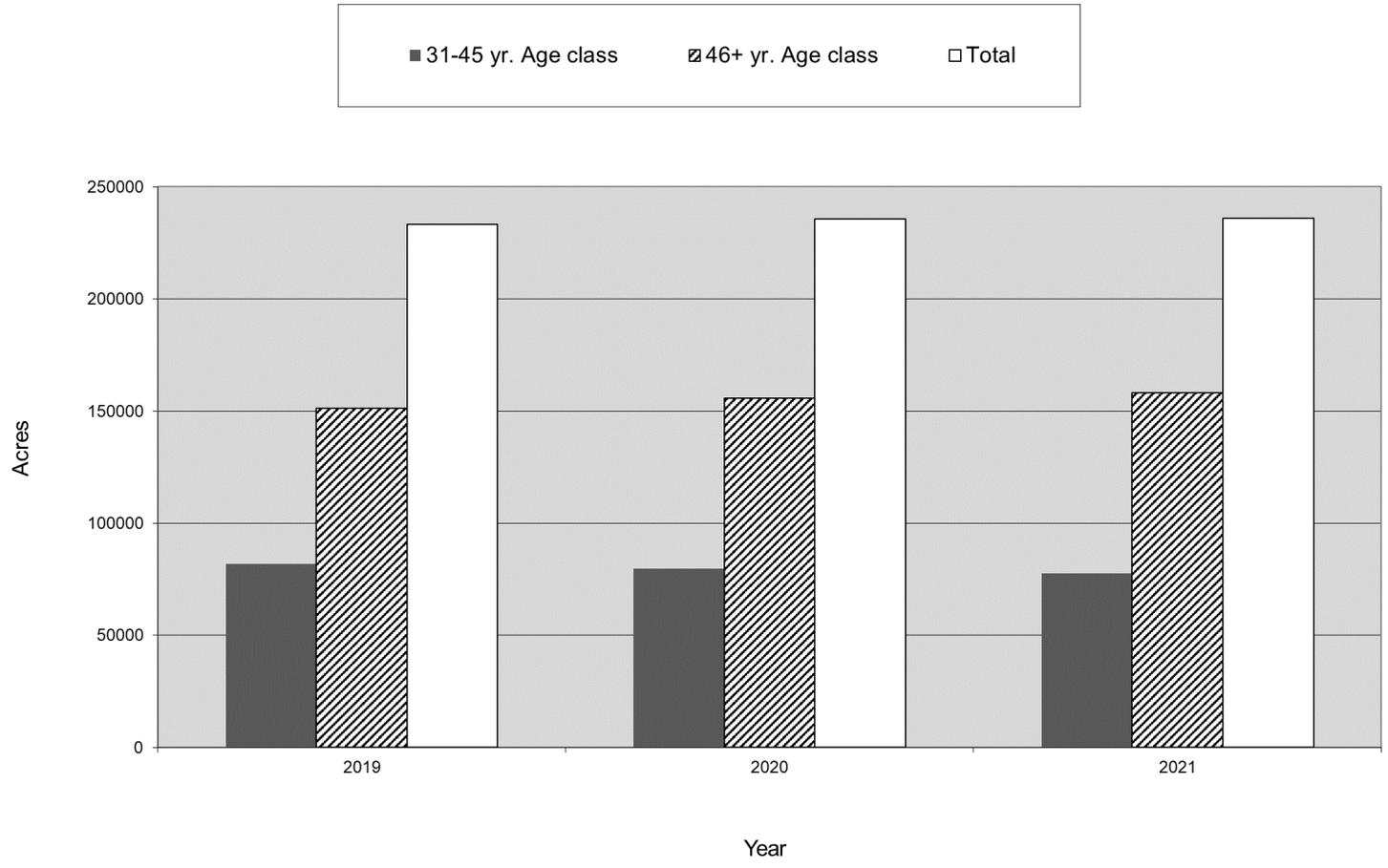


Table 7. Percent of owl habitat (stands greater than 30 years old) within 500-ft. and 0.5-mile radius circles centered on owl sites, and percent of the total area changed (i.e., habitat removed) by timber harvest. Bold indicates sites potentially displaced (both direct and indirect) by timber harvest in the current reporting period. Site names followed by an asterisk (\*) are potential direct displacement sites. "DCA" or "AMDCA" indicate the site was associated with a Dynamic Core Area or Adaptive Management Core Area, respectively. "Previous" indicates a potential displacement was triggered in a previous reporting period.

Site	500 feet		0.5 mile	
	% Habitat	% Change	% Habitat	% Change
5700 (AMDCA)	92.4	0.0	75.4	1.0
B.C. Powerline	99.7	0.0	62.7	8.9
Boulder Creek #4	98.6	0.0	81.8	1.0
Boulder Creek #5 (DCA)	100.0	0.0	73.3	3.6
Cal Barrel Washout (DCA)	100.0	0.0	90.6	0.03
<b>Clear Creek*</b>	94.6	8.6	45.0	20.6
Coyote North	100.0	0.0	93.7	7.7
Dominie Winchuck	100.0	0.0	66.2	9.9
Dry Creek (DCA)	100.0	0.0	77.5	0.3
Fernwood (DCA)	100.0	0.0	74.0	1.5
Garrett South	100.0	0.0	77.1	8.0
<b>Guptil Gulch</b>	100.0	0.0	42.2	2.8
Hulla Crup Turwar	100.0	0.0	92.8	4.4
Hunter 400	100.0	0.0	80.0	4.4
Jackson Hill	95.4	0.0	79.7	0.4
Jiggs Creek	100.0	0.0	89.9	6.3
Lower Dry Creek	98.6	0.0	66.5	13.3
Old 299 #1 (DCA)	100.0	0.0	61.6	2.5
Panther Bridge (DCA)	100.0	0.0	99.4	8.8
<b>PL3</b>	100.0	0.0	38.6	3.5
Poverty Creek	100.0	0.0	88.1	1.1
Rock Ranch	100.0	0.0	65.8	1.9

Site	<u>500 feet</u>		<u>0.5 mile</u>	
	<u>% Habitat</u>	<u>% Change</u>	<u>% Habitat</u>	<u>% Change</u>
Salmon Creek #3 (DCA)	76.7	0.0	59.9	7.1
Simpson Creek	96.0	0.0	66.9	16.9
T-Line	100.0	0.0	95.6	6.1
Turwar CF	100.0	0.0	85.5	6.4
<b>Upper Maple BL</b>	70.9	0.0	34.5	14.3
Upper Mynot Creek	100.0	0.0	95.7	0.7
Upper SF Winchuck	100.0	0.0	65.2	22.9
W100	100.0	0.0	91.2	2.0
W302	100.0	0.0	97.6	0.0
<b>Windy Point (previous)</b>	52.0	0.0	38.4	0.0

## C. Discussion

The results of the habitat analysis for this annual report showed a slight overall increase in the total amount of habitat for spotted owls and fishers, indicating that growth of timber stands into owl and fisher habitat or habitat gained through land acquisitions exceeded timber harvest or habitat lost through land disposals. Typically, land exchanges are relatively small acreages. In 2021, several small (range 0.11 - 27 acres) land disposals totaling approximately 95 acres (50 acres of owl and fisher habitat) was offset by habitat growth. The change in the proportion of vole nesting habitat within the Plan Area for this annual report did not exceed the projected average.

## V. Take

The term 'take' means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any such conduct (16 U.S.C. section 1532(19)). Harm in the definition of take means an act which actually kills or injures wildlife. This may include significant habitat modification or degradation that actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. Although Green Diamond's incidental take permit covers all take of the Covered Species incidental to timber harvest operations, the primary form of incidental take anticipated in the FHCP is the displacement of the Covered Species due to habitat modification. However, it was recognized that such displacement could impair essential behavioral patterns and result in actual death or injury.

### A. Northern spotted owl

#### 1. Methods

##### a. Displacement (take) evaluation

An assessment of potential displacement (take) was conducted for sites when timber harvest or other Covered Activities resulted in one or more of the following conditions:

- Suitable nesting, roosting or foraging habitat was removed or destroyed within a 500-foot radius of a spotted owl site center (direct displacement)
- Less than 89 acres of stands 46 years and older remained post-harvest within a 0.5-mile radius of a spotted owl site (indirect displacement)
- Less than 233 acres of stands 31 years and older remained post-harvest within a 0.5-mile radius of a spotted owl site center (indirect displacement)
- Timber harvest within a 0.5-mile radius of a spotted owl site that was already below thresholds or that reduced habitat below thresholds (<89 acres of stands 46 years and older or < 233 acres of stands 31 years and older) post-harvest (indirect displacement)

If any of the above conditions occurred, a potential displacement occurred, and monitoring was triggered. A confirmed displacement was based on the post-harvest demographic performance of spotted owls within the home range where harvest (or other Covered Activities) triggered the assessment of potential displacement. The performance criteria are described below under 'Displacement monitoring and accounting'. Displacement associated with a particular owl site in a home range occurred only once, unless the site was designated as vacant and later recolonized. Additionally, individual owls could be displaced (taken) more than once if they occupied

successive owl sites in different home ranges where harvesting triggered a report of potential displacement.

Each THP initiated within the reporting period that had an owl site within 0.5 miles of the plan was evaluated for displacement using the process described in section IV.A.3. This involved estimating the amount of habitat within the 0.5-mile radius circle around each owl site using Green Diamond's GIS and remote sensing data. If the entire 502-acre circle was not on Green Diamond land, aerial photographs or other remote sensing data were used to determine the age class or habitat category of areas outside of the ownership, because Green Diamond's inventory does not include data from other ownerships.

### **b. Displacement monitoring and accounting**

The displacement accounting period was based on the date of approval for the FHCP (June 13, 2019). Therefore, the displacement accounting period started on June 13 of the previous reporting year and ended on June 12 of the current reporting year. The number of potential displacements allocated for a given accounting period was based on the total number of active spotted owl sites at the end of the previous breeding season. Unused potential displacements were held in reserve and may be used in subsequent years so long as the total number of potential displacements is no more than twice the number of allocated potential displacements for the accounting period for which the potential displacement(s) was triggered. For example, if the number of allocated potential displacements in year X was 3, then a maximum of 6 potential displacements could be triggered in year X even if the number in reserve was greater.

Displacement (take) was designated based on the post-harvest demographic performance of spotted owls within the home range where harvest (or other Covered Activities) triggered the potential displacement assessment. The performance criteria were based upon occupancy and/or reproduction of any spotted owls at a site. The final displacement determination could occur beginning at the third and ending at the fifth breeding season following the last harvest that triggered the assessment. The following criteria were used for concluding that displacement (take) did not occur:

- in third breeding season following trigger of potential displacement:
  - owls nested (whether successful or not) in at least 2 years **or**
  - owls nested in 1 year with 2 years occupancy (at least 1 year of pair occupancy for sites with pair occupancy prior to timber harvest or a single owl at sites without pairs)
- in fourth breeding season following trigger of potential displacement:
  - owls nested in at least 2 years or
  - owl(s) occupied the site for four years (at least two years of pair occupancy for sites with pair occupancy prior to timber harvest or a single owl at sites without pairs)

- in fifth breeding season following trigger of potential displacement:
  - owl(s) occupied the site four out of five years (at least two years of pair occupancy for sites with pair occupancy prior to timber harvest or a single owl at sites without pairs)

The status of owls at sites being monitored for potential displacement was assessed by noting the 2021 location and behavior of the owls. All owl sites for which a report of potential displacement was triggered during this reporting period will be monitored in future breeding seasons to determine if displacement (take) has occurred. If the above criteria cannot be met, the site was considered to have been taken (owl or owls displaced) and recorded for the initial year in which the timber harvest triggered the potential displacement.

### **c. Projected potential displacement**

The displacement accounting period was based on the approval date of the FHCP and was based on the number of active spotted owl sites in the previous breeding season. The initial displacement accounting period was June 13, 2019 through June 12, 2020 and the amount of allocated potential displacements (number of potential takes available) was based on the number of active spotted owl sites at the end of the 2018 breeding season. Likewise, the amount of allocated potential displacements for the 2020-2021 displacement accounting period was based on the number of active spotted owl sites at the end of the 2019 breeding season, and the 2021-2022 displacement accounting period was based on the number of active spotted owl sites at the end of the 2020 breeding season.

#### 1) Outcome of 2020-2021 projected potential displacements

The number and type (direct or indirect) of potential displacement projected in the last reporting period were compared to the actual numbers in this reporting period.

#### 2) Projected 2021-2022 potential displacements

The results of the owl surveys (section II.B.1.) in conjunction with planned THP locations were used to estimate the type and location of potential displacements for the next reporting period.

## **2. Results**

### **a. Displacement evaluation**

Thirty-two sites that had potential for direct or indirect displacement were evaluated during the reporting period (Table 8). Harvest initiated in the reporting period resulted in reports of one potential direct displacement and four potential indirect displacements (Table 8).

Table 8. Acres of age and habitat classes within 0.5-mile radius circles (502 acres) centered on owl sites potentially impacted by timber harvest. Bold indicates potential displacement sites for the current reporting period. “DCA” or “AMDCA” indicate site was associated with a Dynamic Core Area or Adaptive Management Core Area, respectively. Asterisks indicate potential direct displacement sites and “previous” indicates a potential displacement was triggered in a previous reporting period and often at a different activity center.

Site	Owl site year	0-7 yrs. (acres)	8-30 yrs. (acres)	31-45 yrs. (acres)	46+ yrs. (acres)	Total acres owl habitat (31+)
5700 (AMDCA)	2020	26.3	97.5	245.1	130.0	375.1
B.C. Powerline	2020	134.3	32.9	0.0	307.6	307.6
Boulder Creek #4	2020	69.1	0.0	0.0	407.1	407.1
Boulder Creek #5 (DCA)	2018	122.0	0.0	0.0	367.5	367.5
Cal Barrel Washout (DCA)	2020	3.6	43.4	40.3	415.3	455.6
<b>Clear Creek*</b>	2020	36.2	217.6	0.0	202.3	202.3
Coyote North	2021	31.9	0.0	188.7	234.9	423.6
Dominie Winchuck	2021	70.7	86.3	0.0	299.8	299.8
Dry Creek (DCA)	2019	17.2	95.8	150.0	238.7	388.7
Fernwood (DCA)	2021	85.6	45.3	23.4	343.0	366.3
Garrett South	2020	88.9	26.2	67.4	289.3	356.7
<b>Guptil Gulch</b>	2021	280.7	9.7	166.9	45.4	212.3
Hulla Crup Turwar	2020	27.0	9.3	259.1	187.0	446.0
Hunter 400	2019	28.9	71.5	242.9	141.7	384.5

Table 8. Acres of age and habitat classes within 0.5-mile radius circles (502 acres) centered on owl sites potentially impacted by timber harvest. Bold indicates potential displacement sites for the current reporting period. “DCA” or “AMDCA” indicate site was associated with a Dynamic Core Area or Adaptive Management Core Area, respectively. Asterisks indicate potential direct displacement sites and “previous” indicates a potential displacement was triggered in a previous reporting period and often at a different activity center.

Site	Owl site year	0-7 yrs. (acres)	8-30 yrs. (acres)	31-45 yrs. (acres)	46+ yrs. (acres)	Total acres owl habitat (31+)
Jackson Hill	2021	94.7	7.4	113.0	286.0	399.0
Jiggs Creek	2021	44.2	0.0	21.4	408.7	430.1
Lower Dry Creek	2020	0.7	167.3	156.6	133.7	290.2
Old 299 #1 (DCA)	2021	33.8	156.7	0.0	304.6	304.6
Panther Bridge (DCA)	2021	3.1	0.0	301.5	154.3	455.8
<b>PL3</b>	2021	99.3	209.1	87.3	107.0	194.3
Poverty Creek	2021	23.9	35.9	92.5	345.5	438.0
Rock Ranch	2020	156.7	11.8	0.0	327.8	327.8
Salmon Creek #3 (DCA)	2020	54.9	146.3	0.0	280.0	280.0
Simpson Creek	2021	22.7	143.8	55.4	224.1	279.5
T-Line	2019	18.6	3.4	261.3	189.9	451.3
Turwar CF	2019	14.0	58.9	227.7	174.5	402.2
<b>Upper Maple BL</b>	2021	85.0	242.8	0.5	149.5	150.0
Upper Mynot Creek	2020	18.1	2.3	309.4	169.6	479.1

Table 8. Acres of age and habitat classes within 0.5-mile radius circles (502 acres) centered on owl sites potentially impacted by timber harvest. Bold indicates potential displacement sites for the current reporting period. “DCA” or “AMDCA” indicate site was associated with a Dynamic Core Area or Adaptive Management Core Area, respectively. Asterisks indicate potential direct displacement sites and “previous” indicates a potential displacement was triggered in a previous reporting period and often at a different activity center.

Site	Owl site year	0-7 yrs. (acres)	8-30 yrs. (acres)	31-45 yrs. (acres)	46+ yrs. (acres)	Total acres owl habitat (31+)
Upper SF Winchuck	2021	170.0	79.9	0.0	252.7	252.7
W100	2020	28.8	15.4	281.4	168.1	449.5
W302	2021	0.0	12.0	397.5	93.1	490.7
<b>Windy Point (previous)</b>	2020	80.4	229.0	0.0	193.2	193.2

## 1) Activity at owl sites where harvest initiated a potential displacement

Clear Creek

This site was associated with Green Diamond THP #47-1407 (State ID #1-14-113HUM) Unit B. The following is a summary of the birds' known activity within the reporting period.

Date	Activity/Response
9/1/2020	Falling initiated causing potential direct displacement.
4/08/2020	Site visit survey, no detection
4/29/2020	Site visit survey, no detection
5/12/2020	Site visit survey, no detection
6/10/2020	Site visit and night call survey, no detection
6/30/2020	THP survey, no detection
7/07/2020	THP survey, no detection
7/14/2020	THP survey, no detection
7/22/2020	THP survey, no detection
7/23/2020	Night call survey, no detection

Upper Maple B.L.

This site was associated with Green Diamond THP #45-1501 (State ID #1-15-051HUM) Unit F. The following is a summary of the birds' known activity within the reporting period.

Date	Activity/Response
6/7/2021	Falling initiated causing potential indirect displacement.
4/08/2021	Site visit and THP survey, no detection
4/19/2021	THP survey, no detection
4/28/2021	THP survey, no detection
5/03/2021	Site visit and THP survey, no detection
5/10/2021	THP survey, no detection
5/14/2021	Site visit survey, no detection
5/17/2021	THP survey, no detection
6/01/2021	Site visit survey, unknown sex SPOW
6/02/2021	Site visit and night call survey, no detection

Guptil Gulch

This site was associated with Green Diamond THP #19-2101 (State ID #1-21-00067HUM) Unit B. The following is a summary of the birds' known activity within the reporting period.

Date	Activity/Response
7/22/2021	Falling initiated causing potential indirect displacement.
4/15/2021	Site visit and night call survey, no detection
5/03/2021	Site visit and night call survey, no detection
6/07/2021	Site visit survey, no detection
6/17/2021	THP survey, no detection
6/24/2021	Site visit and THP survey, no detection
7/01/2021	THP survey, no detection
7/09/2021	THP survey, no detection

PL3

This site was associated with Green Diamond THP #19-2101 (State ID #1-21-00067HUM) Unit A. The following is a summary of the birds' known activity within the reporting period.

Date	Activity/Response
7/26/2021	Falling initiated causing potential indirect displacement.
4/15/2021	Site visit and night call survey, no detection
5/03/2021	Site visit and night call survey, no detection
5/14/2021	Night call survey, no detection
5/27/2021	Site visit and night call survey, no detection
6/17/2021	Site visit and THP survey, no detection
6/24/2021	THP survey, no detection
7/01/2021	THP survey, no detection
7/09/2021	THP survey, no detection

**b. Displacement monitoring and accounting**

During the 2020-2021 displacement accounting period, four potential displacements were allocated, four potential displacements were triggered, and zero were reserved. During the 2021-2022 accounting period, four potential displacements were allocated. Through the end of the current reporting period, two of the four allocated potential displacements were triggered and two were reserved. Table 9 summarizes the allocated and reserved potential displacements for each accounting period. No sites were available to evaluate for confirmed displacements because at least three breeding seasons had not passed

subsequent to harvest triggering potential displacement. Table 10 summarizes potential and confirmed displacements since implementation of the FHCP. Table 11 summarizes the occupancy and nesting status of potential displacement sites in breeding seasons subsequent to those in which the report of potential displacement was triggered. Since no sites were available to evaluate for confirmed displacements, no sites were added to the confirmed displacement total during the 2021 reporting period.

Table 9. Summary of allocated and reserved potential displacements by accounting period since implementation of the FHCP.

Accounting Period	Total # of Active Sites in Previous Breeding Season	Allocated Potential Displacements	Triggered Potential Displacements	Reserved Potential Displacements	Total Available Potential Displacements
2019-2020	152	5	2	3	3
2020-2021	136	4	4	0	3
2021-2022*	134	4	2	2	5

\*Displacement accounting information reported through the end of the annual reporting period (June 13, 2021 – September 1, 2021)

Table 10. Summary of spotted owl sites potentially displaced since implementation of the FHCP, including potential displacements reported for the current reporting period (2020 - 2021). Bold indicates potential direct displacement and underline indicates a designation of displacement (confirmed displacement).

Year		
2019	2020	2021
Windy Point	<b>Pollnow Peak</b>	Upper Maple B.L.
	McCloud Creek	Guptil Gulch
	HRC 372	PL3
	<b>Clear Creek</b>	
Potential Displacements		
1	4	3
Cumulative Potential Displacements		
1	5	8
Displacements		
0	0	0
Cumulative Displacements		
0	0	0
Cumulative Net Potential Displacements		
1	5	8
Cumulative Net Displacements		
0	0	0

Table 11. Spotted owl habitat ( $\geq 31$  years of age), occupancy, and reproductive status at potentially displaced sites. Bold indicates potential direct displacement and shading indicates a confirmed displacement.

Site	displ. year	Habitat within ½ mile	Status prior to displ.	Status 1 year after	Status 2 years after	Status 3 years after	Status 4 years after	Status 5 years after	Status 6 years after	Status 7 years after	Status 8 years after
Windy Point	2019	169.9	Single, unk.	Non-nesting male	UO						
<b>Pollnow Peak</b>	2020	185.9	UO	Vacant	Vacant						
McCloud Creek	2020	214.5	Non-nesting pair.	Female, unk.							
HRC 372	2020	225.5	UO	UO							
<b>Clear Creek</b>	2020	202.3	UO	UO							
Upper Maple B.L.	2021	150	Single, unk.								
Guptil Gulch	2021	212.3	UO								
<b>PL3</b>	2021	194.3	UO								

Explanation of abbreviations: displ. = displacement; unk. = reproductive status unknown or unconfirmed; UO = unoccupied

## 1) Summary of potential displacement monitoring and accounting by year.

### **Potential displacement based on year 2019**

#### **Windy Point (indirect)**

Harvest in September of 2019 initiated a potential indirect displacement. A single spotted owl of unknown gender and unknown paired status occupied this site in 2019 prior to potential displacement. This site was occupied by a single male in 2020 and unoccupied in 2021. Additional harvest in 2021 triggered continued potential displacement, and this site does not yet qualify to be evaluated for final displacement determination.

### **Potential displacement based on year 2020**

#### **Pollnow Peak (direct)**

Harvest in January of 2020 initiated a potential direct displacement. This site was unoccupied prior to potential displacement and remained unoccupied through 2021. This site is now considered to be vacant and does not yet qualify to be evaluated for final displacement determination.

#### **McCloud Creek (indirect)**

Harvest in June of 2020 initiated a potential indirect displacement. This site was occupied by a non-nesting pair in 2019 prior to the potential displacement. The site was occupied by a non-nesting pair in 2020 and a female with unknown paired status in 2021. This site does not yet qualify to be evaluated for final displacement determination.

#### **HRC 372 (indirect)**

Harvest in July of 2020 initiated a potential indirect displacement. This site was unoccupied in 2020 prior to potential displacement. This site was unoccupied in 2021 and does not yet qualify to be evaluated for final displacement determination.

#### **Clear Creek (direct)**

Harvest in September of 2020 initiated a potential direct displacement. This site was unoccupied in 2020 prior to potential displacement. This site was unoccupied in 2021, and additional harvest in 2021 triggered continued potential displacement. This site does not yet qualify to be evaluated for final displacement determination.

### **c. Projected potential displacement**

#### 1) Outcome of 2020-2021 projected potential displacements

In the 2020 report, it was estimated that four owl sites would be potentially displaced in the current reporting period. Four potential displacements were triggered during this reporting period (Table 12).

2) 2021-2022 Projected potential displacements.

Green Diamond is projecting four potential displacements during the next reporting period (Table 13).

**d. Direct harm**

No direct harm or injury to spotted owls inadvertently occurred within the purview of Green Diamond's 10(a)(1)(B) permit.

Table 12. Potential displacement status of owl sites in 2021 projected in 2020 to be triggered from Sept. 1, 2020 - Sept. 1, 2021, and type of potential displacement projected.

Owl site	Projected type of potential displacement	Actual potential displacement status
Clear Creek	Direct	Clear Creek – Direct
Upper Maple B.L.	Indirect	Upper Maple B.L. - Indirect
Stevens Creek East	Indirect	No Potential Displacement
Lower Stevens Creek	Indirect	No Potential Displacement
Not Projected	Not Projected	Guptil Gulch - Indirect
Not Projected	Not Projected	PL3 - Indirect

Table 13. Owl sites projected to be potentially displaced from Sept. 1, 2021 - Sept. 1, 2022 and type of potential displacement anticipated.

Owl site	Type of potential displacement	Site Status
Middle Stevens Creek	Indirect	Non-nesting Pair
Salmon Creek #4	Indirect	Single SPOW
Stevens Creek East	Indirect	Unoccupied
Upper Stevens Creek	Indirect	Non-reproductive Pair

### 3. Discussion

Since implementation of the FHCP, potential displacements have occurred at eight spotted owl sites. Three of these sites (Windy Point, Guptil Gulch, and Upper Maple BL), were considered displaced under the previous 1992 Northern Spotted Owl HCP. Windy Point continued to be occupied by a single male until this reporting period. Guptil Gulch was newly colonized in 2008 and was unoccupied prior to the initiation of the potential displacement under the previous HCP. This site remains unoccupied by spotted owls but has been consistently occupied by barred owls. Upper Maple BL was unoccupied prior to the initiation of the potential displacement under the previous HCP in 2009. The site remained unoccupied until recolonized by a single spotted owl in 2016. The site remains occupied by a single spotted owl. The Clear Creek site was occupied by single spotted owls in 2016 through 2019 before remaining unoccupied. The single birds resighted at this

site have also been periodically observed occupying the Upper Maple BL site. The Pollnow Peak site was newly colonized by a pair of spotted owls in 2016, but this same pair was observed at multiple sites throughout 2016 and 2017 including the Upper Maple BL and Clear Creek sites. Ultimately, this site remained unoccupied for two years prior to the harvest that triggered the potential displacement. Similarly, the HRC 372 site was unoccupied for two years prior to the harvest that triggered the potential displacement. The PL3 site activity center is located off of the Green Diamond ownership, but a portion of the 0.5-mile buffer overlaps with the Plan Area. This site has remained unoccupied by spotted owls over the past five years but consistently occupied by barred owls. The McCloud Creek site has been occupied by non-nesting spotted owls (pairs or single owls) for nine years. The McCloud Creek site is located within the Salmon Creek tract (approximately 8,000 acres within the Humboldt Bay-Eel River Owl Management Unit), and nine other spotted owl sites with successful reproduction are located within this tract. To date, all potential displacements have occurred at sites lacking reproductive success over the past five years or longer, and only one of the potential displacement sites was occupied by a pair in recent years.

Previous analyses examining displacements that occurred during the 1992 Northern Spotted Owl HCP permit term have suggested that site occupancy subsequent to potential displacement was strongly correlated with the type of potential displacement. For example, if potential displacement reporting was triggered as a result of timber harvest within 500 feet of an activity center (potential direct displacement) but an adequate amount of habitat remained within the territory, the owls were more likely to persist in the area. During the current reporting period, the only potential direct displacement was associated with the Clear Creek site that demonstrated low occupancy prior to harvest that triggered the potential displacement. Future monitoring is needed to understand the potential impacts of harvesting and type of displacement on site persistence and biological performance. However, the potential displacements that have occurred during FHCP implementation were associated with sites demonstrating low occupancy and a lack of reproduction. These sites were unlikely to provide biological support for the local population within the Plan Area.

## **B. Fisher**

### **1. Methods**

Similar to spotted owls, the primary source of potential harm to fishers is habitat modification through timber harvesting that results in displacement of fishers. Displacement likely decreases survival and fecundity as fishers attempt to find suitable habitat not already occupied by a resident fisher. Through previous studies conducted on the Green Diamond ownership, the estimated population density of fishers across the Plan Area is 335 fishers. Because timber harvest averages approximately 2.0% of the

ownership per year, annual timber harvest has the potential to harm an average of 6.7 fisher (2.0% of 335 = 6.7). Therefore, take is estimated to be 6.7 fisher annually. The percent of harvest within the Plan Area was estimated using harvest depletion data. Harvest depletion data are derived from post-harvest aerial imagery that depicts actual acres removed through Covered Activities and accounts for retention acres. The harvest depletion data is available at the end of each calendar year, and analyses are conducted over several months. Therefore, the percent of harvest within the Plan Area between January 1, 2020 and January 1, 2021 was reported.

Green Diamond has also documented fisher deaths at abandoned or unmaintained water tanks. Fishers may enter an unrestricted opening resulting in drowning or entrapment. All water tanks are inspected annually to ensure that openings are secured against potential entry by fishers. The details of these inspections are further described in Chapter VIII.

## **2. Results**

A total of 350,916 acres were estimated to occur within the Plan Area, and 5,747 acres were harvested resulting in harvest of 1.6% of the Plan Area between January 1, 2020 and January 1, 2021.

## **3. Discussion**

The annual level of take was projected to average 2.0% of the Plan Area fisher population as measured by the total acres harvested. During the current reporting period, the percent of harvest within the Plan Area did not exceed the projected average. Additionally, no fisher carcasses were observed during inspections of water tanks and covers over openings were intact indicating exclusion efforts continue to be successful.

## **C. Tree vole**

### **1. Methods**

Direct harm or displacement of tree voles may occur as a result of timber harvest. The approximate level of take is equal to the proportion of suitable nesting habitat harvested each year, which is projected to average 2.0% annually. Acreages were estimated using harvest depletion data to determine the change in the proportion of stands 20 years or older with at least 20% basal area of Douglas-fir (nesting habitat). Harvest depletion data are derived from post-harvest aerial imagery that accounts for retention acres in addition to acres removed. The depletion data allows for a more accurate measure of the changes in the proportion of vole habitat from one year to the next (growth and harvest). The harvest depletion data is available at the end of each calendar year, and analyses are conducted over several months. Therefore, the change in proportion of habitat between January 1, 2020 and January 1, 2021 was reported. Although this does not coincide with the dates of the reporting period, it more accurately reflects changes in the proportion of nesting habitat for tree vole from one year to the next. Additionally, Green Diamond's forestry staff avoided felling trees with tree vole nests located within the Riparian Management Zones (RMZs) and geological areas.

### **2. Results**

The proportion of vole nesting habitat within the Plan Area as of January 1, 2020 was 55.8%, and the overall change in vole nesting habitat during the current reporting period was -1.8% (Table 6, Chapter IV).

No trees with known tree vole nests were felled within the RMZs or geological areas during the current reporting period.

### **3. Discussion**

The annual level of take was projected to average 2.0% of the Plan Area vole population as measured by the change in the proportion of vole nesting habitat. The change in the proportion of vole nesting habitat within the Plan Area for this annual report did not exceed the projected average. Additionally, no trees containing tree vole nests were felled within the RMZs or geological areas.

## VI. Conservation Areas

The fundamental premise of the FHCP is that a mosaic of high-quality habitat would be maintained for the Covered Species within the term of the permit through retention of habitat elements and regrowth of other habitat components temporarily lost due to timber harvest. This central conservation strategy is augmented by specific landscape commitments. The primary mitigation strategy for the Northern spotted owl under the FHCP is the establishment of Dynamic Core Areas (DCAs) as the highest priority and level of protection for the most productive spotted owl sites distributed throughout the Plan Area. DCAs are intended to be dynamic and adaptive, which contrasts with the static reserve concept of the set-asides established under the 1992 Northern Spotted Owl HCP. Upon FHCP approval, set-aside areas established under the 1992 Northern Spotted Owl HCP that were not included as DCAs were available for timber harvest. However, harvesting was scheduled in a manner to delay take of spotted owl sites as long as possible within the constraints of the Forest Practice Rules (FPRs) and adjacency requirements. In addition to the DCAs, the FHCP established a Peripheral Area of approximately 2% of the Green Diamond ownership where spotted owls were specially managed for no take. This section of the annual report describes harvesting within former set-asides; designation, monitoring, and replacement of DCAs; and Peripheral Area management.

### A. Methods

Green Diamond established 44 DCAs in the Plan Area, totaling 3777.4 acres. Each DCA was designed to provide a core nesting area for a single pair of spotted owls with a minimum no-harvest core area of 89 acres of nesting/roosting habitat where available. These initial DCAs were selected by first evaluating all sites within the Plan Area during the course of study (1990-2015). The criteria included selecting the most functional sites in terms of high occupancy and fecundity while considering extenuating factors related to maintaining good spatial distribution and considering barred owl influences on spotted owl site occupancy. In order to maintain spatial distribution for existing DCAs and future replacement DCAs, the Plan area was divided into 11 Owl Management Units (OMUs) ranging in size from approximately 22,000 acres to approximately 55,000 acres. OMUs were also used to evaluate spotted owl sites within geographical areas of somewhat similar habitat composition and management history. Using the same criteria, twelve additional DCAs were established as potential replacement or “Adaptive Management DCAs” (AMDCA) to provide for augmentation of the spotted owl population, as options for replacing spotted owl sites designated in the initial set of 44 DCAs, and for additions if Adaptive Management was triggered.

## 1. Transition from 1992 Northern Spotted Owl HCP set-asides

All set-aside areas defined in the 1992 Northern Spotted Owl HCP that were not designated as a DCA were available for timber harvest. However, Green Diamond implemented harvesting of these former set-asides within the Plan Area to maximize the persistence of any existing spotted owl sites by using a pattern of harvest unit layouts that avoided the core nesting area until the final harvest unit(s) within that set-aside.

## 2. DCA monitoring

The 44 DCAs and 12 AMDCAs were surveyed for spotted owls and barred owls, including a combination of site visits (daytime stand searches) and nighttime broadcast surveys at known spotted owl sites. A DCA/AMDCA was considered occupied if the associated spotted owl site was occupied, including occupancy at activity centers located outside of the DCA/AMDCA boundary. Annual occupancy and mean fecundity were calculated for all associated spotted owl sites in order to monitor the success of the biological functionality of the DCA (i.e., mean annual occupancy  $\geq 0.75$  and mean fecundity  $\geq 0.25$  averaged over the last four years). All owl activity centers were classified according to the definitions in section 6.2.4.4 of the FHCP. Since demographic surveys were not conducted for barred owls, information on barred owl site activity centers was limited. However, a combination of daytime and nighttime barred owl detections was used to determine if a spotted owl site associated with a DCA/AMDCA was influenced by barred owls. The spotted owl site was considered barred owl influenced if one of the following conditions were met:

- a pair of barred owls were detected within the site,
- a single barred owl was detected within the site more than once during the breeding season and detections were separated by at least two weeks, or
- a single barred owl was detected within the site over multiple consecutive breeding seasons.

## 3. DCA replacement or additions

The DCA conservation strategy was designed to maintain a well-distributed array of protected nesting core areas with high occupancy and good fecundity. Since these sites occur on a changing managed landscape, the locations of DCAs must remain dynamic through time to maintain their biological functionality while also providing flexibility in timber harvesting. Therefore, a DCA replacement occurred if the site declined below or failed to meet the biological thresholds for a DCA (i.e., mean annual occupancy  $\geq 0.75$  and mean fecundity  $\geq 0.25$  averaged over the last four years). DCA replacement may also occur for economic reasons so long as the replacement DCA met the biological and spatial requirements defined in the FHCP (Section 5.3.1.4.4). However, DCAs were not replaced during the first 5 years of FHCP implementation in order to allow time for the Conservation Program to be effective, especially barred owl removal efforts. As described above, 12 AMDCA sites may be used for replacing spotted owl sites designated in the initial set of 44

DCAs and for additions if Adaptive Management was triggered. One additional DCA was designated for each incremental net increase in the Plan Area of 8,000 acres, and the additional DCA was located within the scope of the added lands.

#### **4. Peripheral Area management**

The Peripheral Area consisted of timberlands that Green Diamond does not intend to own and manage as part of its long-term business plan and conservation plan for the Covered Species. Additionally, the Peripheral Area consisted of any other Green Diamond Ownership in Del Norte or Humboldt Counties, California that were outside the Eligible Plan Area described in the FHCP. The Peripheral Area was managed solely for the prevention of spotted owl take by timber harvest through implementation of pre-harvest survey protocols. If a spotted owl site was known to exist or was detected through surveys, it was protected by no take seasonal harvest restrictions and by maximum habitat modification limitations within no take spatial buffers around the spotted owl site (FHCP Section 6.2.4).

## **B. Results**

### **1. Transition from 1992 Northern Spotted Owl HCP set-asides**

Two timber harvest plans consisting of 44.8 acres were initiated within two of the former set-asides during the current reporting period (Table 14). Although 1 active spotted owl site was within the boundaries of these set asides, harvest operations were not impacted due to sufficient habitat.

Table 14. Schedule of set-asides and spotted owl site occupancy 2021.

Set-aside name	Original acres	Acres harvested in current reporting period	Cumulative acres harvested	Acres remaining	Site name	Site status	Harvest within site core
4076	297.1	0.0	0.0	297.1	4076*	Unoccupied	None
					4128	Nesting pair	None
					4300	Nesting pair	None
4230	77.0	0.0	0.0	77.0	4230#1*	Nesting pair	None
4850	875.9	0.0	0.0	875.9	4850	Vacant	None
					4851*	Nesting pair	None
					6600*	Unoccupied	None
					Bear Creek	Nesting pair	None
					Maple Creek #1	Unoccupied	None
					Maple Creek #2	Single female, non	None
5700	76.2	0.0	0.0	76.2	5700*	Non reproductive pair	None
6007	193.8	0.0	0.0	193.8	6007*	Nesting pair	None
Bald Mt. Creek	61.2	0.0	0.0	61.2	Bald Mt. Creek	Vacant	None
Black Dog Creek	167.7	0.0	43.4	124.3	Lower Dry Creek	Non nesting pair	None
Blue Creek Cabin	498.8	0.0	0.0	498.8	None	Not applicable	None
Boulder Creek	1987.8	0.0	208.5	1779.3	Boulder Creek #1	Unoccupied	None
					Boulder Creek #2*	Unoccupied	None
					Boulder Creek #3*	Unoccupied	None
					Boulder Creek #4	Nesting pair	None

Set-aside name	Original acres	Acres harvested in current reporting period	Cumulative acres harvested	Acres remaining	Site name	Site status	Harvest within site core
					Boulder Creek #5*	Vacant	None
					Camp Gate	Unoccupied	None
					Camp Gate North*	Female, pair status unknown	None
					Camp Gate South*	Unoccupied	None
Bug Creek	371.5	0.0	0.0	371.5	None	Not applicable	None
Cal Barrel	192.5	0.0	32.0	160.5	Cal Barrel	Nesting pair	None
Camp Bauer	241.1	0.0	0.0	241.1	Camp Bauer*	Non reproductive pair	None
					Jiggs Creek	Unoccupied	None
Canyon Creek	188.3	0.0	0.0	188.3	Canyon Creek #1*	Female, pair status unknown	None
Devil's Creek	113.3	0.0	0.0	113.3	Devil's Creek*	Non reproductive pair	None
Dolly Varden	374.2	26.9	26.9	347.3	Dolly Varden*	Vacant	None
EBF	111.6	0.0	0.0	111.6	EBF*	Non reproductive pair	None
Fawn Prairie	242.3	0.0	73.8	168.5	None	Not applicable	None
H131	166.9	0.0	0.0	166.9	H131	Unoccupied	None
Humbug Creek	162.6	0.0	0.0	162.6	Humbug Creek	Nesting pair	None
Johnson Creek	125.2	0.0	0.0	125.2	None	Not applicable	None
Little Deer Creek	680.8	0.0	0.0	680.8	Deer Creek	Unknown**	None
					Little Deer Creek	Unknown	None
Lower Tully Creek	376.1	0.0	0.0	376.1	None	Not applicable	None

Set-aside name	Original acres	Acres harvested in current reporting period	Cumulative acres harvested	Acres remaining	Site name	Site status	Harvest within site core
Lupton Creek	249.0	0.0	0.0	249.0	Lupton Creek #1*	Unoccupied	None
					Lupton Creek #2	Unoccupied	None
					Lupton Creek #3	Unoccupied	None
McCloud Creek	174.9	0.0	0.0	174.9	None	Not applicable	None
Mettah Creek	176.3	0.0	0.0	176.3	None	Not applicable	None
Morek Creek	1002.7	0.0	0.0	1002.7	None	Not applicable	None
Mule Creek	853.1	0.0	99.8	753.3	Denman Creek	Unoccupied	None
					Mule Creek	Unoccupied	None
No Name Creek	735.2	0.0	0.0	735.2	7000	Unoccupied	None
					Noname Creek*	Vacant	None
					Upper Noname Creek	Unoccupied	None
Old 299	172.1	0.0	0.0	172.1	Old 299 #1*	Nesting pair	None
Poverty Creek	363.9	17.9	17.9	346.0	Poverty Creek	Unoccupied	None
Puter Creek	127.8	0.0	0.0	127.8	Quarry Creek*	Single male, not nesting	None
Redwood Creek	181.1	0.0	0.0	181.1	Dick Bird	Unoccupied	None
Roddiscraft/Powerline	312.3	0.0	0.0	312.3	Powerline North	Non reproductive pair	None
					Roddiscraft Powerline	Unoccupied	None
					Snow Camp Creek	Vacant	None
Salmon Creek	218.0	0.0	0.0	218.0	Salmon Creek #3*	Single female, not nesting	None

Set-aside name	Original acres	Acres harvested in current reporting period	Cumulative acres harvested	Acres remaining	Site name	Site status	Harvest within site core
					Salmon Creek #5	Nesting pair	None
SF Bald Mt.	130.0	0.0	0.0	130.0	None	Not applicable	None
T300	71.8	0.0	0.0	71.8	T300	Unoccupied	None
Upper Tully Creek	239.5	0.0	0.0	239.5	Upper Tulley Creek	Vacant	None
Walsh	148.2	0.0	0.0	148.2	Middle Salmon Creek	Unoccupied	None
					Walsh	Single female, not nesting	None
Williams Ridge	261.8	0.0	0.0	261.8	None	Not applicable	None
Wiregrass	229.0	0.0	0.0	229.0	None	Not applicable	None

\* Denotes a spotted owl site that is also associated with a DCA or AMDCA.

\*\*Unknown site status indicates that protocol surveys were not conducted. During the current reporting period, sites with an 'unknown' status were located outside of the demographic study area and where no timber harvesting was proposed.

## 2. DCA monitoring

The 44 originally designated DCAs were located in seven of the 11 OMUs, and the 12 AMDCAs were located in four of the OMUs (Table 15). Eighteen DCAs (Table 16) and eight AMDCAs (Table 17) were occupied by spotted owls in 2021. Twelve DCA sites were occupied by pairs, two were occupied by a single owl, and four were occupied by owls with unknown social status. Eight DCA-associated pairs attempted nesting and five pairs successfully fledged six owlets. Six AMDCAs were occupied by pairs, one was occupied by a single owl, and one was occupied by an owl with unknown social status. Four AMDCA-associated pairs attempted nesting and three pairs successfully fledged six owlets. Compared to the previous reporting period, DCA/AMDC occupancy and paired occupancy increased in 2021

Thirty-one of the 44 DCAs were considered to be influenced by barred owls in a previous year, 23 continued to be barred owl influenced in 2021, and one DCA was influenced by barred owls for the first time in 2021. Five of the 12 AMDCAs were considered to be influenced by barred owls in a previous year, three continued to be barred owl influenced in 2021, and zero AMDCAs were newly barred owl influenced during the current reporting period.

Of the 44 originally designated DCAs, four met the criteria for mean fecundity and mean occupancy, 12 met the criteria for either mean fecundity or mean occupancy, and 28 failed to meet either criteria. Of the 12 AMDCAs, six met the criteria for mean fecundity and mean occupancy, and six met the criteria for either mean fecundity or mean occupancy.

Table 15. Owl Management Units (OMUs) and their current associated DCA/AMDCA. AMDCA's are differentiated with an asterisk.

OMU#	OMU Name	DCA	AMDCA
1	Smith River	None	Winchuck River
2	Wilson, Hunter, Terwer Creeks	East Fork Hunter, Hunter 500, T-Line, W100, W302	None
3	McGarvey, Ah Pah, Surpur Creeks	None	None
4	Tectah, Mettah, Roach, Tully Creeks	Ambrose, Hancorne Ranch, Lower Roach, Morek Creek, Notchkoo, WM200, WM400	None
5	Maple Creek	None	None
6	Redwood Creek	Dolly Varden, Fernwood, Garrett Creek, Lupton Creek #1, Noisy Creek, Panther Bridge	None
7	Little River	None	None
8	North Fork Mad River	Cal Barrel Washout, Camp Bauer, Jurin, Lower Dolf Creek, Old 299 #1, SF Bald Mt. Creek	Tip Top Ridge
9	Lower Mad River, Jacoby Creek	4076, 4230 #1, 4851, 6007, 6600, Canyon Creek #1, Devil's Creek, Dry Creek, Noname Creek	4107, 5700, Blue Blossom, Mad River Overlook, Mad River STS, Noname North, Quarry Creek, Sullivan Gulch
10	Upper Mad River, Upper Redwood Creek	Boulder Creek #2, Boulder Creek #3, Boulder Creek #5, Camp Gate North, Camp Gate South, Graham Creek, Mt. Andy, N. Goodman Prairie, Pardee South	None
11	Humboldt Bay, Eel River	EBF, Salmon Creek #3	C2300, Salmon Creek #2

Table 16. Dynamic Core Area (DCA) characteristics based on the current reporting period. 'Previous' indicates barred owl influence in a previous year.

DCA #	DCA site name	Acres	Starting year of occupancy	Year last occupied	Barred owl influence	Current year		Last 4 years (2018-2021)			
						Site Status	Number of fledglings	Mean fecundity	Number of fledglings	Years occupied	Mean Occupancy <sup>1</sup>
1	Hunter 500	78.2	2006	2021	Yes	Nesting Pair	2	0.33	2	3	0.75
2	W302	87.4	1992	2015	Yes (previous)	Unoccupied	0	0.00	0	0	0.00
3	W100	76.9	1992	2020	Yes (previous)	Unoccupied	0	0.00	0	1	0.25
4	East Fork Hunter	56	2004	2021	No	Single Female, not nesting	0	0.50	2	2	0.50
5	T-Line	98.1	1992	2019	No	Unoccupied	0	0.00	0	2	0.50
6	Ambrose	80.8	1993	2010	Yes (previous)	Unoccupied	0	0.00	0	0	0.00
7	Notchkoo	72.3	1992	2020	Yes (previous)	Unoccupied	0	0.00	0	3	0.75
8	Lower Roach	98.6	1992	2021	Yes (previous)	Non reproductive pair	0	0.00	0	2	0.50
9	Morek Creek	107.7	1992	2016	Yes (previous)	Unoccupied	0	0.00	0	0	0.00
10	Hancorne Ranch	90.4	2001	2012	No (previous)	Unoccupied	0	0.00	0	0	0.00
11	WM400	105.5	1992	2016	No (previous)	Unoccupied	0	0.00	0	0	0.00
12	WM200	79.6	1992	2016	Yes (previous)	Vacant	0	0.00	0	0	0.00
13	Panther Bridge	81.1	1992	2020	Yes (previous)	Unoccupied	0	0.00	0	2	0.50
14	Garrett Creek	76.5	1992	2012	Yes (previous)	Unoccupied	0	0.00	0	0	0.00

DCA #	DCA site name	Acres	Starting year of occupancy	Year last occupied	Barred owl influence	Current year		Last 4 years (2018-2021)			
						Site Status	Number of fledglings	Mean fecundity	Number of fledglings	Years occupied	Mean Occupancy <sup>1</sup>
15	Dolly Varden	118.2	1992	2006	Yes (previous)	Vacant	0	0.00	0	0	0.00
16	Lower Dolf Creek	67.9	1999	2013	No (previous)	Vacant	0	0.00	0	0	0.00
17	Jurin	91.2	1993	2016	No (previous)	Unoccupied	0	0.00	0	0	0.00
18	Old 299 #1	81.3	1992	2021	No (previous)	Nesting pair	1	0.25	1	2	0.50
19	Lupton Creek #1	92.7	1992	2015	Yes (previous)	Unoccupied	0	0.00	0	0	0.00
20	Cal Barrel WO	81.7	1992	2021	No	Nesting pair	1	0.125	1	4	1.00
21	SF Bald Mt. Creek	69.4	1992	2021	Yes (previous)	Nesting pair	0	0.00	0	2	0.50
22	Camp Bauer	103.8	1992	2021	Yes (previous)	Non reproductive pair	0	0.00	0	3	0.75
23	Fernwood	93.4	1992	2021	No	Female, pair status unknown	0	0.00	0	3	0.75
24	Noisy Creek	129.7	1992	2011	Yes (previous)	Vacant	0	0.00	0	0	0.00
25	4230 #1	76	1992	2021	No (previous)	Nesting pair	1	0.375	3	4	1.00
26	Canyon Creek #1	73.5	1992	2021	No	Female, pair status unknown	0	0.17	1	4	1.00
27	4076	84.7	1992	2018	Yes (previous)	Unoccupied	0	0.00	0	1	0.25
28	6007	78.5	1997	2021	No	Nesting pair	1	0.25	2	4	1.00
29	Devil's Creek	97	1999	2021	Yes (previous)	Non reproductive pair	0	0.00	0	3	0.75

DCA #	DCA site name	Acres	Starting year of occupancy	Year last occupied	Barred owl influence	Current year		Last 4 years (2018-2021)			
						Site Status	Number of fledglings	Mean fecundity	Number of fledglings	Years occupied	Mean Occupancy <sup>1</sup>
30	Dry Creek	68	1992	2021	No	Nesting pair	0	0.00	0	4	1.00
31	4851	65.9	1992	2021	Yes (previous)	Nesting pair	0	0.00	0	2	0.50
32	6600	70.7	1992	2014	Yes (previous)	Unoccupied	0	0.00	0	0	0.00
33	Noname Creek	77.6	1992	2012	No	Vacant	0	0.00	0	0	0.00
34	Pardee South	71.5	2004	2018	Yes (previous)	Unoccupied	0	0.00	0	1	0.25
35	Boulder Creek #3	104.1	1992	2017	Yes (previous)	Unoccupied	0	0.00	0	0	0.00
36	Boulder Creek #2	78.9	1992	2018	Yes (previous)	Unoccupied	0	0.00	0	1	0.25
37	Camp Gate North	76.6	1992	2021	Yes (previous)	Female, pair status unknown	0	0.00	0	1	0.25
38	Boulder Creek #5	96.9	1997	2018	No	Vacant	0	0.00	0	1	0.25
39	Camp Gate South	72.4	1992	2020	Yes (previous)	Unoccupied	0	0.17	1	3	0.75
40	Mt. Andy	95.7	1994	2015	No	Vacant	0	0.00	0	0	0.00
41	North Goodman Prairie	130.3	1992	2021	No (previous)	Male, pair status unknown	0	0.00	0	3	0.75
42	Graham Creek	89.3	1992	2016	No	Vacant	0	0.00	0	0	0.00
43	EBF	74.3	1992	2021	No	Non reproductive pair	0	0.13	1	4	1.00

DCA #	DCA site name	Acres	Starting year of occupancy	Year last occupied	Barred owl influence	Current year		Last 4 years (2018-2021)			
						Site Status	Number of fledglings	Mean fecundity	Number of fledglings	Years occupied	Mean Occupancy <sup>1</sup>
44	Salmon Creek #3	77.1	1992	2021	No (previous)	Single female, not nesting	0	0.33	2	4	1.00

<sup>1</sup>Mean Occupancy is reported as naïve occupancy (i.e., not modeled occupancy).

Table 17. Characteristics of Potential Replacement or Adaptive Management Dynamic Core Areas (AMDCA) established during the first five years of plan implementation. 'Previous' indicates barred owl influence in a previous year.

AMDCA #	DCA site name	Acres	Starting year of occupancy	Year last occupied	Barred owl influence	Current year		Last 4 years (2017-2020)			
						Site status	Number of fledglings	Mean fecundity	Number of fledglings	Years occupied	Mean occupancy <sup>1</sup>
45	Winchuck River	93.6	2011	2021	No (previous)	Nesting pair	0	0.25	1	4	1.00
46	Tip Top Ridge	94.9	2016	2019	No (previous)	Unoccupied	0	0.75	3	2	0.50
47	Sullivan Gulch	89.7	2010	2021	No	Non reproductive pair	0	0	0	4	1.00
48	Quarry Creek	92.4	1992	2021	No	Single male, not nesting	0	0	0	4	1.00
49	Mad River STS	97.5	2012	2021	No	Nesting pair	2	0.375	3	4	1.00
50	4107	92.4	1992	2020	No	Unoccupied	0	0	0	3	0.75
51	Blue Blossom	97.1	2010	2020	Yes (previous)	Unoccupied	0	0.5	2	3	0.75
52	5700	90.3	1992	2021	No	Non reproductive pair	0	0.25	2	4	1.00
53	Mad River Overlook	90.1	2015	2021	Yes(previous)	Unoccupied	0	0	0	3	0.75
54	Noname North	93.1	2013	2021	Yes (previous)	Male, pair status unknown	0	0	0	3	0.75
55	Salmon Creek #2	93.5	1992	2021	No	Nesting pair	2	0.25	2	4	1.00
56	C2300	90	1992	2021	No	Nesting pair	2	0.83	5	4	1.00

<sup>1</sup>Mean Occupancy is reported as naïve occupancy (i.e., not modeled occupancy).

Table 18. Comparison of occupancy and reproductive success for DCA and AMDCA sites from 2020 through 2021.

Year	# Occupied	# Pairs	# Pairs nesting	# Pairs successful	# Fledged owlets
2020	25	14	8	6	7
2021	26	18	12	8	12

### 3. DCA replacement and additions

No DCAs were replaced during the current reporting year. No DCAs were added to the Plan Area as a result of land acquisitions.

### 4. Peripheral Area management

Between September 8, 2020 and November 16, 2020, approximately 4,000 acres within the Peripheral Area burned as a result of the Slater fire. As a result, 1,834 acres of the burned area were salvaged through emergency regulations under the California Forest Practice Rules. No known spotted owl sites occurred within or adjacent to the salvaged areas. Therefore, pre-harvest surveys were not required. No additional harvesting or pre-harvest surveys occurred within the Peripheral Area, and no land transactions occurred within the Peripheral Area during the reporting period.

## C. Discussion

Although harvest occurred within two of the historic set-asides, active spotted owl sites were not impacted due to the location of harvest in relation to the current activity center and the amount of habitat post-harvest. One of the five set-asides, Fawn Prairie, was never occupied by spotted owls during the 1992 Northern Spotted Owl HCP permit term, and this area continued to be unoccupied in 2021.

In 2021, 36% of the successful spotted owl nest sites within the Plan Area were located within a DCA ( $n = 5$ ) or an AMDCA ( $n = 3$ ). Of the fourteen successful nest sites not associated with a DCA or an AMDCA, eleven were located within an OMU containing the successful DCA or AMDCA sites. Of the 22 successful nests, 82% were not influenced by barred owls (no detections within 0.5 mile of the activity center) in 2021. Additionally, seven of the eight DCAs/AMDCA sites that successfully fledged young were not influenced by barred owls in 2021. Although formal analyses have not been completed, the increase in overall mean fecundity and mean occupancy at DCA/AMDCA sites during the reporting is likely a result of ongoing barred owl removal efforts. As outlined in the FHCP, DCAs will not be replaced for the first five years of FHCP implementation in order to allow time for the Conservation Program to be effective, especially barred owl removal efforts. In the absence of barred owls, spotted owls may select sites based strictly on habitat quality, and spotted owl performance at currently designated DCA/AMDCA sites may improve once the competitive pressures are alleviated.

## VII. Spotted Owl Studies

Green Diamond's spotted owl studies from 1989 through 2019, which included a two-year graduate study of the owls' habitat and implementation of Green Diamond's 1992 HCP for Northern Spotted Owls, provided a firm biological basis for the conservation strategy of the FHCP. The demographic portion of these studies, which were continued in 2021, addressed population density, reproductive success, site occupancy, population turnover rates, and other demographic information pertaining to the owls.

The objectives of Green Diamond's continuing owl studies are to monitor the efficacy of the FHCP through:

- Estimating distribution and population density of northern spotted owls through direct counts of banded birds in large tracts of managed young-growth forests in northern California.
- Estimating demographic parameters (reproductive success, survival rates, site occupancy, and turnover rates) to determine viability of this population.
- Assessing the long-term dynamic relationship between owl distribution, habitat loss through timber harvest, and habitat gain through forest growth.
- Assess the potential impact on spotted owl viability from barred owls, West Nile Virus or other new threats

### A. Methods

#### 1. Site occupancy/status

Surveys were conducted at owl sites located in 2020 for occupancy in 2021. A site was considered occupied in 2021 if owls were detected at the same roost and/or nest site from previous years. A site was considered unoccupied in 2021 if it previously was a confirmed site, but not occupied in 2021. If a site was occupied early in the 2021 season, but apparently unoccupied later in the season, it was considered occupied in 2021. Such a site will not be considered unoccupied unless it is still unoccupied in 2022.

New sites were categorized in 2021 according to their survey history. A site was designated as a "newly discovered" site if it had been found in 2021 in an area that had not been surveyed or had inadequate survey coverage prior to 2020. A site was classified as a "newly colonized" site if it had been found in 2021 in an area that had been adequately surveyed prior to 2021, but no owls had been previously detected in the area. A site was classified as recolonized if it had been occupied in one or more previous years, unoccupied for three or more years prior to 2021 and then occupied again in 2021. A site

was classified as 'possible' if first responses of spotted owls occurred late in the breeding season and for which the required number of surveys/follow-up visits could not be completed before the end of the breeding season. 'Possible' sites designated in one breeding season are surveyed in the subsequent breeding season to determine if a perennial owl site exists.

## **2. Reproductive success**

Pair status was designated by observing a male and female in close proximity (less than 1/4 mile) in any of the following contexts: roosting, vocalizing, nesting, delivering prey, or tending young. An owl was judged to be single if the same owl was observed on two or more occasions in the same general area without detecting an owl of the opposite gender.

Nesting was designated for pairs if the female was observed incubating eggs or brooding young between April 1 and May 31. In some instances, incubation was determined in late-March, but a second visit was generally conducted prior to May 31 to confirm nesting. We determined reproductive success of nesting owl pairs that were monitored to protocol from June 1- August 31. Pairs were considered to have successfully nested if at least one owlet was observed to have fledged. In special circumstances, the location and stage of development of an owlet found dead were evaluated to determine whether the owlet had fledged.

## **3. Spotted owl banding**

When unbanded owls or owls banded with cohort auxiliary leg bands (owls banded as juveniles with a color band identifying the year in which they were banded) were located during follow-up visits, bait mice or artificial lures were used to attract the owls within range of capture. All age classes of spotted owls were primarily captured using a snare pole. Once an owl was captured, a USFWS band was placed on one of its legs and an auxiliary colored leg band on the other. The following measurements were usually taken in earlier years of the study: wing cord, body mass, length of tarsus, length of footpad, and tail length. If conditions permitted, toe, claw, bill length and bill depth also were measured. The age class of the owl was recorded. Subadults (one- or two-year-old owls) were distinguished from adults (greater than two years old) by having pointed retrices. One-year-old (S1) and two-year-old (S2) subadults were distinguished using the methods of Moen et al. (1991). Owls were also checked for molt, previous or current injuries, parasites, and presence of brood patches for females. Owls were released immediately after they were banded and measured.

## **4. Juvenile dispersal**

Owls banded as juveniles were assigned to the appropriate age class when they were recaptured. We used locations of spotted owls banded as juveniles (both within and outside the Green Diamond study area) and recaptured as adults or subadults to measure

juvenile dispersal distances. Distances were determined for juveniles: 1) dispersing within Green Diamond's study area and 2) dispersing from Green Diamond's study area to another area or dispersing from another area to Green Diamond. Other study areas included the Willow Creek Study Area, Hoopa Reservation, Humboldt Redwood Company, Redwood National Park and regional studies in Oregon.

## 5. Turnover

Adult and subadult owls banded or resighted in one year were used to determine turnover rates in the subsequent year. Owls were considered to be "missing" if they were banded or resighted at least once during one season, but not resighted the next year. If an owl disappeared in the same season in which it was earlier banded or resighted, it was reported as missing the next season if its whereabouts were still unknown. Owls that were present at a site but could not be positively resighted were excluded from the analysis. New recruits were defined as owls that became territorial for the first time.

## 6. Owl density

Large areas (typically greater than 50,000 acres) completely surveyed for spotted owls and owl locations were mapped on a GIS database. GIS programs determined the acreage of thoroughly surveyed areas that included a northern and a southern study area. Once the owl sites were plotted, the number of sites in the surveyed areas was determined. The sites were classified into those occupied by paired or single owls. It was assumed that a single owl occupied the site 1) if it was confirmed that a single bird was at the site, or 2) if the pair status of the site was unknown. The total number of territorial owls associated with the sites in completely surveyed areas was used to calculate overall owl density and density of owls in the northern and southern areas. The density study area on and adjacent to Green Diamond ownership is shown in Figure 2. *The **density study area** is a defined subset of the demographic study area (see definition below in section 7) in which the entire area is surveyed each year in an attempt to locate all occupied northern spotted owl sites, which can be used to calculate an annual estimate of spotted owl density.*

## 7. Demography

Green Diamond Resource Company has been conducting a demography study on Northern Spotted Owls since 1990 to monitor trends in the owl's population within Green Diamond's ownership. *The **demographic study area** is the portion of Green Diamond's ownership and selected adjacent areas in which all known northern spotted owl sites are monitored annually to estimate occupancy, fecundity and survival following accepted scientific protocols. The number of demographic sites may change over time as a result of land acquisitions and disposals, newly colonized sites, or significant activity center shifts at historic sites.* The Green Diamond demographic study area is one of 11 long-term, ongoing studies that contribute to a periodic, region-wide meta-

analysis of the status of the northern spotted owl. In January 2020, Green Diamond biologists attended a workshop convened in Corvallis, Oregon to analyze demographic data on Northern Spotted Owls. The workshop was attended by biologists from 11 study areas throughout Washington, Oregon and California along with a large contingent of biometricians and statisticians from several academic and research institutions across North America. Most of the study areas were on federal lands or a mix of federal, state and private lands, with only one entirely on private lands and one on Indian Reservation lands.



## 8. Barred owls

Since 1989, Green Diamond biologists have noted the incidental detection of barred owls on or adjacent to the ownership while conducting surveys for spotted owls. We recorded all barred owl detections from daytime and nighttime owl surveys since 1989. We defined a barred owl site as an area having a history of detections from a single bird on multiple occasions within the same year or in multiple years. Single detections of pairs or evidence of young were also included as sites. The assessment for number of sites was limited to the density study area since this area has consistent and adequate annual survey coverage. We did not conduct site visit level surveys for barred owls to determine paired or reproductive status.

Upon approval of the amendment to the 1992 Northern Spotted Owl HCP in December 2007, Green Diamond committed to further research on the interactions between spotted owls and barred owls. In 2009, Green Diamond began conducting barred owl surveys in select areas within the spotted owl density study area. Surveys were conducted using electronic solid state callers (Wildlife Technologies) with a variety of barred owl vocalizations. Coincident with the specific surveys for barred owls, Green Diamond launched a pilot study (Phase I) in participation with the California Academy of Sciences. The removal of barred owls was conducted in the context of before-after-control-impact (BACI) design that divided the study area into paired areas of similar size where one portion of the study area was treated (barred owls lethally removed, Diller et al. 2014) and the other area considered a “control” was untreated by allowing unfettered expansion of barred owls. The spotted owl response variables in both treatment and control areas were occupancy, fecundity and survival. A secondary objective of the study was to observe more “case studies” of how spotted owls respond to the removal of territorial barred owls. The highest priority was given to removing barred owls from nest sites or activity centers that were formerly occupied by spotted owls. Following removal, we documented the specifics of the site relative to potential recolonization by either species of owl. These case studies provided insight into how spotted owls respond, when they have been displaced by barred owls. For example, if the original spotted owl territory holders rapidly recolonize a site (i.e., several weeks to a month) following the removal of an invading pair of barred owls, this would suggest the spotted owls remained in or near their original territory after being displaced. However, if a site that has been “freed” of barred owls takes a long time (i.e., a year or more) to be recolonized and/or the spotted owls are new individuals at the site, this would suggest that displaced spotted owls abandon their territories after being displaced. The initial Phase I experiment was completed in 2014 and results of the study are available in Diller et al. 2016.

In 2020, based on the results of the Phase I experiment, Green Diamond initiated Phase II of the barred owl removal experiment which expands the removal effort across all of the Plan Area, where feasible. Phase II also utilizes a BACI (before-after-control-impact) design with paired treated (i.e., the Plan Area where barred owls will be removed) and

untreated control areas (i.e., the Willow Creek Demographic Study Area). Phase II objectives include those of Phase I (spotted owl demographic response to barred owl removal), determining the feasibility of a large-scale removal experiment, and estimating the recovery of spotted owl populations that have been suppressed by barred owls for a decade or more. Phase II has an expected duration of approximately 10 years or until objectives of the study have clearly been achieved. Following completion and evaluation of the results of Phase II, Phase III implementation will include an approved invasion and co-existence experiment. During the invasion portion of Phase III, barred owls will be allowed to recolonize selected areas from which they had previously been removed for 10 years or more. The objectives of the second portion of Phase III will be to fine tune suppression of barred owl numbers to achieve a stable equilibrium in which the FHCP spotted owl objectives are achieved while minimizing the need for continued lethal removal of barred owls.

Removal efforts in 2020 focused on spotted owl sites associated with Dynamic Core Areas (DCAs), sites with recent (within the last three years) spotted owl occupancy, and Owl Management Units (OMUs) with designated DCAs. Removal efforts in 2021 continued to focus on these same areas but also expanded to include the majority of the Plan Area. For more information on DCAs and OMUs, see Chapter VI of this report. Since initiation of the Phase II barred owl removal experiments in 2020, barred owl surveys have been conducted year-round.

In 2010, we conducted occupancy surveys for barred owls within the spotted owl Density Study Area. We established 68 survey points from which we conducted the occupancy surveys. Occupancy surveys were conducted during the early breeding season and in the late fall/winter. We used a variety of barred owl vocalizations broadcast from digital wildlife callers (Wildlife Technologies, MA-15). Each survey point was called for a minimum of sixteen minutes. The goal is to conduct occupancy surveys on an annual basis to assess occupancy over the long-term in relation to potential management actions.

From 2011 through 2021, the barred owl occupancy survey effort was expanded to include the spotted owl Demographic Study Area. We modified our survey protocols to include nine minutes of spotted owl vocalizations followed by nine minutes of barred owl vocalizations broadcast from digital wildlife callers (Wildlife Technologies model MA-15). In order to cover the study area more completely, we increased the number of survey points from 68 to 500 or approximately one station/800 acres within the demographic study area. Each survey point was called for a minimum of eighteen minutes at least twice during the spotted owl breeding season (March 1 through August 31).

## **9. Model validation**

### **a. Habitat fitness**

Green Diamond developed a habitat fitness model for spotted owls using research and monitoring data collected over two decades. Habitat fitness projections indicate an increasing trend in the habitat with greatest fitness values suggesting the spotted owl population is capable of increasing in the Plan Area in the future. After approximately ten years of FHCP implementation, Green Diamond will attempt to validate the habitat fitness model by determining if the trend in estimated occupied spotted owl sites are statistically shown to be stable or increasing as predicted by the increasing trend in habitat quality. If validated, then direct monitoring of the entire spotted owl population across the Plan Area will be replaced by monitoring habitat conditions projected by a multi-state occupancy model.

### **b. Site occupancy**

Since the habitat fitness model was not developed to predict how site-specific management actions might influence habitat quality for a specific spotted owl site, Green Diamond will develop and validate a multi-state occupancy model that includes management covariates that are more easily calculated and interpreted. A first draft of this site occupancy model will be developed within three years of signing the FHCP. If validated, the site occupancy model will be used to estimate take (displacement), estimate population change for the Plan Area spotted owl population and assess triggers for adaptive management. The triggers for adaptive management under the occupancy model will be the same as triggers used for rate of population change where there is evidence of a statistically significant decline in the Plan Area spotted owl population.

If both models are validated, the intensive Plan Area demographic spotted owl surveys will be replaced by occupancy surveys. However, Green Diamond will continue spotted owl surveys to protect individual nesting spotted owls, monitor DCAs, and monitor spotted owl fecundity in the Plan Area.

## **B. Results**

### **1. Site occupancy**

In 2021, a total of 86 owl sites were located in the Green Diamond demographic study area (Table 19). Of these sites, 82 were confirmed as occupied and four were confirmed as possible sites. Fifty-six sites were occupied by pairs, five were occupied by a single owl and 25 were occupied by owls with unknown social status. Thus, a minimum of 142 territorial owls were on the study area in 2021. The annual variation in confirmed and possible owl sites is shown in Table 20.

Of the sites occupied in 2020, 60 were occupied in 2021. Seven sites occupied by pairs in 2020 were occupied by single birds or birds with unknown social status in 2021. Similarly, ten sites occupied by single birds or birds of unknown social status in 2020 were occupied by pairs in 2021. Owl sites occupied in 2021 that were not accounted for in 2020 included four possible sites, 16 perennial sites, four recolonized sites, and two newly colonized sites (Table 21 and Appendix III). Since 1994, there were 75 sites considered newly colonized in the density study area, and 97 sites considered newly colonized in the demographic study area. Since the adoption of the FHCP in 2019, there were four sites considered newly colonized in the demographic study area. No sites were newly discovered in 2021. A complete list of spotted owl sites located within the demographic study area and/or on the Green Diamond ownership along with matching state master owl numbers and the status of each site during the current reporting period is located in Appendix IV.

## 2. Reproductive success

Thirty-six pairs at 49 sites (73%) monitored (paired sites with protocol reproductive surveys) during the nesting season attempted nesting (Table 22). The reproductive success for two pairs that attempted nesting was unknown. Twenty-eight nesting pairs successfully fledged a minimum of 47 owlets, for a reproductive success rate of 0.96 owlets fledged per monitored site. To date, eight pairs have made 13 nesting attempts in nest boxes. Eight attempts were successful, and ten owlets were fledged.

The trend in the number of owlets fledged per monitored pair from 1992-2021 is shown in Figure 3. The equation of the straight line relating owlets fledged per monitored pair versus year was estimated as:  $\text{owlets fledged/monitored pair} = 12.473 - 0.006 \cdot \text{year}$ . The slope of the regression line is -0.0060 with a standard error of 0.004. Due to this relatively high annual variation, the significance test that the slope is zero resulted in a t-value of -1.34 with  $P = 0.19$ .

**Figure 3. Trend in the number of owlets fledged per monitored pair, 1992-2021**

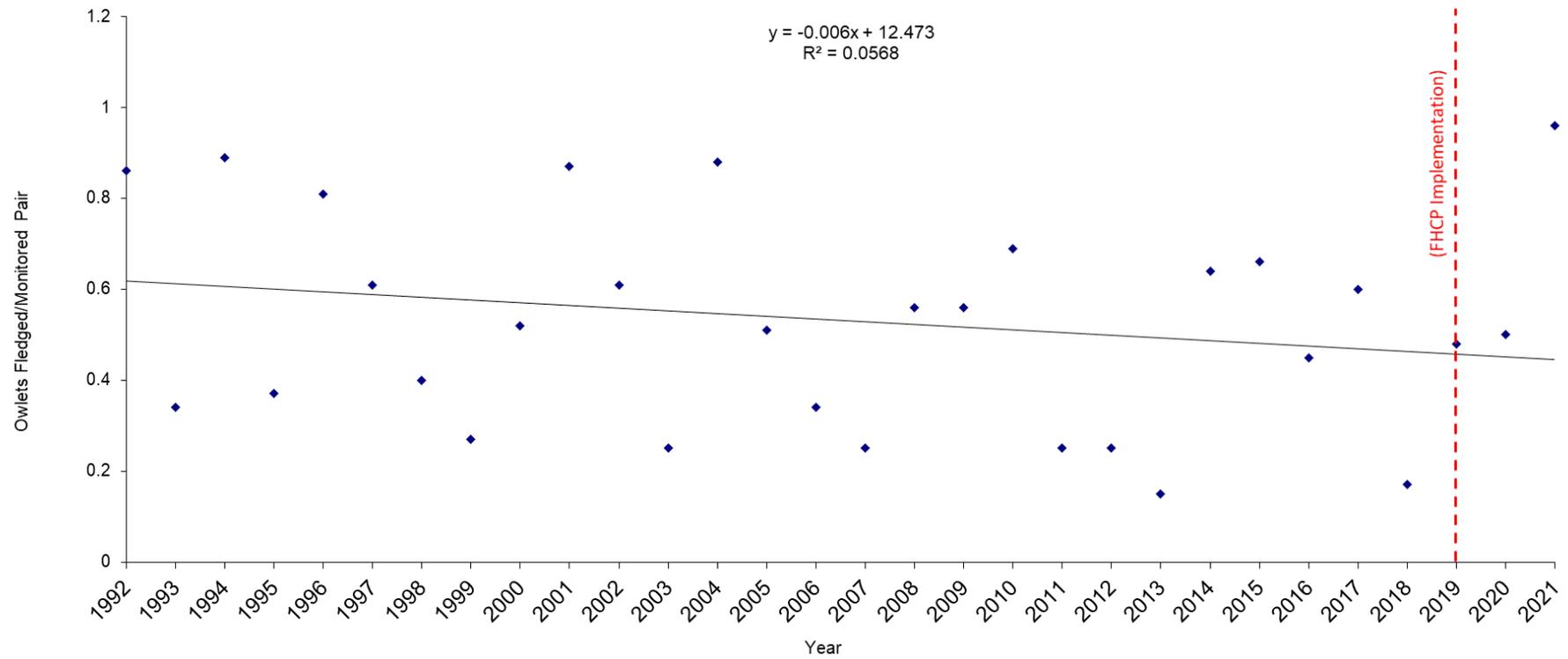


Table 19. Status of northern spotted owls, Green Diamond demographic study area, 2021.

Nesting pairs (n)	Non-nesting pairs (n)	Nesting Status unknown pairs (n)	Singles (n)	Social status unknown (n)	Total sites (n)	Fledged owlets (n)
36	4	16	5	25	86	47

Table 20. Annual variation in northern spotted owl sites, Green Diamond demographic study area 1990-2021.

Year	Sites		Total
	Confirmed	Possible	
1990	86	1	87
1991	142	2	144
1992	171	18	189
1993	185	15	200
1994	183	5	188
1995	163	3	166
1996	155	0	155
1997	167	3	170
1998	186	3	189
1999	168	0	168
2000	163	0	163
2001	161	1	162
2002	156	1	157
2003	146	0	146
2004	141	0	141
2005	123	0	123
2006	128	0	128
2007	107	0	107
2008	99	0	99
2009	116	4	120
2010	117	2	119
2011	125	1	126
2012	125	2	127
2013	126	6	132
2014	122	3	125
2015	131	2	133
2016	119	8	127
2017	98	3	101
2018	95	6	101
< FHCP Implementation >			
2019	88	2	90
2020	86	9	95
2021	82	4	86

Table 21. Site occupancy of northern spotted owls, Green Diamond demographic study area, 2021.

Pair Status	Sites occupied in 2020	Sites Located in 2021			
		Sites occupied in 2020 and 2021	Sites Newly Colonized	Sites Recolonized	Sites Newly Discovered
Total	95	60	2	4	0

Table 22. Reproductive success of northern spotted owl pairs monitored from 1990-2021, Green Diamond demographic study area.

Year	# Sites monitored	# Pairs not nesting or reproductive	# Pairs nesting	# Pairs successful	# Fledged owlets	# Owlets fledged/monitored site
1990	56	18	38	29	46	0.82
1991	101	45	56	47	70	0.69
1992	126	39	87	73	109	0.86
1993	92	56	36	20	31	0.34
1994	131	46	85	76	117	0.89
1995	106	59	47	30	39	0.37
1996	117	40	77	62	95	0.81
1997	94	54	40	35	57	0.61
1998	100	49	51	29	40	0.40
1999	111	86	25	20	30	0.27
2000	120	60	60	40	62	0.52
2001	114	40	74	58	99	0.87
2002	112	53	59	43	68	0.61
2003	91	71	20	16	23	0.25
2004	94	34	60	51	83	0.88
2005	98	37	61	32	50	0.51
2006	71	44	27	18	24	0.34
2007	67	55	12	10	17	0.25
2008	77	44	33	26	43	0.56
2009	66	29	37	23	37	0.56
2010	65	26	39	28	45	0.69
2011	75	58	17	12	19	0.25
2012	63	48	15	10	16	0.25
2013	80	67	13	10	12	0.15
2014	84	48	36	31	54	0.64
2015	74	42	32	29	49	0.66
2016	58	39	21	15	26	0.45
2017	52	28	24	19	31	0.60
2018	58	46	12	7	10	0.17
-----<FHCP Implementation>-----						
2019	48	26	22	14	23	0.48
2020	40	19	21	15	20	0.50
2021	49	15	36	28	47	0.96
Overall Mean						0.54

### 3. Spotted owl banding

Thirteen adults, four subadults and 12 juvenile spotted owls were captured and banded on the Green Diamond study area in 2021 (Table 23). Combined with 1990-2020 banding totals, 863 (46.0%) adults and subadults, and 1012 (54.0%) juveniles, for a total of 1875 owls have been banded. Of all non-juvenile owls that were banded on the Green Diamond study area through 2021, 32.1% were subadults, 67.8 were adults, and the age of one non-juvenile was unknown. Since FHCP implementation, 36 (69.2%) adults and subadults, and 16 (30.8%) juveniles, for a total of 52 owls have been banded (Table 24).

From 1990-2021, 70 owls recaptured on the Green Diamond study area were originally banded on other study areas such as the Willow Creek Study Area, Redwood National Park, Hoopa Reservation, and Humboldt Redwood Company lands (Table 25). These 70 owls included with the 1875 owls reported above combine for a grand total of 1945 individual owls captured on the Green Diamond study area. Since FHCP implementation, three owls recaptured on the Green Diamond study area were originally banded on other study areas (Table 26). Three birds previously banded as a juvenile were recaptured in 2021, for a total of 269 juveniles banded on the Green Diamond study area that were later recaptured within the Green Diamond study area (Table 27). More detailed information on the individual spotted owls banded, recaptured or resighted in 2021 can be found in Appendix V.

### 4. Juvenile dispersal

Three-hundred eighty-nine juveniles were known to have dispersed within, to, or from the Green Diamond study area between 1990 and 2021. Dispersal distance information for 387 of these owls ranged from 0.5 to 93 miles, with a mean of 9.3 miles. Dispersal distances for two males were unknown. Dispersal distances of 189 males ranged from 0.5 to 93 miles, with a mean of 7.8 miles. One-hundred ninety-two females dispersed an average of 10.5 miles, with a range of 0.75 to 87.4 miles. The gender of six owls was unknown. Owls dispersing within the Green Diamond study area (n=266) dispersed an average of 6.9 miles while those dispersing to or from the study area averaged 14.4 miles (n=123).

Table 23. Age and gender of northern spotted owls banded on the Green Diamond study area, 1990-2021.

Years	Gender	Age				Total
		Adults	Subadults	Juveniles	Unknown	
1990-2021	males	310	131	-	-	441
	females	275	145	-	-	420
	unknown	0	1	1012	1	1014
Total		585	277	1012	1	1875

Table 24. Age and gender of northern spotted owls banded on the Green Diamond study area since FHCP implementation (2019 – 2021).

Years	Gender	Age				Total
		Adults	Subadults	Juveniles	Unknown	
2019 - 2020	males	9	2	-	-	11
	females	7	0	-	-	7
	unknown	0	0	4	1	5
Subtotal		16	2	4	1	23
2021	males	5	1	-	-	6
	females	8	3	-	-	11
	unknown	0	0	12	0	12
Subtotal		13	4	12	0	29
Total		29	6	16	1	52

Table 25. Age and gender of northern spotted owls banded as juveniles by Willow Creek Study Area, Humboldt Redwood Company, Hoopa Indian Reservation studies, Oregon Bureau of Land Management, U.S. Forest Service or Redwood National Park and recaptured as territorial owls on the Green Diamond study area 1990-2021.

Gender	Age			Total
	Adults	1st year Subadults	2nd year Subadults	
Males	17	4	10	31
Females	13	14	12	39
Total	30	18	22	70

Table 26. Age and gender of northern spotted owls banded as juveniles by Willow Creek Study Area, Humboldt Redwood Company, Hoopa Indian Reservation studies, Oregon Bureau of Land Management, U.S. Forest Service or Redwood National Park and recaptured as territorial owls on the Green Diamond study area since FHCP implementation (2019-2021).

Gender	Age			Total
	Adults	1st year Subadults	2nd year Subadults	
Males	1	1	0	2
Females	0	0	1	1
Total	1	1	1	3

Table 27. Recaptures of juveniles banded on the Green Diamond study area 1991-2021. Parentheses indicate number of recaptures of juveniles banded by Green Diamond and captured on other study sites. Shaded years indicated pre-FHCP implementation.

Year of recapture with the number of recaptures in the column below

Cohort	# banded	1991 - 2000	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21	Total	% recapture
1990 - 2000	601	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	204	33.9
2001	82			6	9	7	1	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	26	31.7
2002	53				3	7	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	34.0
2003	19					1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	4	21.1
2004	67						7	3	4	1	3	1	0	0	0	3	0	0	0	0	0	0	0	22	32.8
2005	45							1	1	3	3	1	0	1	0	1	1	0	0	0	0	0	0	12	26.7
2006	17								0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	2	11.8
2007	14									1	0	0	1	0	0	1	0	0	0	0	0	0	0	3	21.4
2008	30										3	2	2	0	1	0	0	0	0	0	0	0	0	8	26.7
2009	24											0	3	1	1	0	0	0	0	0	0	0	0	5	20.8
2010	16												1	1	0	0	0	0	0	0	0	0	0	2	12.5
2011	9													1	1	1	0	0	0	1	0	0	0	4	44.4
2012	10														0	2	0	0	0	0	0	0	0	2	20.0
2013	3															1	0	1	0	0	0	0	0	2	66.7
2014	25																0	1	2	0	0	1	1	5	20.0
2015	21																	1	0	0	0	0	0	1	4.8
2016	1																		0	0	0	0	0	0	0.0
2017	3																			0	0	0	2	2	66.7
2018	0																				0	0	0	0	0.0
2019	0																					0	0	0	0.0
2020	4																						0	0	0.0
Total	1044	171 (34)	19 (7)	10 (2)	15 (1)	17 (6)	18 (2)	8 (1)	6 (1)	6	9	5	7 (1)	5	5 (2)	10 (1)	1	3	2	1	0	1	3	322 (58)	30.8

## 5. Turnover

### a. Missing owls

In 2021, seven non-juvenile territorial owls (six males and one female) were found at sites different from those that they occupied in 2020 (Table 28). An additional 20 banded non-juvenile territorial owls present in 2020 were not resighted in 2021 (Table 28).

### b. New recruits

The cumulative total since 1991 of new recruits of known age class was 442 subadults (41%) and 624 adults (59%) (Table 29). Four of the new recruits into the territorial population in 2021 were subadults and 17 were adults (Table 30). Nine of the adults were females and eight were males. The cumulative total since FHCP implementation (2019-2021) of new recruits of known age class was eight subadults (19%) and 34 adults (81%) (Table 30).

## 6. Owl density

An estimated 367,393 acres (97.9%) of Green Diamond Resource Company timberlands have been surveyed to date. This acreage includes numerous blocks of land that are typically surveyed for owls but are too small and isolated to use in our density estimates. Green Diamond's California timberlands ownership increased in 2019 through 2021 with the acquisition of 9,878 acres in southern Humboldt County. Of the newly acquired lands, 9,489 acres were surveyed for owls but are not enrolled in the FHCP and not included in the density study for the reporting year. For estimating density, we used 3 large contiguous blocks of land; one in the northern area and 2 in the southern area. The northern study area had seven owl sites occupied by 11 owls within 123,258 acres, or 0.09 territorial owls/1000 acres. The southern study area had 63 owl sites occupied by at least 105 owls within 165,650 acres, or 0.63 territorial owls/1000 acres. Thus, a total of 70 owl sites occupied by a minimum of 116 owls were within 288,908 acres, for an overall density of 0.40 territorial owls/1000 acres. The total number of spotted owl sites on the density study area is shown in Figure 4. In 1998, Green Diamond acquired approximately 70,000 acres of timberland in Humboldt County. This area was included in the density study area as a one-time expansion. The increase in the number of sites in 1998 as shown in Figure 4 reflects this expansion. Similarly, from 2010 through 2017 Green Diamond disposed of approximately 27,600 acres of timberlands within the density study area. However, this decrease in the number of occupied sites was offset each year by the number of newly colonized and recolonized sites within the remaining density study area.

Table 28. Turnover rates of individual northern spotted owls, Green Diamond study area, 2021.

Gender	Banded or Resighted in Previous Year and Resighted in Current Year n (%)	Banded or Resighted in Previous Year Not Resighted in Current Year n (%)	Resighted at Site Different from that of Previous Year n
males	28	8	6
females	27	12	1
Total	55 (73)	20 (27)	7

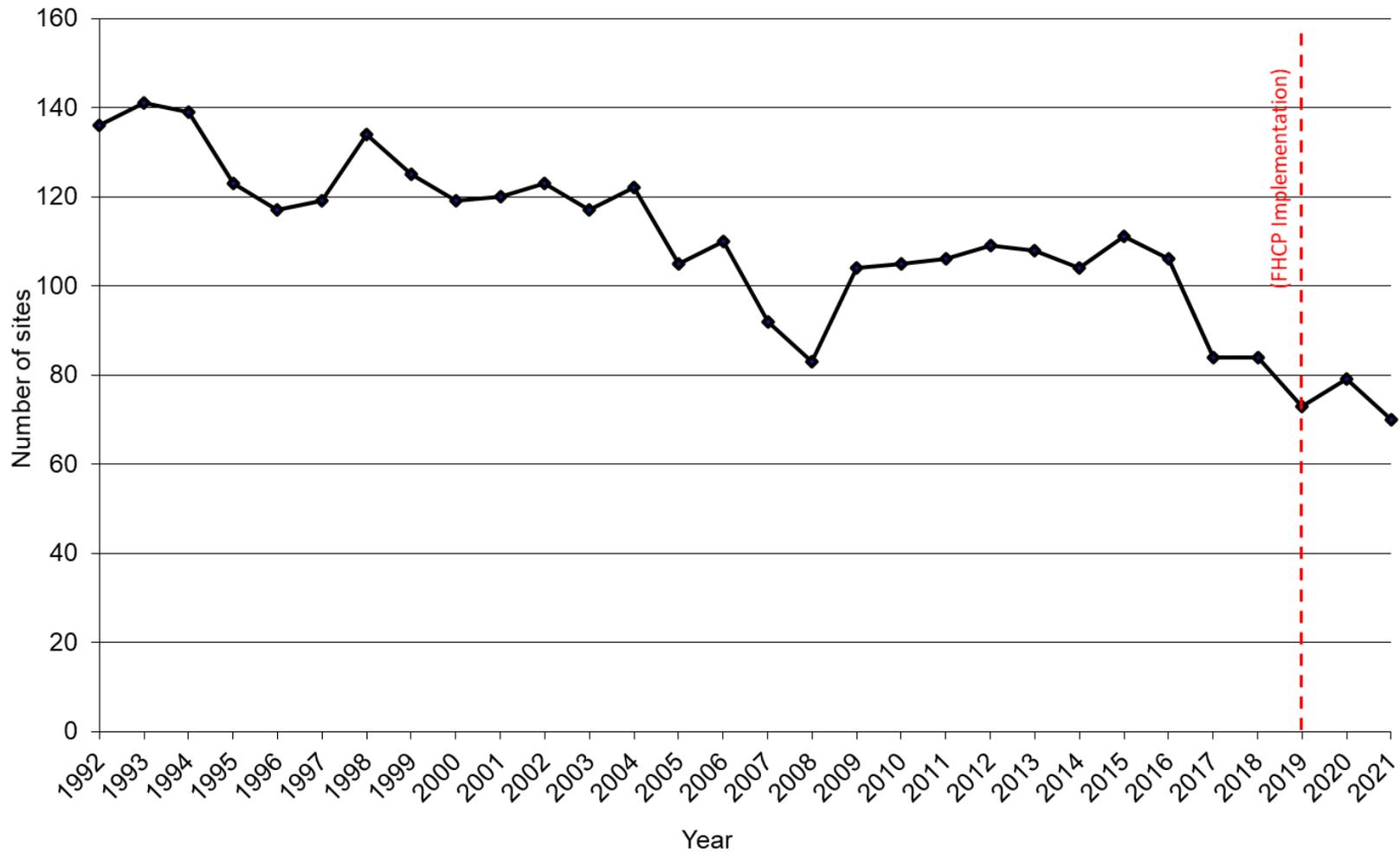
Table 29. Gender and age class of northern spotted owl new recruits, Green Diamond study area 1991-2021.

Year	Gender	Subadults n (%)	Age		Total (n)
			Adults n (%)	Unknown n(%)	
Cumulative total 1991- 2021	Males	201	340	-	541
	females	239	283	-	522
	unknown	2	1	1	4
<b>Total</b>		<b>442 (41)</b>	<b>624 (59)</b>	<b>1 (0)</b>	<b>1067</b>

Table 30. Gender and age class of northern spotted owl new recruits, Green Diamond study area since FHCP implementation (2019-2021).

Year	Gender	Subadults n (%)	Age		Total (n)
			Adults n (%)	Unknown n(%)	
2019-2020	Males	3	10	-	13
	females	1	7	-	8
	unknown	0	0	1	1
	subtotal	4 (18)	17 (77)	1(5)	22
2021	males	1	8	-	9
	females	3	9	-	12
	unknown	0	0	0	0
	subtotal	4 (19)	17 (81)	0	21
<b>Total</b>		<b>8 (19)</b>	<b>34 (79)</b>	<b>1 (2)</b>	<b>43</b>

Figure 4. Total number of occupied and possible spotted owl sites on Green Diamond density study area, 1992-2021



## 7. Demography

Green Diamond initiated mark-recapture studies throughout its ownership in 1990 to estimate key demographic parameters and trends in the population. Along with other range-wide demographic studies of the northern spotted owl, Green Diamond participated in five meta-analyses in 1998, 2004, 2009, 2014, and 2020. The most recent published meta-analysis (Franklin et al. 2021) analyzed Green Diamond data from 1990-2018. As a result of the Phase I barred owl removal study 2009 - 2014 (see Diller et al. 2016), data from areas where barred owls were removed were censored from the analysis beginning in the year of first removal and including all subsequent years regardless of whether removals were later discontinued.

Fecundity was estimated for adult northern spotted owls ( $\geq 3$  years) for 11 study areas from 1993-2018 using reproductive survey data. The best model included the additive fixed effects of ecological region (state and major forest type), quadratic relationship of time, annual estimates of barred owl occupancy within a spotted owl territory, and the oscillating even-odd year time effect. Estimates indicated that years with higher reproductive output tend to be followed by years with low reproductive output, and fecundity decreased with increased proportion of spotted owl territories where barred owls were detected.

Apparent survival, recruitment rates, and rates of population change were estimated from mark-recapture data. Apparent survival estimates for all 11 study areas indicated a period of gradual decline since 1993 that was followed by a notable steep decline after 2011 and a strong negative effect of barred owl occupancy on apparent spotted owl survival. Recruitment rates declined across all study areas as the proportion of spotted owl territories occupied by barred owls increased.

The annual finite rate of northern spotted owl population change ( $\lambda$ ) was estimated using data from 1993-2018 for all study areas except Hoopa, which only included data through 2012 when barred owl removals began over the entire study area. Annual rate of population change estimates for all study areas indicated a declining population with annual population declines of 2-9%.

The trend in estimates of the realized population change for all study areas (1995-2017) indicated that the population of northern spotted owls in 2017 was smaller than in 1995. Estimated population sizes in 2017 had declined by  $>80\%$  in Washington, almost 75% in Oregon, and  $\geq 30\%$  in California. For the California study areas, Northwestern California declined by about 50%, Hoopa declined by about 30%, and Green Diamond's population had declined by  $>60\%$ .

Franklin et al. 2021 also investigated the co-occurrence dynamics of northern spotted owls and barred owls using two-species occupancy models to estimate occupancy, local extinction rates, and colonization rates of northern spotted owl territories based on

detection/non-detection data for northern spotted owls and barred owls (all study areas 1993-2018, excluding territories where barred owl removals occurred). Results indicated that northern spotted owl territory occupancy declined in all study areas coincident with increasing barred owl occupancy. The results also indicated a strong positive association between the presence of barred owls and northern spotted owl territory extinction rates and a strong negative association between barred owl presence and northern spotted owl colonization.

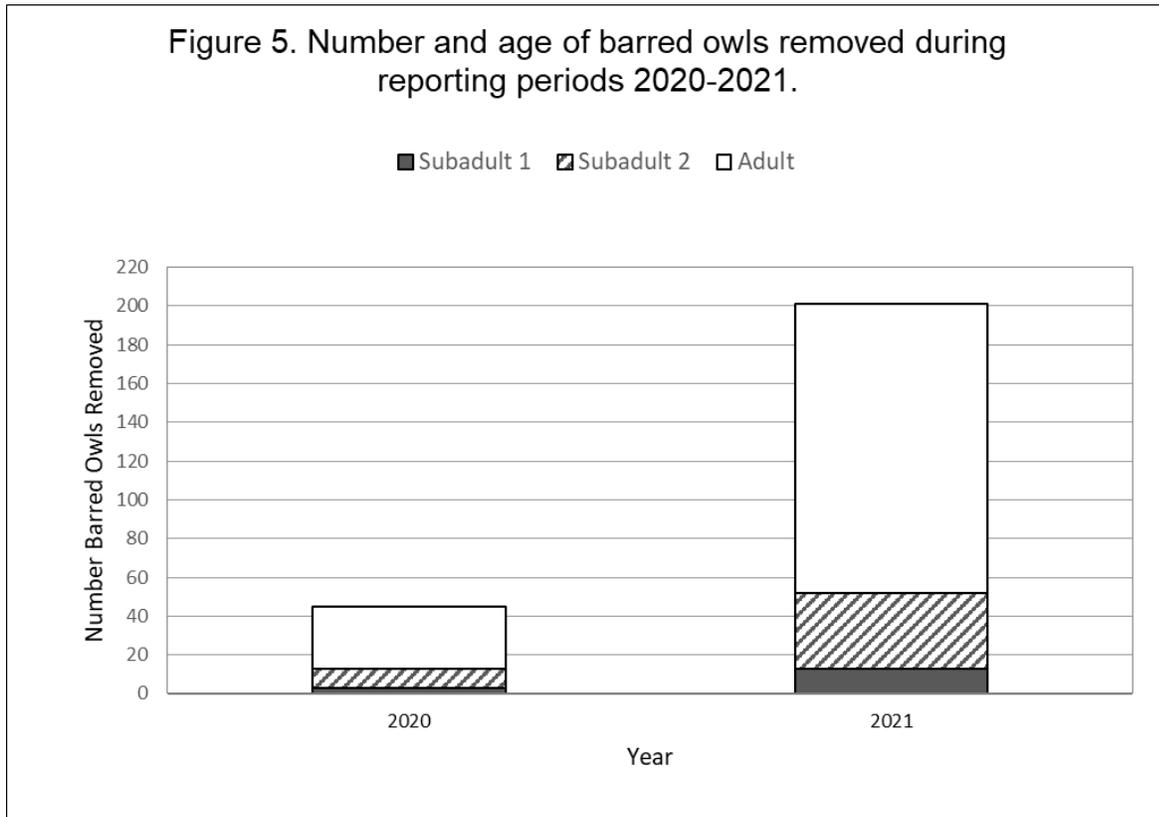
Since the previous meta-analysis, northern spotted owls continued to experience significant declines range wide in areas without barred owl management. Since 1995, it was estimated that northern spotted owls on the Green Diamond study area declined by greater than 60%. However, these estimates were derived using less than half of the monitored spotted owl territories due to data being censored for areas with prior barred owl removals. Study area specific analyses are needed to understand current population trends on the Green Diamond study area subsequent to the Phase I experiment and after initiation of the Phase II barred owl removal experiment. The Phase II barred owl removal experiment was initiated in 2020, and once additional years of data are collected, in-depth study area specific analyses will be conducted and presented in future annual reports.

## **8. Barred owls**

During the reporting period (September 1, 2020 - August 31, 2021), barred owls were detected during 733 surveys. Single barred owls were detected during 518 surveys and pairs were detected during 215 surveys. From March 1 through August 31 of 2021 barred owls were detected during 529 surveys. Single barred owls were detected during 381 surveys, and pairs were detected during 148 surveys. Since each site (survey station, spotted owl territory, or barred owl territory) is surveyed multiple times throughout the season and individual barred owls are not marked, it is difficult to estimate a minimum number of barred owls detected during a given season. The number of detections at the same site or area ranged from one to 12 (mean = 2.25). From these detections, we estimated a minimum of 178 barred owl territories within the density study area and a minimum of 229 barred owl territories within the demographic study area.

Since initiation of Phase II, 246 barred owls have been removed from 111 sites. During the reporting period, 157 barred owls were removed from 74 currently or previously occupied spotted owl sites and 44 barred owls were removed from 24 sites without previous spotted owl occupancy. Pairs were successfully removed from sites on 36 occasions. During the 2020 reporting period 28.8% of removed barred owls were sub-adults and 71.2% were adults (Figure 5). During the 2021 reporting period, 149 (74.1%) adult and 52 (25.9%) subadult barred owls were removed (Figure 5). During the 2020 reporting period, 28 (62.2%) female and 17 (37.8 %) male barred owls were removed (Figure 6). During the 2021 reporting period 123 (61.2%) female barred owls and 78 (38.8%) male barred owls were removed.

Fifty-three barred owls were removed from 23 unique Dynamic Core Area sites (DCAs; Chapter VI) during the reporting period. The number of barred owls removed from an individual Owl Management Unit (OMU) ranged from zero to 33 (Table 31).



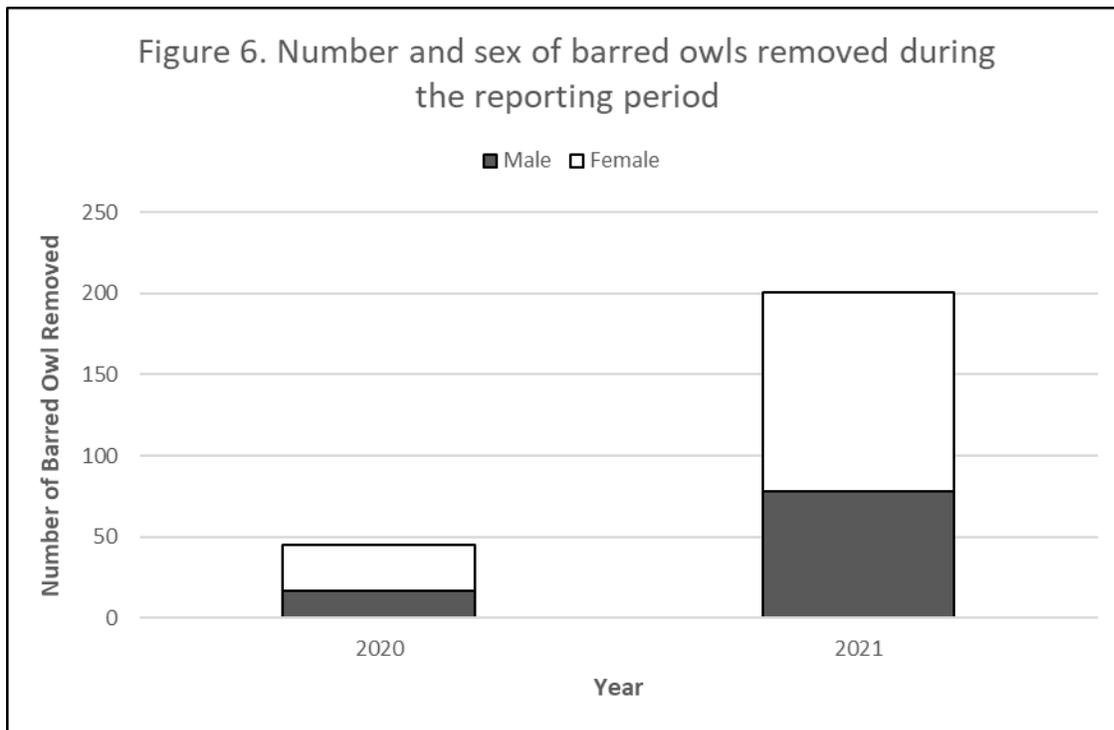


Table 31. Number of barred owls removed within the Owl Management Units (OMUs) during the reporting period by year.

Owl Management Unit	2020	2021	Total
Smith	0	16	16
Wilson, Hunter, Terwer Creeks	0	36	36
McGarvey, Ah Pah, Surpur Creeks	0	11	11
Tectah, Mettah, Roach, Tully Creeks	0	41	41
Maple Creek	0	4	4
Redwood Creek	14	25	39
Little River	0	3	3
North Fork Mad River	16	12	28
Lower Mad River, Jacoby Creek	9	28	37
Upper Mad River, Upper Redwood Creek	6	20	26
Humboldt Bay, Eel River	0	5	5
<b>Total</b>	<b>45</b>	<b>201</b>	<b>246</b>

The number of spotted owl sites located on the Green Diamond demographic study area that were considered to be influenced by barred owls (barred owl detections within 0.5-mile) increased from 2011 through 2020 but decreased in 2021 (Figure 7). Since initiation of Phase Two, several case studies have been observed which potentially represent the positive effect barred owl removal has for spotted owls. Since Phase II began several spotted owl territories previously occupied by barred owls have had spotted owls reoccupy the site. (Table 32).

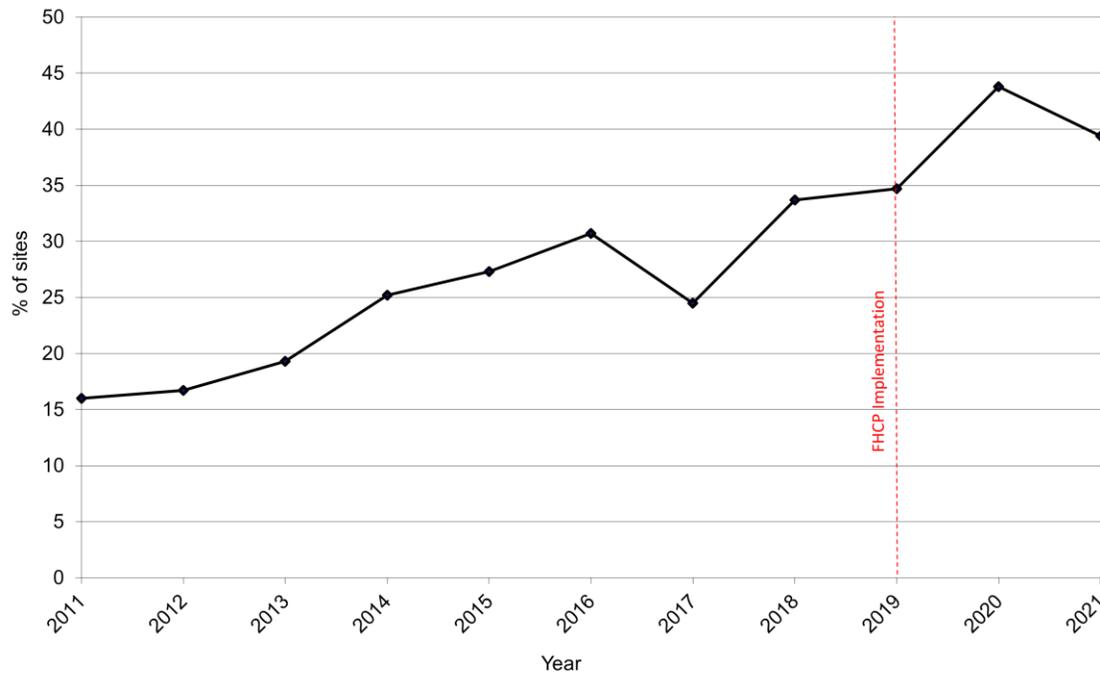
Table 32. Spotted owl site status before and after barred owl removals.

Site	Site status prior to removal	Removal date	Spotted owl detection date post-removal
Old 299 #1	Vacant	3/18/2020	5/19/2020
North Goodman Prairie	Unoccupied	3/26/2020	4/02/2020
4851	Unoccupied	3/24/2020	7/13/2020
4128	Unoccupied	9/03/2020	4/09/2021
Lower Roach	Vacant	3/22/2021	5/06/2021
Lord Ellis Creek	Unoccupied	4/28/2021	7/28/2021
Lord Ellis North	Unoccupied	10/07/2020	4/09/2021
Devils Creek	Unoccupied	3/29/2020	4/29/2021
SF Bald Mountain Creek	Unoccupied	1/25/2021	3/26/2021

In addition to spotted owls reoccupying sites where barred owls have been removed, spotted owl pairs that established activity centers on the edge of their territory after being displaced by barred owls were observed reoccupying and producing young within their historic nesting core areas after barred owls were removed. These observations are anecdotal and future analyses are pending.

From 2010 through 2021, Green Diamond continued to collect information on the impacts of barred owls on spotted owl apparent survival, fecundity and occupancy. Results from the detailed analysis comparing the spotted owl vital rates between the treatment and control study areas from 2010 through 2014 are published and available in Diller et al. 2016. Results from the Phase II will be available in future annual reports.

Figure 7. Percentage of spotted owl sites influenced by barred owls on Green Diamond demography study area, 2011-2021



### 9. Habitat and occupancy modeling

Results for spotted owl habitat and occupancy modeling will be made available in future annual reports.

## C. Discussion

The trend in the total number of owl sites (occupied and possible) in the density study area provided the most accurate estimate of the real trend in total owl sites for the entire ownership, because peripheral areas tended to have less consistent survey effort. The apparent initial increase from 1990-1993 was the result of a “learning curve” associated with field crews becoming familiar with the study area and documenting all perennial owl sites. The peak in total owl sites occurred in 1993-1994 followed by a decline until 1998, a relatively stable period through 2004, and a further decline from 2004 through 2008. This was followed by an increase of sites from 2009 through 2015 and a decline since 2015. In 1998, the apparent increase in sites was a result of an expansion in the size of the density study area after a land acquisition and a resultant increase in sites. The increase in sites from 2009 to 2015 did not result from any changes in the study area, but the average number of recolonized, newly colonized, and newly discovered sites in those years (average = 9.1) was greater than the average from 1996 through 2008 (average = 4.2). The removal of barred owls within portions of the study area was the most likely factor influencing the increase in the number of recolonized spotted owl sites. The decrease in the number of spotted owl sites since 2015 is likely associated with an increasing number of barred owl sites within the density study area. Although the total number of occupied sites within the density study area declined in 2021, the number of territorial owls observed only decreased by one while the number of sites occupied by pairs increased. Barred owl removals initiated under the Phase II experiments likely contributed to this increase in paired spotted owl sites.

The negative trend in number of owlets fledged per monitored pair (fecundity), although not statistically significant, is one of several potential factors that could have contributed to the overall decline in spotted owl sites during the study period. The decline is also partially due to the net displacements that occurred during this time period under the incidental take permit for the 1992 Northern Spotted Owl HCP and potential displacements that occurred under the FHCP. However, the number of owl sites has declined similarly in areas with and without significant timber harvest indicating other factors were involved. Additional analyses using mark-recapture data with covariates such as weather, habitat elements, barred owls and timber harvest are necessary to assess the factors responsible for the trend in owl sites. The direct competitive interactions with the barred owl and recent disease factors such as West Nile virus may further contribute to declining trends in the spotted owl population that are not easily identified. The results from the 2020 meta-analysis support the hypothesis that reduced fecundity is likely the result of increased competition with barred owls, but other factors such as habitat and climactic variables have also been shown to influence spotted owl fecundity (Franklin et al. 2021). Although additional years of data are needed, the increase in naïve paired occupancy and fecundity since 2020 may be the result of property-wide barred owl removals initiated in 2020.

The fundamental premise of the spotted owl FHCP is that owl sites lost through timber harvest will be replaced in other areas as stands mature and become suitable for

occupancy by owls. However, simply tracking stands transitioning from one age class to another may not adequately predict suitable owl habitat on the landscape, if a high proportion of stands have recently matured into age classes defined as suitable owl habitat. Habitat used by spotted owls (whether foraging, roosting or nesting) develops gradually through time and a simplistic accounting of the proportion of the landscape in different age classes of forest may not accurately reflect the amount of habitat available to spotted owls. The use of spatially explicit models incorporating foraging and nesting site selection along with demographic parameters will provide insight into the matrix of habitat ages, types and components necessary to support owls on the landscape and further refine our definitions of owl habitat. Continued monitoring of the population and analyses of how timber harvest has affected the owl population will lend insight to future management of the forests within Green Diamond's ownership.

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## VIII. Fisher Studies

The fundamental premise in the FHCP for fisher conservation is ample foraging habitat and potential resting and denning habitat will increase through time. Green Diamond will develop an occupancy model that will be used to estimate the probability that a fisher will occupy (i.e., foraging or moving through) a specific point in the Plan Area. Validation and refinement of this fisher occupancy model will be completed within five years of FHCP approval and will rely on data collected using non-invasive remote camera survey techniques.

### A. Methods

#### 1. Occupancy Surveys

Green Diamond established a randomly located sampling frame for remote camera stations across the Plan Area. The sampling frame consisted of baited remote camera stations centered at a 4-km grid spacing. Each camera station (sampling unit) consisted of one or two cameras located within 200 meters of the grid center point resulting in 93 sampling units. Of the 93 sampling units, two were located within the Peripheral Area (Figure 8).

The sampling period was October through March for each year the surveys occurred. In order to estimate fisher occupancy, all sampling units were surveyed in each of the first two sampling periods (October 2018 - March 2019 and October 2019 - March 2020). After the first two complete sampling periods, Green Diamond will continue to monitor fisher occupancy by conducting non-invasive surveys on at least one-half of the Plan Area every five years such that a complete survey would occur by year ten. This will permit either a validation or refinement of the fisher occupancy model at 10-year intervals. The survey grid was divided into five sampling blocks to sample all stations with a logistically feasible approach while accounting for spatial issues and comparisons among the various watersheds. Sampling blocks were randomly selected to determine sampling order. Sampling order in year one remained the sampling order in subsequent survey years to allow for comparisons and account for seasonal variation in detection rates. All sample units within a sampling block were surveyed simultaneously.

Green Diamond deployed high-end Reconyx brand cameras (Reconyx Inc., Holmen WI, USA) at each sampling station. Models included first generation Hyperfire HC500, HC600, PC800, PC900, and second generation Hyperfire HP2X. Camera stations were baited with two raw chicken drumsticks and commercial trapping lure (Caven's Gusto Lure, Minnesota Trapline Products, Pennock MN) secured to a tree within 5 – 15 feet of the camera. Cameras were deployed for a minimum of 21 days and were checked and rebaited weekly.

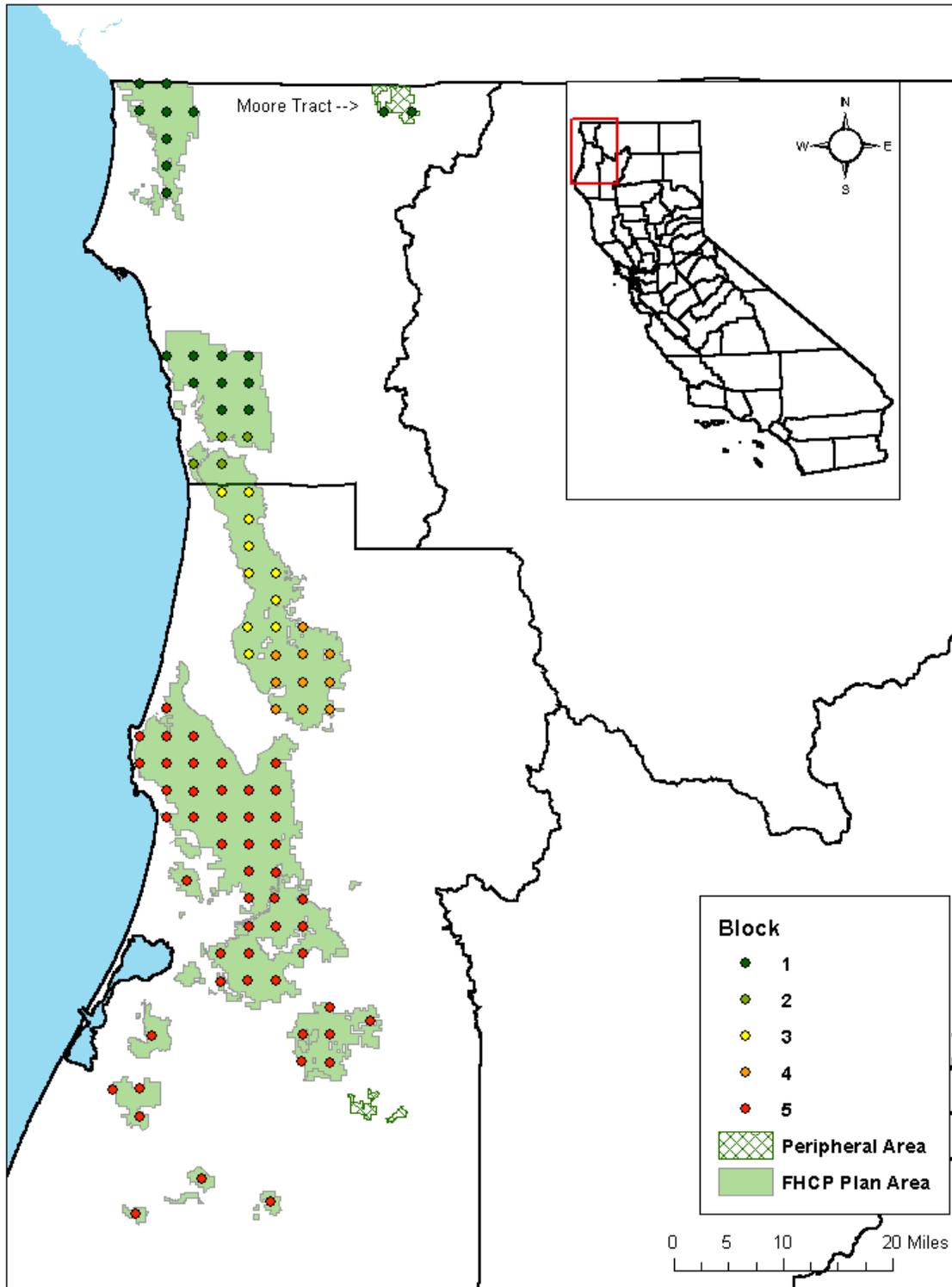


Figure 8. Location of remote camera stations by block within the Plan Area and Peripheral Area (2018/2019 and 2019/2020 sampling periods).

## **2. Occupancy Modeling**

Validation of the fisher occupancy model will be based on demonstrating high fisher occupancy ( $\Psi > 0.6$ ) in areas that are predicted to have high probability of occupancy. In other words, determining whether or not fisher are found at specific areas where the model predicts occupancy to be high. As stated above, validation and refinement of the occupancy model will begin after five years of initial occupancy surveys or when enough data are available. Green Diamond will estimate occupancy rates for at least half of the Plan Area at five-year intervals so that the entire Plan Area is surveyed every 10 years. If statistically significant ( $p \leq 0.05$ ) declines in fisher occupancy rates are observed for five years or more in all or a major portion of the Plan Area, Green Diamond will collaborate with the Service to assess the cause of the decline and propose corrective actions as necessary following the procedures described under Adaptive Management.

## **3. Water Tank Surveys**

Water tanks within the Plan Area were inspected annually and measures were taken to prevent marten from becoming entrapped. Annual inspections determined if openings greater than two inches existed, and if the openings were secure and effective in excluding wildlife. Tanks are composed of either plastic or steel material. Modern plastic tanks generally have round, threaded openings for use in PVC plumbing. These types of tanks use modern, standard fittings which can be used interchangeably. Plastic tanks usually require little to no exclusion efforts. Steel tanks generally date from the early 1900's to the 1960's. These tanks use widely varying types of fittings and can have openings created from cutting torches. Exclusion techniques vary and require specialized tools. A powder fastener is often utilized to drive nails into the steel surfaces of the tank to fasten mesh around openings. The primary issues with using steel mesh is oxidation which can be mitigated by applying a coat of spray paint. Since 2012, this technique has been monitored and proven to be a long-lasting repair method.

## **4. Incidental observations**

Company employees that frequently conduct field work throughout the Plan Area received training on species identification and reporting of incidental observations of listed or sensitive wildlife species, including fishers. All incidental observations of fisher were vetted by Green Diamond's biological staff and records maintained in a spatial database.

## **5. Prevention of rodenticide use**

Anticoagulant rodenticide poisoning has been identified as a threat to the Covered Species, including fisher. Anticoagulant rodenticides are used to eradicate or suppress rodent pest populations in illegal marijuana cultivation sites to minimize economic losses. Exposure to anticoagulant rodenticides can cause direct mortality and potentially increase the risk of predation or other diseases. During the current reporting period, measures were

taken to discourage unauthorized marijuana cultivation and associated rodenticide use in the Plan Area. In addition to maintaining a system of controlled access for the Plan Area, security patrols were conducted to detect cultivation sites, and if detected, eradication efforts were conducted in coordination with the Sheriff's Department.

## **6. Den Sites**

If an active den was located, the den structure received a 0.25-mile radius no-harvest buffer to protect reproducing female fisher and their young from disturbance. The disturbance buffer remained in place until a determination was made that the den had been abandoned or fisher kits had been moved to another den more than 0.25 miles from the harvest area. Any confirmed den trees were retained even after they were no longer active.

## **B. Results**

### **1. Occupancy Surveys**

Occupancy surveys were not conducted during the current reporting period.

### **2. Occupancy Modeling**

The results of the occupancy modeling will be presented to the Service no later than the 2024 report.

### **3. Water Tank Surveys**

Sixty-four water tanks were located within the Plan Area in 2021, and all 64 tanks were inspected for damage or openings (Figure 9, Appendix VI). An increased effort to survey the property for tanks has resulted in a larger number of tanks monitored on the property compared to previous years. Past exclusion installations were also assessed for continued integrity. Twenty-five of the 64 tanks had openings repaired in previous years, and 21 were still functional. Eleven tanks were found to have new openings or damage to previous patches, and all 11 were repaired. Thirty-nine of the 64 tanks did not require exclusion installations. No fisher, marten, or other remains were identified in or around the 64 tanks.

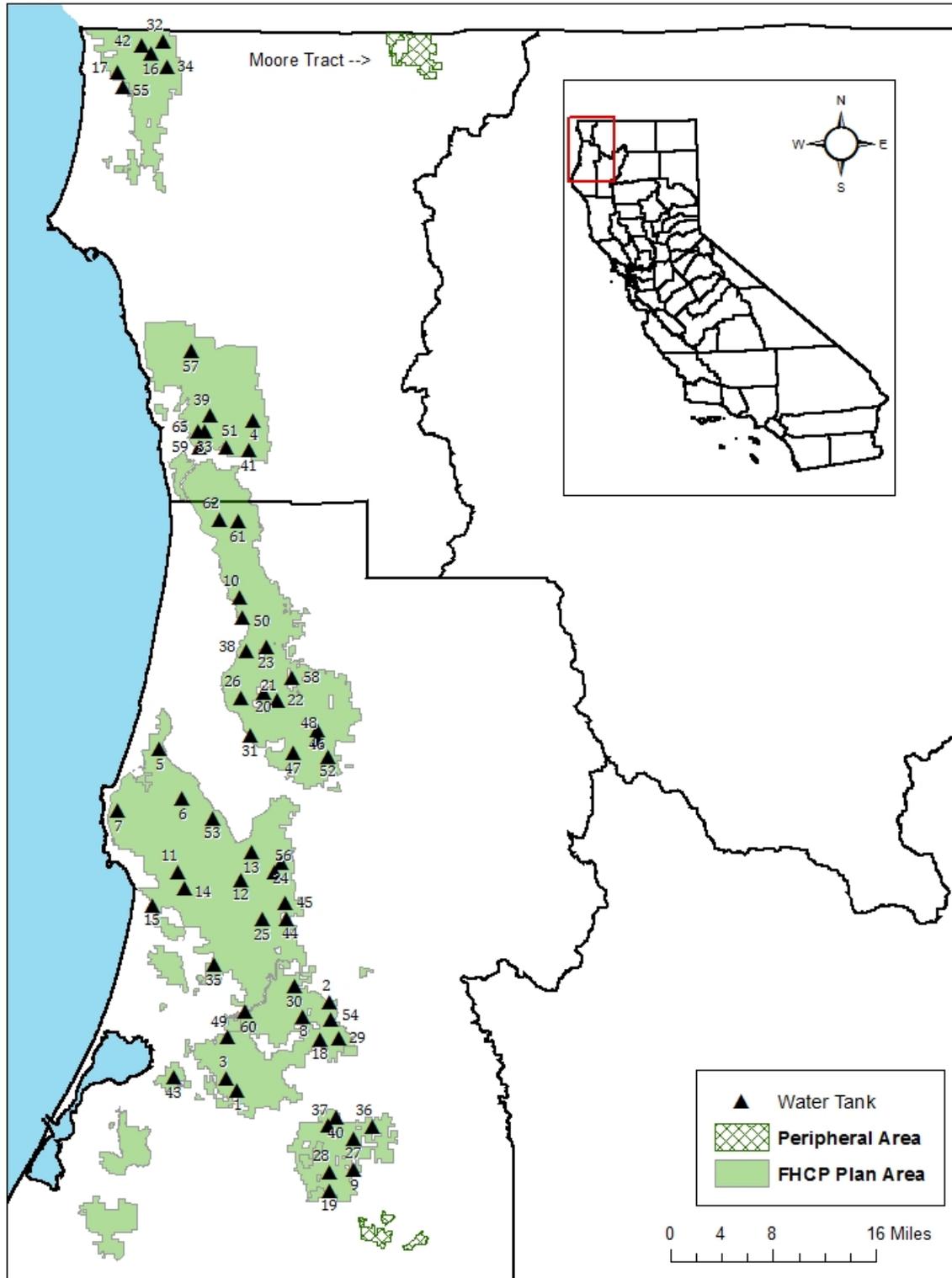


Figure 9. Water tank locations within the Plan Area and Peripheral Area.

#### **4. Incidental observations**

One incidental fisher observation occurred during the current reporting period (Figure 10).

#### **5. Prevention of rodenticide use**

Two trespass marijuana cultivation sites were identified within the Plan Area during the 2020 reporting period, and site cleanup occurred during the current reporting period. No trespass cultivation sites were identified within the Plan Area during the current reporting period. However, active wildfires and associated smoky conditions as well as Covid-related restrictions limited security patrols during the current reporting period.

#### **6. Den Sites**

No active den sites were located during the current reporting period.

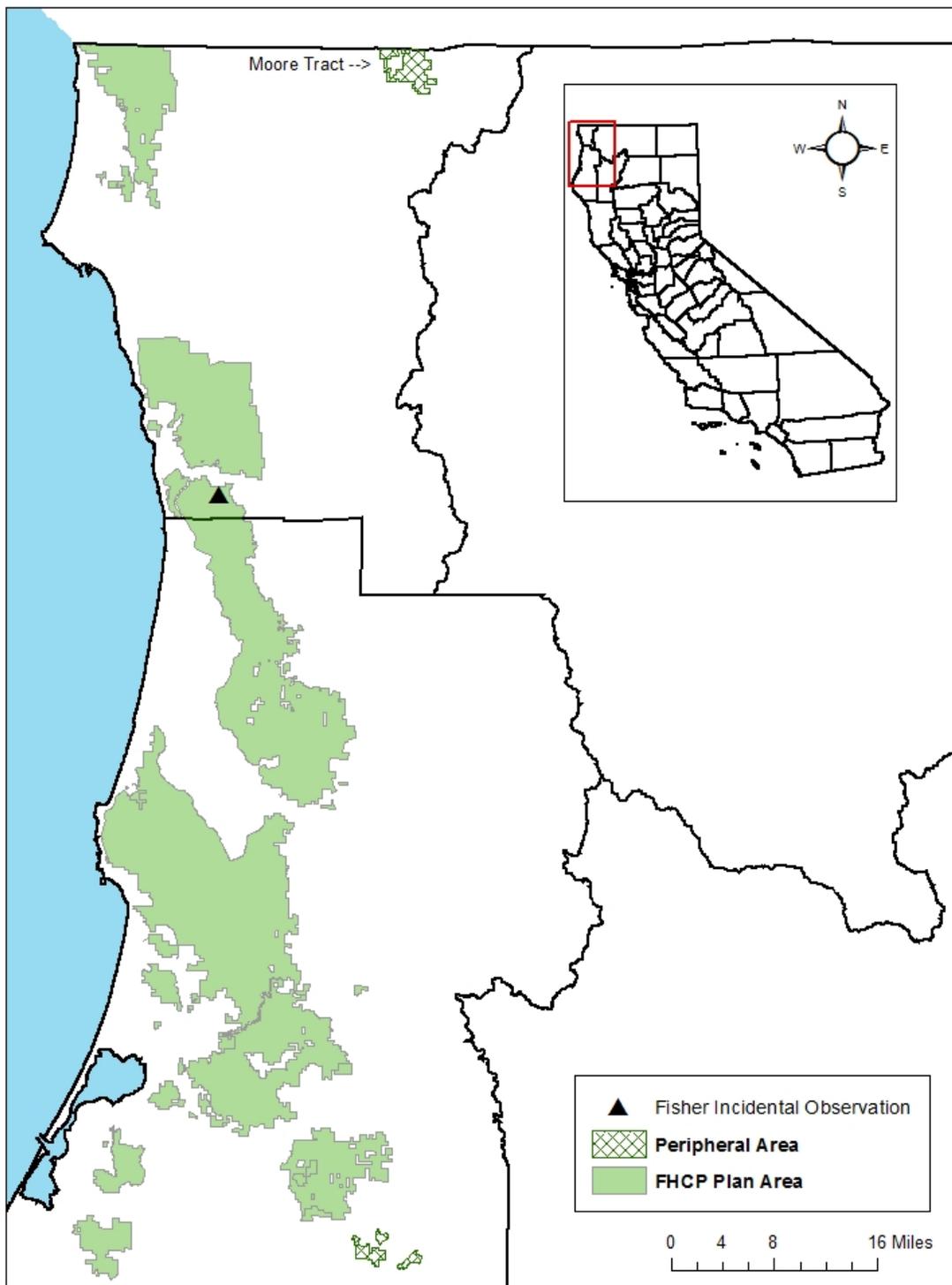


Figure 10. Incidental observations of fisher within the Plan Area during the current reporting period.

## **C. Discussion**

Green Diamond will use the results from 2018-2019 and 2019-2020 sampling periods to validate or refine the occupancy model, and the results of this analysis will be available within 5 years of FHCP approval. All active and historic water tanks were inspected during the current reporting period, and exclusion methods appear to be successful at preventing entrapment and drowning of fisher and other species. Water tank inspections will continue in subsequent years to ensure exclusion methods continue to be effective.

## **IX. Tree Vole Studies**

Direct survey methods for tree voles were not incorporated in the FHCP due to the high cost associated with stand searches and climbing trees to confirm vole nests and estimate occupancy. Therefore, the primary approach to monitoring property-wide trends in tree vole populations will be through evaluating presence of tree voles in spotted owl pellets collected during demographic monitoring. An occupancy model will be developed within three years following FHCP approval to detect changes in tree voles in spotted owl pellets. Green Diamond will also continue to investigate alternative approaches to monitoring tree voles and supplementing spotted owl pellet collections. In addition to more rigorous monitoring methods, Green Diamond also maintains an incidental observations database for several listed or sensitive wildlife species, including tree voles. The following sections summarize the occupancy surveys and incidental observations for tree voles.

### **A. Methods**

#### **1. Occupancy surveys**

Pellets were collected during demographic surveys at known spotted owl sites throughout the Plan Area during the spotted owl breeding season for the current reporting period. Visual searches were conducted around known nest trees and roost trees and any other areas within the stand where whitewash was present. Since pellets tend to break apart upon falling to or hitting the ground, intact pellets and portions of pellets were collected. All pellets and portions of pellets collected during a single visit to a spotted owl site were collected in the same small plastic bag, labeled with the date and associated spotted owl site name, and frozen. Pellets were dissected to determine if the contents contained tree vole bones. Pellet samples containing tree vole bones will be utilized in future occupancy modeling, and the statistical methods will be further defined in the 2023 annual report.

#### **2. Incidental observations**

Company employees that frequently conduct field work throughout the Plan Area received training on species identification and reporting of incidental observations of listed or sensitive wildlife species including tree voles. All incidental observations of tree voles or tree vole nests were vetted by Green Diamond's biological staff and records maintained in a spatial database.

## B. Results

### 1. Occupancy surveys

In 2021, 122 pellet samples from 59 different spotted owl sites were collected and dissected. Forty-nine of these samples from 34 different sites contained bones from at least 103 individuals within the Arvicolinae subfamily. Of these 103 individuals, 79 were identified as *Arborimus* sp., 17 were identified as either *Clethrionomys* or *Microtus*, and the genera of seven could not be identified. The 79 *Arborimus* individuals were associated with 29 unique spotted owl sites primarily located in the Lower Mad River – Fickle Hill Owl Management Unit (Table 33). Eleven of the 122 total samples (one containing two individuals within *Arborimus* and another containing one individual within the *Microtus* genus) were collected from nine sites that were not occupied by spotted owls during the reporting period. Therefore, these pellets could have been produced by other owls or by foraging or roosting spotted owls from adjacent territories. For some samples, poor skull and mandible condition prevented taxonomic classification to genus (*Arborimus* versus other sympatric voles) utilizing basic skull/teeth morphology resulting in the possibility that there were more tree voles in our samples than reported. Further classification of the *Arborimus* genus (*A. pomo* and *A. longicaudus* vs. *A. albipes*) has proven difficult in the absence of genetic confirmation in the past, so we did not differentiate between the three *Arborimus* species in this report. Further results on tree vole occupancy will be presented in a future report.

Table 33. Number of individuals classified as Arvicolinae and *Arborimus* sp. in pellet samples collected from Owl Management Units within the Green Diamond study area in 2021.

Owl Management Unit Name	# of Samples	# of Arvicolinae individuals	# of <i>Arborimus</i> sp.
Humboldt Bay – Eel River	5	6	6
Little River	1	8	6
Lower Mad River – Fickle Hill	27	57	43
Maple Creek	0	0	0
McGarvey, Tarup, Ah Pah and Surpur Creeks	0	0	0
North Fork Mad River	6	17	15
Redwood Creek	4	7	4
Smith River	2	3	3
Tectah, Mettah, Roach, and Tully Creeks	0	0	0
Upper Mad River, Upper Redwood Creek	3	4	2
Wilson, Hunter, and Turwar Creeks	1	1	0

## 2. Incidental observations

No incidental observations of tree voles or tree vole nests occurred during the current reporting period.

## C. Discussion

In 2021, members of Green Diamond's biological staff worked with vole experts associated with Oregon State University to further refine bone identification techniques and update existing keys resulting in higher classification rates compared to the previous reporting period. As described above, further classification of species belonging to the genus *Arborimus* would potentially require a genetic approach given the similarities in skull and mandible characteristics between *A. longicaudus*, *A. pomo*, and *A. albipes*. However, historic and contemporary survey efforts have demonstrated that presence of *A. albipes* within the Plan Area is rare. Given the habitat associations and foraging behavior of *A. albipes*, it is extremely unlikely that spotted owls would prey upon *A. albipes*. Therefore, the *Arborimus* specimens are most likely *A. longicaudus* or *A. pomo*.

The digestive process of pellet formation may result in bone loss or degradation, and weathering post regurgitation may further degrade pellet samples. The resulting poor condition of the skulls and mandibles may prevent identification of tree vole specimens (genus *Arborimus*) versus other sympatric vole species using basic skull or teeth morphology. This small subset of samples could be further analyzed using more advanced techniques such as a genetic-based approach to accurately identify individual species. Although the number of bones or individual pellets within a single sample may vary, the overall number of pellet samples collected between 2018 and 2020 declined while pellet samples collected during the current reporting period increased. Alternative methods for locating pellets in years when spotted owl occupancy within the Plan Area is low may be incorporated in future reporting periods to increase pellet sample size for the occupancy modeling. Based on Green Diamond's spotted owl demographic studies (Chapter VII of this report), the number of occupied and paired sites within the Plan Area declined in recent years with the exception of the current reporting period where the number of territorial spotted owls did not change and the number of paired sites increased compared to the previous reporting period. Spotted owl site occupancy has a direct impact on the number of pellet samples available for collection each reporting period and likely contributed to the increase in number of pellet samples collected in 2021. Increased spotted owl occupancy and paired occupancy expected as a result of the Phase II barred owl removal experiments should continue to result in an increase in the number of pellet samples collected each year.

## X. Adaptive Management

The adaptive management process addresses scientific uncertainties through monitoring of Covered Species to determine whether FHCP conservation measures have intended effects. Green Diamond will initiate reviews and implement adaptive management measures in response to monitoring outcomes specific to the Covered Species. A basic premise of adaptive management is that early warning of unanticipated and undesirable outcomes of the FHCP implementation, such as declines in the number and/or distribution of the Covered Species, should be addressed as early as possible. Therefore, the FHCP adaptive management process includes an early warning 'yellow-light' trigger, as well as a second, more urgent 'red light' trigger. Objective yellow light triggers will cause Green Diamond to intensify monitoring efforts. If the monitoring indicates that red light conditions have been triggered, Green Diamond (in coordination with the USFWS and the CDFW) will conduct an assessment to identify the potential cause behind the negative monitoring result, its potential management activity relationship, and any appropriate management changes.

This section of the annual report highlights the prospective adaptive management triggers and commitments, as well as any adaptive management measures implemented.

### A. Methods

#### 1. Northern Spotted Owl Adaptive Management Thresholds

##### a. Threshold One

Prior to model validation, a 'yellow light' condition will be triggered if the northern spotted owl population declines in the 6 years following approval of the FHCP relative to the baseline northern spotted owl population. (i.e., 95% confidence interval (CI) of realized population change does not overlap 1.0 as described in Dugger et al., 2016).

##### b. Threshold Two

Following model validation, a 'yellow light' condition will be triggered if the 95% CI in realized population change based on mark-recapture or occupancy models does not overlap 1.0 in two of the most recent five years.

##### c. Threshold Three

Prior to model validation, 'red light' condition will be triggered if the northern spotted owl population continues to decline in the 10 years following approval of the FHCP relative to the northern spotted owl population at the initiation of barred owl removal (i.e., 95% CI of realized population change does not overlap 1.0 as described in Dugger et al., 2016).

#### **d. Threshold Four**

Following model validation, a 'red light' condition will be triggered if the 95% CI in realized population change based on mark-recapture or occupancy models does not overlap 1.0 in three out of five years.

#### **e. Threshold Five**

Green Diamond will annually assess the mean reproductive success of the northern spotted owl population at all Dynamic Core Areas (DCAs) plus a minimum of 12 other northern spotted owl sites selected by a spatially stratified random sample. The trend in fecundity over the prior six years within the Plan Area will be compared to the trend in a comparable regional mean. A 'red light' condition will be triggered if the trend in mean fecundity estimate from the Plan Area is statistically lower ( $p \leq 0.05$ ) than the comparable regional mean reported for the Willow Creek Study Area.

### **2. Fisher Adaptive Management Thresholds**

#### **a. Threshold One**

A 'yellow light' condition will be triggered if there is a statistically significant ( $p = 0.05$ ) decrease in occupancy estimates for a major portion (e.g., ~50,000 acres) of the plan area at 5 years after occupancy model development.

#### **b. Threshold Two**

A 'red light' condition will be triggered if there is a statistically significant decrease in occupancy estimates in the same yellow light area at 10 years.

### **3. Tree Voles**

#### **a. Threshold One**

A 'yellow light' condition will be triggered if there is a statistically significant ( $p=0.05$ ) decrease in occupancy estimates for a major portion (e.g., ~50,000 acres) of the plan area for three consecutive years.

#### **b. Threshold Two**

A 'red light' condition will be triggered if there is a statistically significant ( $p=0.05$ ) decrease in occupancy estimates in the same yellow light area for  $\geq 5$  consecutive years.

## **B. Results**

### **1. Northern Spotted Owl Adaptive Management Threshold Evaluation**

#### **a. Threshold One**

This threshold will be evaluated in the sixth year (2025) following FHCP approval.

#### **b. Threshold Two**

This threshold will be evaluated following model validation.

#### **c. Threshold Three**

This threshold will be evaluated in the tenth year (2030) following FHCP approval.

#### **d. Threshold Four**

This threshold will be evaluated following model validation.

#### **e. Threshold Five**

This threshold will be evaluated in the sixth year (2025) following FHCP approval.

### **2. Fisher Adaptive Management Threshold Evaluation**

#### **a. Threshold One**

This threshold will be evaluated five years after occupancy model development.

#### **b. Threshold Two**

This threshold will be evaluated ten years after occupancy model development.

### **3. Tree Voles**

#### **a. Threshold One**

This threshold will be evaluated three years after occupancy model development.

#### **b. Threshold Two**

This threshold will be evaluated five years after occupancy model development.

## **C. Discussion**

Adaptive management is an important component of habitat conservation planning that addresses biological uncertainty concerning the needs of the Covered Species throughout the life of the permit. If future monitoring reveals that biological objectives are not being met based on the established monitoring thresholds, then the adaptive management process will be implemented, and if warranted, corrective actions taken. Since the monitoring thresholds established through the adaptive management process are based on assessing trends in habitat or occupancy, several years of data are needed. This is the first full year of FHCP implementation, and adequate time has not passed to assess the conservation commitments.

## Appendix I. Results of THP surveys for spotted owls 2021.

THP#	State ID	THP Name	Unit ID	Survey Type	Surveyed in previous year	Spotted owl site within 0.5 mile
09-1501	1-15-068HUM	Stevens Creek Central 16	D	Detection Probability	N	Middle Stevens Creek
09-2001	1-21-00011HUM	Spread Stevens	A	Detection Probability	N	
09-2001	1-21-00011HUM	Spread Stevens	B	Detection Probability	N	
09-2001	1-21-00011HUM	Spread Stevens	C	Detection Probability	N	Upper Stevens Creek
09-2001	1-21-00011HUM	Spread Stevens	D	Detection Probability	N	Lower Stevens Creek
09-2001	1-21-00011HUM	Spread Stevens	E	Detection Probability	N	HRC 47, Stevens Creek East
09-2001	1-21-00011HUM	Spread Stevens	F	Detection Probability	N	Stevens Creek East
14-2001	1-20-00124HUM	Salmon West	A	Detection Probability	Y	
14-2001	1-20-00124HUM	Salmon West	B	Detection Probability/Spot Call	Y	Salmon Creek #3
14-2001	1-20-00124HUM	Salmon West	C	Detection Probability	Y	Salmon Creek #4
14-2001	1-20-00124HUM	Salmon West	D	Detection Probability	Y	Salmon Creek #2
14-2001	1-20-00124HUM	Salmon West	E	Detection Probability	Y	EBF, Salmon Creek #2
15-1802	1-18-00161HUM	JC Thin	B	Detection Probability	Y	
15-1802	1-18-00161HUM	JC Thin	C	Detection Probability	Y	
15-2001	1-21-00022HUM	Jacoby 22	A	Detection Probability	N	
15-2001	1-21-00022HUM	Jacoby 22	B	Detection Probability	N	
15-2001	1-21-00022HUM	Jacoby 22	C	Detection Probability	N	
15-2001	1-21-00022HUM	Jacoby 22	D	Detection Probability	N	
15-2001	1-21-00022HUM	Jacoby 22	E	Detection Probability	N	
15-2001	1-21-00022HUM	Jacoby 22	F	Detection Probability	N	
17-1602	1-16-138HUM	Boulder Creek North '17	C	Detection Probability	Y	Boulder Creek #4, B.C. Powerline
17-1602	1-16-138HUM	Boulder Creek North '17	D	Detection Probability	Y	B.C. Powerline
17-1801	1-18-00144HUM	Brown's Ridge	C	Detection Probability	Y	
17-1801	1-18-00144HUM	Brown's Ridge	H	Detection Probability	Y	
17-1802	1-18-00176HUM	Goodman Prairie '20	B	Detection Probability	Y	Wiggins Pond
17-2001	1-20-00222HUM	Graham Goodman	A	Detection Probability	N	

THP#	State ID	THP Name	Unit ID	Survey Type	Surveyed in previous year	Spotted owl site within 0.5 mile
17-2001	1-20-00222HUM	Graham Goodman	B	Detection Probability	N	
17-2001	1-20-00222HUM	Graham Goodman	C	Detection Probability	N	
17-2002	1-21-00049HUM	Snow Camp Lake '22	A	Detection Probability	N	
17-2002	1-21-00049HUM	Snow Camp Lake '22	B	Detection Probability	N	
17-2002	1-21-00049HUM	Snow Camp Lake '22	C	Detection Probability	N	
17-2002	1-21-00049HUM	Snow Camp Lake '22	D	Detection Probability	N	
17-2002	1-21-00049HUM	Snow Camp Lake '22	E	Detection Probability	N	
17-2002	1-21-00049HUM	Snow Camp Lake '22	F	Detection Probability	N	
17-2002	1-21-00049HUM	Snow Camp Lake '22	G	Detection Probability	N	
18-1801	1-19-00013HUM	Smokehouse Creek	A	Detection Probability	Y	Upper Pardee
18-1801	1-19-00013HUM	Smokehouse Creek	D	Second Year	Y	
18-1801	1-19-00013HUM	Smokehouse Creek	F	Second Year	Y	
18-2001	1-20-00207HUM	Boulder Bundle	A	Detection Probability	N	
18-2001	1-20-00207HUM	Boulder Bundle	B	Detection Probability	N	
18-2001	1-20-00207HUM	Boulder Bundle	C	Detection Probability	N	
18-2001	1-20-00207HUM	Boulder Bundle	D	Detection Probability	N	
18-2001	1-20-00207HUM	Boulder Bundle	E	Detection Probability	N	
18-2001	1-20-00207HUM	Boulder Bundle	F	Detection Probability	N	
19-1601	1-16-140HUM	R-13 Thin	A	Detection Probability	N	
19-1601	1-16-140HUM	R-13 Thin	E	Detection Probability	Y	
19-2101	1-21-00067HUM	McKay Deuce2022	A	Detection Probability	N	Guptil Gulch, PL3
19-2101	1-21-00067HUM	McKay Deuce2022	B	Detection Probability	N	Guptil Gulch
22-1701	1-18-004HUM	Van Cleave	A	Detection Probability	Y	Upper Palmer Creek
22-1701	1-18-004HUM	Van Cleave	D	Detection Probability	Y	Van Cleave South
22-1701	1-18-004HUM	Van Cleave	E	Detection Probability	Y	Quarry Creek
22-1701	1-18-004HUM	Van Cleave	G	Detection Probability	Y	Van Cleave South
22-1901	1-19-00164HUM	Mad Mountain	C	Detection Probability	Y	Lower Dry Creek, 5700
22-1901	1-19-00164HUM	Mad Mountain	D	Detection Probability	Y	Dry Creek

THP#	State ID	THP Name	Unit ID	Survey Type	Surveyed in previous year	Spotted owl site within 0.5 mile
22-1901	1-19-00164HUM	Mad Mountain	E	Detection Probability	Y	Dry Creek
22-1901	1-19-00164HUM	Mad Mountain	F	Detection Probability	Y	Dry Creek
22-2001	1-21-00124HUM	Fickle Hill 1100	C	Detection Probability	N	
22-2001	1-21-00124HUM	Fickle Hill 1100	D	Detection Probability	N	Jacoby Creek #1
22-2001	1-21-00124HUM	Fickle Hill 1100	E	Detection Probability	N	Jacoby Creek #1
22-2001	1-21-00124HUM	Fickle Hill 1100	F	Detection Probability	N	
22-2001	1-21-00124HUM	Fickle Hill 1100	G	Detection Probability	N	
24-1901	1-20-00019HUM	Ward Road Combo	C	Detection Probability	Y	Simpson Creek
24-1901	1-20-00019HUM	Ward Road Combo	D	Detection Probability	Y	Simpson Creek
24-1901	1-20-00019HUM	Ward Road Combo	E	Detection Probability	Y	Simpson Creek
24-1901	1-20-00019HUM	Ward Road Combo	F	Detection Probability	Y	Simpson Creek
24-2001	1-21-00016HUM	Maple Bear	A	Detection Probability	N	4800, 4851, Wood Ranch
24-2001	1-21-00016HUM	Maple Bear	B	Detection Probability	N	4800, 4851
24-2001	1-21-00016HUM	Maple Bear	C	Detection Probability	N	4800, 4851, Bear Creek
24-2001	1-21-00016HUM	Maple Bear	D	Detection Probability	N	4851
24-2001	1-21-00016HUM	Maple Bear	E	Detection Probability	N	4851, Maple Creek #1
26-1303	1-14-057HUM	Hungry Hollow '15	D	Detection Probability	N	
26-1602	1-16-083HUM	Cal Barrel 1100 '17	G	Detection Probability	Y	
26-1901	1-19-00161HUM	CB 2000 '20	A	Detection Probability	Y	Cal Barrel, Korbel Mill
26-1901	1-19-00161HUM	CB 2000 '20	B	Detection Probability	Y	
26-1901	1-19-00161HUM	CB 2000 '20	C	Detection Probability	Y	Sullivan Gulch
26-1901	1-19-00161HUM	CB 2000 '20	D	Detection Probability	Y	Sullivan Gulch
26-1901	1-19-00161HUM	CB 2000 '20	E	Detection Probability	Y	Sullivan Gulch
26-1901	1-19-00161HUM	CB 2000 '20	F	Detection Probability	Y	Cal Barrel
26-2001	1-20-00107HUM	Lord Ellis Summit	A	Detection Probability	N	Wiregrass Ridge
26-2001	1-20-00107HUM	Lord Ellis Summit	B	Detection Probability	N	
26-2001	1-20-00107HUM	Lord Ellis Summit	C	Detection Probability	N	
26-2002	1-21-00019HUM	Long Prairie '21	A	Detection Probability	N	Old 299 Pine Creek

THP#	State ID	THP Name	Unit ID	Survey Type	Surveyed in previous year	Spotted owl site within 0.5 mile
26-2002	1-21-00019HUM	Long Prairie '21	B	Detection Probability	N	
26-2002	1-21-00019HUM	Long Prairie '21	C	Detection Probability	N	Old 299 #1
26-2002	1-21-00019HUM	Long Prairie '21	D	Detection Probability	N	
26-2002	1-21-00019HUM	Long Prairie '21	E	Detection Probability	N	
26-2002	1-21-00019HUM	Long Prairie '21	F	Detection Probability	N	
26-2002	1-21-00019HUM	Long Prairie '21	G	Detection Probability	N	Old 299 #1
26-2002	1-21-00019HUM	Long Prairie '21	H	Detection Probability	N	Old 299 #1
27-1801	1-18-084HUM	Cutoff Road	D	Detection Probability	Y	Lupton Creek #2
27-1801	1-18-084HUM	Cutoff Road	E	Detection Probability	Y	
27-2001	1-21-00046HUM	Christmas Carroll	A	Detection Probability	N	
27-2001	1-21-00046HUM	Christmas Carroll	B	Detection Probability	N	
27-2001	1-21-00046HUM	Christmas Carroll	C	Detection Probability	N	Fern Prairie
27-2001	1-21-00046HUM	Christmas Carroll	D	Detection Probability	N	
27-2001	1-21-00046HUM	Christmas Carroll	E	Detection Probability	N	
27-2001	1-21-00046HUM	Christmas Carroll	F	Detection Probability	N	Fernwood
38-1901	1-20-00105HUM	Ribar	A	Spot Call	Y	
40-2001	1-21-00017HUM	NF 1100	B	Detection Probability	Y	
40-2001	1-21-00017HUM	NF 1100	C	Detection Probability	Y	
40-2001	1-21-00017HUM	NF 1100	D	Detection Probability	Y	
40-2001	1-21-00017HUM	NF 1100	E	Detection Probability	Y	
40-2001	1-21-00017HUM	NF 1100	F	Detection Probability	Y	Jackson Hill, Poverty Creek
40-2001	1-21-00017HUM	NF 1100	G	Detection Probability	Y	Jiggs Creek, Poverty Creek
40-2001	1-21-00017HUM	NF 1100	H	Detection Probability	Y	Jackson Hill, Jiggs Creek, Poverty Creek
42-1601	1-16-099HUM	Little River HWD '17	C	Second Year	Y	
42-1601	1-16-099HUM	Little River HWD '17	E	Second Year	Y	
42-2001	1-20-00067HUM	Basin East	A	Spot Call	Y	
42-2001	1-20-00067HUM	Basin East	B	Spot Call	Y	
42-2001	1-20-00067HUM	Basin East	C	Second Year/Spot Call	Y	

THP#	State ID	THP Name	Unit ID	Survey Type	Surveyed in previous year	Spotted owl site within 0.5 mile
42-2001	1-20-00067HUM	Basin East	D	Spot Call	Y	
42-2001	1-20-00067HUM	Basin East	E	Second Year	Y	
42-2001	1-20-00067HUM	Basin East	F	Detection Probability	Y	
42-2002	1-21-00091HUM	Canyon Creek '22	A	Detection Probability	N	
42-2002	1-21-00091HUM	Canyon Creek '22	B	Detection Probability	N	
42-2002	1-21-00091HUM	Canyon Creek '22	C	Detection Probability	N	
42-2002	1-21-00091HUM	Canyon Creek '22	D	Detection Probability	N	
42-2002	1-21-00091HUM	Canyon Creek '22	E	Detection Probability	N	
42-2002	1-21-00091HUM	Canyon Creek '22	F	Detection Probability	N	
42-2002	1-21-00091HUM	Canyon Creek '22	G	Detection Probability	N	
42-2002	1-21-00091HUM	Canyon Creek '22	H	Detection Probability	N	
42-2002	1-21-00091HUM	Canyon Creek '22	I	Detection Probability	N	
43-1801	1-18-00145HUM	Whitehouse '19	A	Spot Call	Y	
43-1801	1-18-00145HUM	Whitehouse '19	E	Detection Probability	Y	
43-1801	1-18-00145HUM	Whitehouse '19	F	Spot Call	Y	
43-1801	1-18-00145HUM	Whitehouse '19	G	Spot Call	Y	
43-1801	1-18-00145HUM	Whitehouse '19	J	Second Year	Y	
43-1801	1-18-00145HUM	Whitehouse '19	K	Second Year	Y	
43-1802	1-18-00064HUM	Railroad Creek Thin	A	Detection Probability	Y	
43-1802	1-18-00064HUM	Railroad Creek Thin	B	Detection Probability	Y	
43-1802	1-18-00064HUM	Railroad Creek Thin	C	Second Year	Y	
43-1802	1-18-00064HUM	Railroad Creek Thin	D	Second Year	Y	
43-1802	1-18-00064HUM	Railroad Creek Thin	E	Detection Probability	Y	
43-1802	1-18-00064HUM	Railroad Creek Thin	F	Detection Probability	Y	
43-1802	1-18-00064HUM	Railroad Creek Thin	G	Detection Probability	Y	
43-1901	1-19-00167HUM	Little Bull Thin	A	Second Year	Y	
43-1901	1-19-00167HUM	Little Bull Thin	C	Second Year	Y	
43-1901	1-19-00167HUM	Little Bull Thin	D	Second Year	Y	

THP#	State ID	THP Name	Unit ID	Survey Type	Surveyed in previous year	Spotted owl site within 0.5 mile
43-1901	1-19-00167HUM	Little Bull Thin	E	Second Year	Y	
43-1901	1-19-00167HUM	Little Bull Thin	F	Second Year	Y	
43-1904	1-20-00016HUM	Mitsui Thin	A	Detection Probability	N	
43-1904	1-20-00016HUM	Mitsui Thin	B	Detection Probability	N	
43-1904	1-20-00016HUM	Mitsui Thin	C	Detection Probability	N	
43-1904	1-20-00016HUM	Mitsui Thin	D	Detection Probability	N	
43-1904	1-20-00016HUM	Mitsui Thin	E	Detection Probability	N	
43-1904	1-20-00016HUM	Mitsui Thin	F	Detection Probability	N	
43-1904	1-20-00016HUM	Mitsui Thin	G	Detection Probability	N	
43-2002	1-20-00106HUM	Little Maple '21	A	Second Year	Y	
43-2002	1-20-00106HUM	Little Maple '21	B	Second Year	Y	
43-2002	1-20-00106HUM	Little Maple '21	C	Second Year	Y	
43-2002	1-20-00106HUM	Little Maple '21	D	Second Year	Y	
43-2002	1-20-00106HUM	Little Maple '21	E	Second Year	Y	
43-2002	1-20-00106HUM	Little Maple '21	F	Second Year	Y	
43-2002	1-20-00106HUM	Little Maple '21	G	Second Year	Y	
43-2002	1-20-00106HUM	Little Maple '21	H	Second Year	Y	
44-1901	1-19-00065HUM	Wire Canyon	B	Detection Probability	Y	
44-1901	1-19-00065HUM	Wire Canyon	C	Detection Probability	Y	
45-1401	1-14-098HUM	Redwood Creek North	A	Second Year	Y	
45-1401	1-14-098HUM	Redwood Creek North	B	Second Year	Y	
45-1401	1-14-098HUM	Redwood Creek North	C	Second Year	Y	
45-1501	1-15-051HUM	Beach Creek 16	F	Detection Probability	N	Upper Maple BL
45-1801	1-18-00175HUM	Pollnow Peak 2020	A	Spot Call	Y	
45-1801	1-18-00175HUM	Pollnow Peak 2020	B	Spot Call	Y	
45-1901	1-20-00099HUM	Panther North	A	Second Year	Y	
45-1901	1-20-00099HUM	Panther North	B	Second Year	Y	
45-1901	1-20-00099HUM	Panther North	C	Second Year	Y	

THP#	State ID	THP Name	Unit ID	Survey Type	Surveyed in previous year	Spotted owl site within 0.5 mile
45-1901	1-20-00099HUM	Panther North	D	Second Year	Y	
45-2001	1-20-00162HUM	Little Beach Thin	A	Detection Probability	N	
45-2001	1-20-00162HUM	Little Beach Thin	B	Detection Probability	N	
45-2001	1-20-00162HUM	Little Beach Thin	C	Detection Probability	N	
45-2001	1-20-00162HUM	Little Beach Thin	D	Detection Probability	N	
45-2001	1-20-00162HUM	Little Beach Thin	E	Second Year/Spot Call	Y	
45-2001	1-20-00162HUM	Little Beach Thin	F	Second Year/Spot Call	Y	
45-2001	1-20-00162HUM	Little Beach Thin	G	Detection Probability	N	
45-2001	1-20-00162HUM	Little Beach Thin	H	Detection Probability	N	
47-1701	1-17-064HUM	BL2200/2600 '18	C	Detection Probability	N	
47-1702	1-17-060HUM	Shotgun Pass	A	Detection Probability	Y	
47-1801	1-18-00157HUM	CR 1710 '18	A	Second Year	Y	
47-1801	1-18-00157HUM	CR 1710 '18	D	Second Year	Y	
47-1901	1-19-00215HUM	CR 1000 West	A	Second Year	Y	
47-1902	1-19-00150HUM	CR 2400/1640	A	Spot Call	Y	
47-1902	1-19-00150HUM	CR 2400/1640	B	Second Year/Spot Call	Y	
47-1902	1-19-00150HUM	CR 2400/1640	C	Spot Call	Y	
47-1902	1-19-00150HUM	CR 2400/1640	D	Second Year	Y	
47-1902	1-19-00150HUM	CR 2400/1640	E	Spot Call	Y	
47-1902	1-19-00150HUM	CR 2400/1640	G	Spot Call	Y	
47-1902	1-19-00150HUM	CR 2400/1640	H	Second Year/Spot Call	Y	
47-1903	1-19-00208HUM	BL 1600/2720	B	Second Year	Y	
47-1903	1-19-00208HUM	BL 1600/2720	C	Second Year	Y	
47-1903	1-19-00208HUM	BL 1600/2720	D	Second Year	Y	
47-1904	1-19-00209HUM	Relief Pitcher	A	Second Year	Y	
47-1904	1-19-00209HUM	Relief Pitcher	B	Second Year/Spot Call	Y	
47-1904	1-19-00209HUM	Relief Pitcher	C	Second Year	Y	
47-1904	1-19-00209HUM	Relief Pitcher	D	Spot Call	Y	

THP#	State ID	THP Name	Unit ID	Survey Type	Surveyed in previous year	Spotted owl site within 0.5 mile
47-1906	1-20-00075HUM	Diamond Pitcher	A	Second Year/Spot Call	Y	
47-1906	1-20-00075HUM	Diamond Pitcher	B	Second Year	Y	
47-1906	1-20-00075HUM	Diamond Pitcher	C	Second Year	Y	
47-2001	1-20-00088HUM	Tom McDonald '21	A	Spot Call	Y	
47-2002	1-20-00082HUM	Mc Maple '21	A	Second Year	Y	
47-2002	1-20-00082HUM	Mc Maple '21	B	Detection Probability	Y	
47-2002	1-20-00082HUM	Mc Maple '21	C	Detection Probability	Y	
47-2002	1-20-00082HUM	Mc Maple '21	D	Detection Probability	Y	
47-2002	1-20-00082HUM	Mc Maple '21	E	Detection Probability	Y	
47-2002	1-20-00082HUM	Mc Maple '21	F	Second Year	Y	
47-2002	1-20-00082HUM	Mc Maple '21	G	Second Year	Y	
47-2002	1-20-00082HUM	Mc Maple '21	H	Detection Probability	Y	Windy Point
47-2002	1-20-00082HUM	Mc Maple '21	I	Second Year	Y	
47-2003	1-20-00133HUM	CR 2473/BL 2250	A	Second Year	Y	
47-2003	1-20-00133HUM	CR 2473/BL 2250	B	Second Year	Y	
47-2003	1-20-00133HUM	CR 2473/BL 2250	C	Detection Probability	Y	
47-2003	1-20-00133HUM	CR 2473/BL 2250	D	Spot Call	Y	
47-2003	1-20-00133HUM	CR 2473/BL 2250	E	Detection Probability	Y	
47-2004	1-21-00099HUM	Big Diamond	A	Detection Probability	N	
47-2004	1-21-00099HUM	Big Diamond	B	Detection Probability	N	
47-2004	1-21-00099HUM	Big Diamond	C	Detection Probability	N	
47-2004	1-21-00099HUM	Big Diamond	D	Detection Probability	N	
47-2004	1-21-00099HUM	Big Diamond	E	Detection Probability	N	
47-2004	1-21-00099HUM	Big Diamond	F	Detection Probability	N	
47-2101	1-21-00147HUM	BL 1800/1900	A	Detection Probability	N	
47-2101	1-21-00147HUM	BL 1800/1900	B	Detection Probability	N	
47-2101	1-21-00147HUM	BL 1800/1900	C	Detection Probability	N	
47-2101	1-21-00147HUM	BL 1800/1900	D	Detection Probability	N	

THP#	State ID	THP Name	Unit ID	Survey Type	Surveyed in previous year	Spotted owl site within 0.5 mile
47-2102	1-21-00088HUM	Baby Lagoon	A	Detection Probability	N	
47-2102	1-21-00088HUM	Baby Lagoon	B	Detection Probability	N	
47-2102	1-21-00088HUM	Baby Lagoon	C	Detection Probability	N	
47-2104	1-21-00120HUM	South McDonald 2022	C	Detection Probability	N	
47-2104	1-21-00120HUM	South McDonald 2022	D	Detection Probability	N	
48-1501	1-15-143HUM	Coyote Creek	B	Detection Probability	Y	
48-1501	1-15-143HUM	Coyote Creek	C	Detection Probability	Y	
48-1501	1-15-143HUM	Coyote Creek	E	Detection Probability	Y	
48-1501	1-15-143HUM	Coyote Creek	G	Detection Probability	Y	Panther Bridge
48-1503	1-16-125HUM	East Coyote	A	Detection Probability	Y	
48-1503	1-16-125HUM	East Coyote	B	Detection Probability	Y	
48-1503	1-16-125HUM	East Coyote	C	Detection Probability	Y	Coyote North
48-1503	1-16-125HUM	East Coyote	D	Detection Probability	Y	
48-1503	1-16-125HUM	East Coyote	E	Detection Probability	Y	Coyote North
48-1503	1-16-125HUM	East Coyote	G	Detection Probability	N	
48-1601	1-17-003HUM	Dolly Varden	C	Detection Probability	Y	
48-1601	1-17-003HUM	Dolly Varden	D	Detection Probability	N	
48-1601	1-17-003HUM	Dolly Varden	E	Detection Probability	Y	
48-1702	1-17-149HUM	K&K 830 18	A	Second Year	Y	
48-1702	1-17-149HUM	K&K 830 18	G	Second Year	Y	
48-1901	1-20-00026HUM	Roar 801	B	Detection Probability	Y	Garrett South
48-2001	1-20-00155HUM	Little Redwood '21	B	Detection Probability	Y	
48-2001	1-20-00155HUM	Little Redwood '21	C	Detection Probability	Y	
48-2001	1-20-00155HUM	Little Redwood '21	D	Second Year	Y	
48-2001	1-20-00155HUM	Little Redwood '21	E	Second Year/Spot Call	Y	
51-1601	1-16-135HUM	The Ridge	E	Second Year	Y	
51-1704	1-17-136HUM	Johnson/Roach '18	A	Detection Probability	Y	
51-1704	1-17-136HUM	Johnson/Roach '18	B	Detection Probability	Y	

THP#	State ID	THP Name	Unit ID	Survey Type	Surveyed in previous year	Spotted owl site within 0.5 mile
51-1704	1-17-136HUM	Johnson/Roach '18	C	Detection Probability	Y	
51-1704	1-17-136HUM	Johnson/Roach '18	D	Detection Probability	Y	
51-1704	1-17-136HUM	Johnson/Roach '18	E	Detection Probability	Y	
51-1704	1-17-136HUM	Johnson/Roach '18	G	Detection Probability	Y	
51-1704	1-17-136HUM	Johnson/Roach '18	I	Detection Probability	Y	
51-1706	1-17-143HUM	Tully Creek East '18	D	Second Year	Y	
51-1706	1-17-143HUM	Tully Creek East '18	E	Second Year	Y	
51-1706	1-17-143HUM	Tully Creek East '18	F	Second Year	Y	
51-1706	1-17-143HUM	Tully Creek East '18	G	Second Year	Y	
51-1801	1-18-092HUM	Bear Prairie	B	Detection Probability	Y	
51-1901	1-20-00018HUM	Cemetery Gates '20	A	Detection Probability	N	
51-1901	1-20-00018HUM	Cemetery Gates '20	B	Detection Probability	N	
51-1901	1-20-00018HUM	Cemetery Gates '20	C	Detection Probability	N	
51-1901	1-20-00018HUM	Cemetery Gates '20	D	Detection Probability	N	
51-1901	1-20-00018HUM	Cemetery Gates '20	E	Detection Probability	N	
51-2001	1-20-00085HUM	Tully Thin	A	Second Year	Y	
51-2001	1-20-00085HUM	Tully Thin	B	Second Year	Y	
51-2001	1-20-00085HUM	Tully Thin	C	Second Year	Y	
51-2001	1-20-00085HUM	Tully Thin	D	Second Year	Y	
51-2001	1-20-00085HUM	Tully Thin	F	Second Year	Y	
56-1611	1-17-057HUM	Lower West Tectah	A	Detection Probability	Y	
56-1703	1-17-147HUM	TT220 '18	B	Detection Probability	N	
56-1703	1-17-147HUM	TT220 '18	C	Detection Probability	N	
56-1703	1-17-147HUM	TT220 '18	D	Detection Probability	N	
56-1703	1-17-147HUM	TT220 '18	E	Detection Probability	N	
56-1704	1-18-063HUM	J-1700 '19	A	Second Year	Y	J1600
56-1704	1-18-063HUM	J-1700 '19	B	Second Year	Y	J1600
56-1704	1-18-063HUM	J-1700 '19	C	Second Year	Y	

THP#	State ID	THP Name	Unit ID	Survey Type	Surveyed in previous year	Spotted owl site within 0.5 mile
56-1704	1-18-063HUM	J-1700 '19	E	Second Year	Y	
56-1704	1-18-063HUM	J-1700 '19	F	Second Year	Y	
56-1704	1-18-063HUM	J-1700 '19	G	Second Year	Y	Ambrose
56-1801	1-18-091HUM	Elk Camp '19	B	Detection Probability	Y	
56-1802	1-19-00002HUM	Buker's Prairie	A	Detection Probability	Y	
56-1802	1-19-00002HUM	Buker's Prairie	C	Detection Probability	Y	
56-1802	1-19-00002HUM	Buker's Prairie	D	Detection Probability	Y	
56-1803	1-18-00141HUM	TT 515 '20	C	Detection Probability	Y	
56-1804	1-18-00173HUM	Tectah 300 '20	B	Second Year	Y	
56-1804	1-18-00173HUM	Tectah 300 '20	C	Second Year	Y	
56-1805	1-19-0040HUM	Big Red	A	Detection Probability	Y	
56-1805	1-19-0040HUM	Big Red	C	Detection Probability/Spot Call	Y	
56-1805	1-19-0040HUM	Big Red	E	Detection Probability	Y	
56-1806	1-19-0094HUM	Surpur Surprise '20	D	Detection Probability	Y	
56-1806	1-19-0094HUM	Surpur Surprise '20	E	Detection Probability	Y	
56-1806	1-19-0094HUM	Surpur Surprise '20	F	Detection Probability	Y	
56-1901	1-19-00156HUM	Forks Ah Pah	C	Detection Probability	Y	
56-1901	1-19-00156HUM	Forks Ah Pah	E	Detection Probability	Y	
56-1901	1-19-00156HUM	Forks Ah Pah	H	Detection Probability	Y	
56-1902	1-21-00087HUM	Tectah Straddle	A	Detection Probability	Y	
56-1902	1-21-00087HUM	Tectah Straddle	B	Detection Probability	Y	
56-1902	1-21-00087HUM	Tectah Straddle	C	Detection Probability	Y	
56-1902	1-21-00087HUM	Tectah Straddle	D	Detection Probability	Y	
56-1902	1-21-00087HUM	Tectah Straddle	E	Detection Probability	Y	
56-1902	1-21-00087HUM	Tectah Straddle	F	Detection Probability	Y	
56-1902	1-21-00087HUM	Tectah Straddle	G	Detection Probability	Y	
56-1904	1-20-00149HUM	A-400	A	Detection Probability	Y	
56-1904	1-20-00149HUM	A-400	B	Detection Probability	Y	

THP#	State ID	THP Name	Unit ID	Survey Type	Surveyed in previous year	Spotted owl site within 0.5 mile
56-1904	1-20-00149HUM	A-400	C	Detection Probability	Y	
56-1904	1-20-00149HUM	A-400	D	Detection Probability	Y	
56-1904	1-20-00149HUM	A-400	E	Detection Probability	Y	
56-1904	1-20-00149HUM	A-400	F	Detection Probability	Y	
56-1904	1-20-00149HUM	A-400	G	Detection Probability/Spot Call	Y	
56-1904	1-20-00149HUM	A-400	H	Detection Probability	Y	
56-1904	1-20-00149HUM	A-400	I	Detection Probability/Spot Call	Y	
56-1904	1-20-00149HUM	A-400	J	Detection Probability/Spot Call	Y	
56-2001	1-21-00023HUM	Ah Pah 1800 '21	A	Detection Probability	N	
56-2001	1-21-00023HUM	Ah Pah 1800 '21	B	Detection Probability	N	
56-2001	1-21-00023HUM	Ah Pah 1800 '21	C	Detection Probability	N	
56-2001	1-21-00023HUM	Ah Pah 1800 '21	D	Detection Probability	N	
56-2001	1-21-00023HUM	Ah Pah 1800 '21	E	Detection Probability	N	
56-2002	1-20-00213HUM	West Tectah	A	Detection Probability	N	
56-2002	1-20-00213HUM	West Tectah	B	Detection Probability	N	
56-2002	1-20-00213HUM	West Tectah	C	Detection Probability	N	
56-2002	1-20-00213HUM	West Tectah	D	Detection Probability	N	
56-2002	1-20-00213HUM	West Tectah	E	Detection Probability	N	
56-2002	1-20-00213HUM	West Tectah	F	Detection Probability	N	
56-2002	1-20-00213HUM	West Tectah	G	Detection Probability	N	
56-2002	1-20-00213HUM	West Tectah	H	Detection Probability	N	
56-2002	1-20-00213HUM	West Tectah	I	Detection Probability	N	
56-2002	1-20-00213HUM	West Tectah	J	Detection Probability	N	
56-2101	1-21-00087HUM	Tectah North	A	Detection Probability	N	
56-2101	1-21-00087HUM	Tectah North	B	Detection Probability	N	
56-2101	1-21-00087HUM	Tectah North	C	Detection Probability	N	
56-2101	1-21-00087HUM	Tectah North	D	Detection Probability	N	
56-2101	1-21-00087HUM	Tectah North	E	Detection Probability	N	

THP#	State ID	THP Name	Unit ID	Survey Type	Surveyed in previous year	Spotted owl site within 0.5 mile
56-2101	1-21-00087HUM	Tectah North	F	Detection Probability	N	
56-2101	1-21-00087HUM	Tectah North	G	Detection Probability	N	
56-2102	1-21-00168HUM	CL North 1000	A	Detection Probability	N	
56-2102	1-21-00168HUM	CL North 1000	B	Detection Probability	N	
56-2102	1-21-00168HUM	CL North 1000	C	Detection Probability	N	
56-2102	1-21-00168HUM	CL North 1000	D	Detection Probability	N	
56-2102	1-21-00168HUM	CL North 1000	E	Detection Probability	N	
56-2102	1-21-00168HUM	CL North 1000	F	Detection Probability	N	
56-2102	1-21-00168HUM	CL North 1000	G	Detection Probability	N	
61-1901	1-20-00177HUM	Omagar Creek	A	Detection Probability	Y	
61-1901	1-20-00177HUM	Omagar Creek	C	Detection Probability	Y	
61-1901	1-20-00177HUM	Omagar Creek	E	Detection Probability	Y	
61-1901	1-20-00177HUM	Omagar Creek	F	Detection Probability	Y	
61-1901	1-20-00177HUM	Omagar Creek	D	Detection Probability	N	
66-1701	1-18-006DEL	SA-10 End	F	Detection Probability	Y	
66-1701	1-18-006DEL	SA-10 End	G	Detection Probability	Y	
66-1802	1-18-00191DEL	McTarup	E	Detection Probability	Y	
66-1802	1-18-00191DEL	McTarup	H	Detection Probability	Y	
66-1901	1-19-00142DEL	McGarvey West	A	Detection Probability	Y	
66-1901	1-19-00142DEL	McGarvey West	B	Detection Probability	Y	
66-1901	1-19-00142DEL	McGarvey West	C	Detection Probability/Spot Call	Y	
66-1901	1-19-00142DEL	McGarvey West	D	Detection Probability	Y	
66-1901	1-19-00142DEL	McGarvey West	E	Detection Probability	Y	
66-1901	1-19-00142DEL	McGarvey West	F	Detection Probability	Y	
66-1901	1-19-00142DEL	McGarvey West	G	Detection Probability	Y	
66-1901	1-19-00142DEL	McGarvey West	H	Detection Probability	Y	
66-1901	1-19-00142DEL	McGarvey West	I	Detection Probability	Y	
66-2001	1-20-00061DEL	Drury Forks	A	Detection Probability	N	

THP#	State ID	THP Name	Unit ID	Survey Type	Surveyed in previous year	Spotted owl site within 0.5 mile
66-2001	1-20-00061DEL	Drury Forks	C	Detection Probability	N	
66-2001	1-20-00061DEL	Drury Forks	D	Detection Probability	Y	
66-2001	1-20-00061DEL	Drury Forks	E	Detection Probability	Y	
66-2002	1-20-00210DEL	Tarup '21	A	Detection Probability	Y	
66-2002	1-20-00210DEL	Tarup '21	B	Detection Probability	N	
66-2002	1-20-00210DEL	Tarup '21	C	Detection Probability	N	
66-2002	1-20-00210DEL	Tarup '21	D	Detection Probability	N	
66-2002	1-20-00210DEL	Tarup '21	E	Detection Probability	N	
67-2001	1-21-00089DEL	Dump Thin	A	Detection Probability	N	
67-2001	1-21-00089DEL	Dump Thin	B	Detection Probability	N	
67-2001	1-21-00089DEL	Dump Thin	C	Detection Probability	N	
67-2001	1-21-00089DEL	Dump Thin	D	Detection Probability	N	
67-2001	1-21-00089DEL	Dump Thin	E	Detection Probability	N	
67-2001	1-21-00089DEL	Dump Thin	F	Detection Probability	N	
67-2001	1-21-00089DEL	Dump Thin	G	Detection Probability	N	
67-2001	1-21-00089DEL	Dump Thin	H	Detection Probability	N	
67-2001	1-21-00089DEL	Dump Thin	I	Detection Probability	N	
70-2001	1-21-00005DEL	Salt Creek	A	Detection Probability	N	
70-2001	1-21-00005DEL	Salt Creek	B	Detection Probability	N	
70-2001	1-21-00005DEL	Salt Creek	C	Detection Probability	N	
70-2001	1-21-00005DEL	Salt Creek	D	Detection Probability	N	
70-2001	1-21-00005DEL	Salt Creek	E	Detection Probability	N	
71-1702	1-17-073DEL	West Wilson	A	Detection Probability	Y	
71-1702	1-17-073DEL	West Wilson	B	Detection Probability	N	
71-1702	1-17-073DEL	West Wilson	D	Detection Probability	Y	
71-1702	1-17-073DEL	West Wilson	F	Detection Probability	Y	
71-1702	1-17-073DEL	West Wilson	G	Detection Probability	N	W100

THP#	State ID	THP Name	Unit ID	Survey Type	Surveyed in previous year	Spotted owl site within 0.5 mile
71-1801	1-18-098DEL	Upper West Fork Hunter Creek	B	Detection Probability	Y	
71-1801	1-18-098DEL	Upper West Fork Hunter Creek	D	Detection Probability	Y	Hunter 500
71-1804	1-19-00120DEL	Wilson End	A	Detection Probability	N	
71-1901	1-20-00080DEL	W150	A	Detection Probability	Y	
71-1901	1-20-00080DEL	W150	B	Detection Probability	Y	
71-1901	1-20-00080DEL	W150	C	Detection Probability	Y	
71-1901	1-20-00080DEL	W150	D	Detection Probability	Y	
71-1901	1-20-00080DEL	W150	E	Detection Probability	Y	
71-1901	1-20-00080DEL	W150	F	Detection Probability	Y	
71-1903	1-19-00220DEL	Wilson 300	B	Spot Call	Y	
71-1903	1-19-00220DEL	Wilson 300	C	Spot Call	Y	W302
71-1903	1-19-00220DEL	Wilson 300	D	Spot Call	Y	
71-1904	1-20-00004DEL	H-400	A	Detection Probability	Y	
71-1904	1-20-00004DEL	H-400	B	Detection Probability	Y	
71-2001	1-20-00118DEL	Wilson 200	A	Detection Probability	Y	
71-2001	1-20-00118DEL	Wilson 200	B	Detection Probability	Y	
73-1802	1-19-00097DEL	Mynot Creek	A	Spot Call	Y	
73-1802	1-19-00097DEL	Mynot Creek	D	Detection Probability/Spot Call	Y	Mynot School, Upper Mynot Creek
73-1802	1-19-00097DEL	Mynot Creek	E	Detection Probability/Spot Call	Y	
73-1901	1-19-00221DEL	Hoppaw 2020	A	Spot Call	Y	
73-1901	1-19-00221DEL	Hoppaw 2020	B	Spot Call	Y	
73-1901	1-19-00221DEL	Hoppaw 2020	C	Spot Call	Y	
73-2001	1-21-00080DEL	T-100	A	Detection Probability	N	
73-2001	1-21-00080DEL	T-100	B	Detection Probability	N	
73-2001	1-21-00080DEL	T-100	C	Detection Probability	N	
73-2001	1-21-00080DEL	T-100	D	Detection Probability	Y	
73-2001	1-21-00080DEL	T-100	E	Detection Probability	Y	

THP#	State ID	THP Name	Unit ID	Survey Type	Surveyed in previous year	Spotted owl site within 0.5 mile
73-2001	1-21-00080DEL	T-100	F	Detection Probability	Y	
85-1602	1-18-007DEL	RM 10	F	Detection Probability	N	
85-1602	1-18-007DEL	RM 10	G	Detection Probability	N	
85-1801	1-18-177DEL	Arrow Mills '18	C	Spot Call	Y	
85-1802	1-20-00103DEL	Lower Turwar	A	Detection Probability	Y	
85-1802	1-20-00103DEL	Lower Turwar	B	Detection Probability	Y	
85-1802	1-20-00103DEL	Lower Turwar	C	Detection Probability	Y	
85-1803	1-20-00013DEL	Top of Turwar	A	Spot Call	Y	
85-1803	1-20-00013DEL	Top of Turwar	B	Detection Probability	Y	
85-1803	1-20-00013DEL	Top of Turwar	C	Detection Probability/Spot Call	Y	
85-1803	1-20-00013DEL	Top of Turwar	D	Spot Call	Y	
85-1803	1-20-00013DEL	Top of Turwar	E	Detection Probability	Y	
85-1803	1-20-00013DEL	Top of Turwar	F	Spot Call	Y	
85-1803	1-20-00013DEL	Top of Turwar	G	Spot Call	Y	
85-1803	1-20-00013DEL	Top of Turwar	H	Spot Call	Y	
85-1803	1-20-00013DEL	Top of Turwar	I	Detection Probability	N	
85-1901	1-20-00008DEL	Dandy Creek	B	Second Year	Y	
85-1901	1-20-00008DEL	Dandy Creek	C	Second Year	Y	
85-1901	1-20-00008DEL	Dandy Creek	D	Second Year	Y	
85-1901	1-20-00008DEL	Dandy Creek	F	Spot Call	Y	
85-2001	1-21-00004DEL	Crowley's Corner	A	Detection Probability	Y	Hulla Crup Turwar
85-2001	1-21-00004DEL	Crowley's Corner	B	Detection Probability	Y	Hulla Crup Turwar
85-2001	1-21-00004DEL	Crowley's Corner	C	Detection Probability	N	Turwar CF
85-2001	1-21-00004DEL	Crowley's Corner	D	Detection Probability	Y	
85-2001	1-21-00004DEL	Crowley's Corner	E	Detection Probability	Y	
85-2002	1-21-00146DEL	Nasty Jack	A	Detection Probability	N	
85-2002	1-21-00146DEL	Nasty Jack	B	Detection Probability	N	
85-2002	1-21-00146DEL	Nasty Jack	C	Detection Probability	N	

THP#	State ID	THP Name	Unit ID	Survey Type	Surveyed in previous year	Spotted owl site within 0.5 mile
85-2002	1-21-00146DEL	Nasty Jack	E	Detection Probability	N	
85-2002	1-21-00146DEL	Nasty Jack	F	Detection Probability	N	
90-1901	1-19-0021DEL	Morrison Thin	A	Detection Probability/Spot Call	Y	
90-1901	1-19-0021DEL	Morrison Thin	B	Detection Probability	Y	
90-2101	1-21-00102DEL	Morrison 200	A	Detection Probability	N	
90-2101	1-21-00102DEL	Morrison 200	B	Detection Probability	N	
90-2101	1-21-00102DEL	Morrison 200	C	Detection Probability	N	
90-2101	1-21-00102DEL	Morrison 200	D	Detection Probability	N	
93-1801	1-18-00195DEL	Gilbert Winchuck	B	Detection Probability	Y	Winchuck River
93-1801	1-18-00195DEL	Gilbert Winchuck	C	Detection Probability	Y	Dominie Dogleg, Upper SF Winchuck, Winchuck River
93-1801	1-18-00195DEL	Gilbert Winchuck	F	Detection Probability	Y	
93-1802	1-18-00187DEL	Win-Do	A	Detection Probability/Spot Call	Y	
93-1802	1-18-00187DEL	Win-Do	B	Detection Probability	Y	Dominie Dogleg
93-1802	1-18-00187DEL	Win-Do	E	Detection Probability	Y	Dominie Winchuck, Upper SF Winchuck
93-1902	1-19-00158DEL	Winchuck 1900	A	Detection Probability	Y	
93-1902	1-19-00158DEL	Winchuck 1900	B	Detection Probability	Y	
93-1902	1-19-00158DEL	Winchuck 1900	D	Detection Probability	Y	
93-1902	1-19-00158DEL	Winchuck 1900	E	Detection Probability	Y	Upper SF Winchuck
93-1902	1-19-00158DEL	Winchuck 1900	F	Detection Probability	Y	Upper SF Winchuck
93-1902	1-19-00158DEL	Winchuck 1900	G	Detection Probability	Y	Dominie Winchuck, Upper SF Winchuck
93-1903	1-19-00199DEL	Rowdy 1210	A	Detection Probability	N	
93-1903	1-19-00199DEL	Rowdy 1210	B	Detection Probability	N	
93-1903	1-19-00199DEL	Rowdy 1210	C	Detection Probability	N	
93-1903	1-19-00199DEL	Rowdy 1210	D	Detection Probability	N	
93-1903	1-19-00199DEL	Rowdy 1210	E	Detection Probability	N	
93-1903	1-19-00199DEL	Rowdy 1210	F	Detection Probability	N	
93-2001	1-20-00142DEL	Bear Creek 3	A	Detection Probability	Y	

THP#	State ID	THP Name	Unit ID	Survey Type	Surveyed in previous year	Spotted owl site within 0.5 mile
93-2001	1-20-00142DEL	Bear Creek 3	B	Detection Probability	Y	
93-2001	1-20-00142DEL	Bear Creek 3	C	Detection Probability	Y	
93-2001	1-20-00142DEL	Bear Creek 3	D	Detection Probability	Y	
93-2001	1-20-00142DEL	Bear Creek 3	E	Detection Probability	N	
95-1701	1-18-107DEL	Fort Dick '18	E	Second Year	Y	
95-1701	1-18-107DEL	Fort Dick '18	F	Second Year	Y	
95-1701	1-18-107DEL	Fort Dick '18	G	Second Year	Y	
98-1801	1-19-00021DEL	The Dump '20	A	Detection Probability	Y	
98-1801	1-19-00021DEL	The Dump '20	B	Detection Probability	Y	
98-1801	1-19-00021DEL	The Dump '20	C	Detection Probability	Y	
98-1801	1-19-00021DEL	The Dump '20	D	Detection Probability	Y	

**Spot call** survey type refers to units that were cut through the beginning of the 2021 survey period with continuous operations until harvest was complete. Such units were surveyed once per week concurrent with operations until five surveys were completed or less than 10 acres of contiguous timber remained standing. All units that were spot called in 2021 were surveyed in 2020 until 95% probability of detection was achieved.

**Detection probability** survey type indicates that a unit was surveyed in 2021 prior to operations until 95% probability of detection was achieved (range 4-6 surveys).

**Second year** survey type indicates that a unit was surveyed in the previous year with the detection probability protocol and no owls were detected. Under these circumstances, a second year survey protocol that incorporates the results from the detection probability analysis described in Chapter II of the annual report may be implemented, and four surveys are required to achieve a 95% probability of detecting an owl.

**Detection probability & spot call or second year & Spot call** survey types indicate that a portion of the unit was cut continuously through the beginning of the 2021 survey period followed by a delay in harvest of the remaining portion. The portion of the unit harvested through the beginning of the 2021 survey period received spot call surveys. The portion of the unit that remained was surveyed either using the detection probability protocol or second year surveys before operations continued in 2021.

Appendix II: Raw data for habitat retention measures for individual clearcut harvest units summarized in Tables 1, 2, 3, and 4.

THP #	State ID	Unit	Acres	Pre HRA #	Post HRA #	Pre green trees/ acre	Post green trees/ acre	Pre snags/ acre	Post snags/ acre	Pre scorecard trees #	Post scorecard trees #	Large woody debris/acre	Dominance	RMZ Acres
191902	1-20-00074HUM	E	24.98	3	3	1.1	1.1	0.25	0.25	5	5	0.25	Conifer	0.00
191902	1-20-00074HUM	F	23.15	1	1	1.1	1.1	0.25	0.25	1	1	0.25	Conifer	0.00
221901	1-19-00164HUM	A	29.64	0	0	2.0	2.0	0.00	0.00	2	2	1.00	Conifer	10.55
241901	1-20-00019HUM	E	14.86	0	0	2.0	2.0	1.00	1.00	24	24	0.00	Conifer	0.88
261801	1-18-00109HUM	D	14.95	0	0	2.0	2.0	1.00	1.00	2	2	0.10	Conifer	0.00
261801	1-18-00109HUM	E	23.93	0	0	2.0	2.0	1.00	1.00	8	8	0.00	Conifer	0.00
272001	1-21-00046HUM	F	29.38	1	1	2.0	2.0	0.25	0.25	0	0	2.00	Conifer	0.00
381901	1-20-00105HUM	A	11.77	0	0	2.0	2.0	0.00	0.00	10	10	1.00	Conifer	0.00
401901	1-20-00005HUM	A	28.69	1	1	2.0	2.0	0.20	0.20	28	28	1.00	Conifer	0.00
401901	1-20-00005HUM	B	27.84	2	2	2.6	2.6	0.20	0.20	21	21	2.00	Conifer	1.72
401901	1-20-00005HUM	C	29.64	1	1	3.4	3.4	0.20	0.20	89	89	2.00	Conifer	0.87
402001	1-20-00067HUM	H	18.00	0	0	2.5	2.5	0.30	0.30	10	10	2.00	Conifer	2.88
422001	1-20-00067HUM	A	26.75	1	1	2.0	2.0	0.00	0.50	22	22	1.00	Conifer	1.20
422001	1-20-00067HUM	D	21.42	0	0	2.0	2.0	0.00	0.10	0	0	1.00	Conifer	0.43
422001	1-20-00067HUM	E	30.45	0	0	2.0	2.0	0.00	0.00	5	5	1.00	Conifer	9.33
432002	1-20-00106HUM	B	20.85	0	0	2.5	2.5	0.20	0.20	0	0	0.10	Conifer	8.82
432002	1-20-00106HUM	C	30.49	0	0	2.0	2.0	0.25	0.25	4	4	0.10	Conifer	9.91
432002	1-20-00106HUM	H	9.75	0	0	3.0	3.0	0.40	0.40	5	5	0.10	Conifer	1.91
441802	1-19-00068HUM	C	27.50	1	1	2.0	2.0	0.30	0.30	59	59	2.00	Conifer	0.00
441802	1-19-00068HUM	D	20.99	0	0	2.0	2.0	0.30	0.30	46	46	0.50	Conifer	1.91
441901	1-19-00065HUM	G	28.26	1	1	2.1	2.1	0.30	0.30	17	17	1.00	Conifer	1.71
451901	1-20-00099HUM	C	30.02	0	0	2.0	2.0	0.25	0.25	1	1	3.00	Conifer	0.00
451901	1-20-00099HUM	D	29.76	0	0	2.0	2.0	0.25	0.25	10	10	2.00	Conifer	5.82
451901	1-20-00099HUM	E	30.33	0	0	2.0	2.0	0.25	0.25	37	37	3.00	Conifer	2.46
471902	1-19-00150HUM	E	20.08	0	0	1.4	1.4	0.25	0.25	0	0	0.00	Conifer	12.72
471902	1-19-00150HUM	F	43.40	0	0	2.7	2.7	0.50	0.50	26	26	0.00	Conifer	12.82

THP #	State ID	Unit	Acres	Pre HRA #	Post HRA #	Pre green trees/ acre	Post green trees/ acre	Pre snags/ acre	Post snags/ acre	Pre scorecard trees #	Post scorecard trees #	Large woody debris/acre	Dominance	RMZ Acres
471902	1-19-00150HUM	G	35.88	1	1	1.8	1.8	0.25	0.25	7	7	0.00	Conifer	2.06
471903	1-19-00208HUM	A	21.42	0	0	0.8	1.5	0.30	0.40	4	4	0.20	Conifer	19.10
471904	1-19-00209HUM	A	28.73	0	0	1.0	1.0	0.00	0.00	3	3	1.00	Conifer	10.49
471904	1-19-00209HUM	B	28.69	0	0	1.0	1.0	0.00	0.00	6	6	1.00	Conifer	9.80
471904	1-19-00209HUM	C	14.97	0	0	2.0	2.0	0.00	0.00	0	0	1.00	Conifer	8.06
471904	1-19-00209HUM	D	15.92	0	0	1.0	1.0	0.00	0.00	0	0	1.00	Conifer	15.61
471904	1-19-00209HUM	F	14.21	0	0	1.0	1.0	0.00	0.00	3	3	0.10	Conifer	11.52
471906	1-20-00075HUM	A	24.45	0	0	1.9	1.9	0.10	0.10	9	9	0.10	Conifer	4.49
471906	1-20-00075HUM	B	14.53	0	0	0.6	0.5	0.10	0.15	2	2	0.10	Conifer	13.12
471906	1-20-00075HUM	D	29.84	0	0	1.0	1.0	0.00	0.00	4	4	0.10	Conifer	10.19
472002	1-20-00082HUM	A	30.49	2	2	1.2	1.2	0.50	0.50	20	20	1.00	Conifer	6.54
472002	1-20-00082HUM	B	12.57	0	0	1.3	1.3	0.50	0.50	4	4	1.00	Conifer	12.92
472002	1-20-00082HUM	F	18.58	0	0	1.3	1.3	0.30	0.30	2	2	1.00	Conifer	1.50
472003	1-20-00133HUM	C	14.50	0	0	1.6	1.2	0.10	0.10	12	12	1.00	Conifer	4.28
472003	1-20-00133HUM	D	11.26	0	0	2.3	3.8	0.10	0.10	1	1	1.00	Conifer	13.25
472003	1-20-00133HUM	E	6.66	0	0	1.2	1.5	0.10	0.10	0	0	1.00	Conifer	11.43
481901	1-20-00026HUM	A	26.67	5	5	2.0	2.0	0.50	0.50	20	20	1.00	Conifer	0.54
481901	1-20-00026HUM	C	33.05	0	0	2.0	2.0	0.50	0.50	20	20	1.00	Conifer	9.68
481901	1-20-00026HUM	D	19.30	0	0	2.0	2.0	0.50	0.50	16	16	1.00	Conifer	6.28
482001	1-20-00155HUM	A	16.17	0	0	1.0	1.0	0.40	0.40	1	1	0.10	Conifer	2.00
482001	1-20-00155HUM	D	11.81	0	0	2.5	2.5	2.00	2.00	0	0	0.20	Conifer	6.21
482001	1-20-00155HUM	E	32.71	0	0	2.0	2.0	5.00	5.00	14	14	0.15	Conifer	11.33
482001	1-20-00155HUM	F	21.74	0	0	2.0	2.0	4.00	4.00	2	2	0.10	Conifer	0.00
511901	1-89-044HUM	A	26.23	3	3	4.0	4.0	0.10	0.10	0	0	1.00	Conifer	0.00
511901	1-89-044HUM	B	25.00	0	0	1.6	4.0	0.10	0.20	25	25	1.00	Conifer	2.16
561806	1-19-00094HUM	A	22.96	0	0	2.2	2.2	0.25	0.30	53	49	2.00	Conifer	2.28
561806	1-19-00094HUM	B	29.77	0	0	2.5	2.5	0.25	0.80	55	49	2.00	Conifer	7.80
561806	1-19-00094HUM	E	25.17	0	0	4.7	4.7	0.10	0.10	75	73	1.00	Conifer	7.63

THP #	State ID	Unit	Acres	Pre HRA #	Post HRA #	Pre green trees/ acre	Post green trees/ acre	Pre snags/ acre	Post snags/ acre	Pre scorecard trees #	Post scorecard trees #	Large woody debris/acre	Dominance	RMZ Acres
561901	1-19-00156HUM	B	15.89	0	0	2.0	2.0	0.10	0.10	50	50	0.20	Conifer	0.00
561901	1-19-00156HUM	F	28.73	0	0	2.0	2.0	0.10	0.20	3	3	0.20	Conifer	4.85
561901	1-19-00156HUM	G	22.79	0	0	2.0	2.0	0.10	0.20	8	8	0.10	Conifer	22.81
561901	1-19-00156HUM	H	37.15	0	0	2.0	2.2	0.10	0.20	24	24	0.10	Conifer	7.04
561904	1-20-00149HUM	A	30.14	0	0	2.0	2.0	1.00	1.00	4	4	1.00	Conifer	15.54
561904	1-20-00149HUM	B	25.35	0	0	2.0	2.5	1.00	1.00	3	3	0.50	Conifer	3.36
561904	1-20-00149HUM	D	24.23	0	0	2.0	4.0	1.00	1.00	9	9	1.00	Conifer	2.21
561904	1-20-00149HUM	F	18.49	0	0	2.0	2.0	0.00	1.00	10	10	2.00	Conifer	6.09
561904	1-20-00149HUM	G	24.79	0	0	2.0	2.0	1.00	1.00	5	5	0.50	Conifer	9.52
561904	1-20-00149HUM	I	29.30	0	0	2.0	4.0	1.00	1.00	5	5	2.00	Conifer	3.21
561904	1-20-00149HUM	J	27.11	0	0	2.0	3.0	1.00	1.00	6	6	0.50	Conifer	3.65
661901	1-19-00142DEL	A	18.82	0	0	2.0	2.0	0.50	0.50	1	1	5.00	Conifer	4.70
661901	1-19-00142DEL	B	17.22	0	0	2.0	3.0	0.50	0.50	1	1	4.00	Conifer	6.59
661901	1-19-00142DEL	C	13.90	0	0	2.0	2.0	0.50	0.50	0	0	7.00	Conifer	9.34
661901	1-19-00142DEL	D	22.99	0	0	2.0	2.0	0.50	0.50	2	2	6.00	Conifer	9.21
662001	1-20-00061DEL	A	22.77	0	0	2.0	2.0	0.50	0.50	8	8	0.50	Conifer	13.72
662002	1-20-00210DEL	B	21.24	1	1	2.0	2.0	0.50	0.50	2	2	6.00	Conifer	1.83
711902	1-20-00007DEL	C	19.74	0	0	2.0	2.0	1.00	1.00	3	3	2.00	Conifer	7.22
711902	1-20-00007DEL	D	29.23	0	0	2.0	2.0	1.00	1.00	4	4	2.00	Conifer	13.58
711903	1-19-00220DEL	A	13.24	0	0	2.0	2.0	0.50	0.50	2	2	10.00	Conifer	10.09
711903	1-19-00220DEL	B	12.54	0	0	2.0	2.0	0.50	0.50	2	2	11.00	Conifer	3.57
711904	1-20-00004DEL	C	29.49	0	0	2.0	2.0	1.00	1.00	3	3	2.00	Conifer	7.55
711904	1-20-00004DEL	D	20.27	0	0	2.0	2.0	1.00	1.00	21	21	2.00	Conifer	3.88
731802	1-19-00097DEL	A	4.07	0	0	2.0	2.0	1.00	0.50	0	0	0.50	Conifer	14.88
731802	1-19-00097DEL	B	26.75	0	0	2.0	2.0	0.00	0.50	1	1	0.50	Conifer	3.03
731802	1-19-00097DEL	E	19.84	0	0	2.0	2.0	1.00	0.50	6	6	1.00	Conifer	3.62
731901	1-19-00221DEL	B	13.19	2	2	2.0	2.0	0.50	0.50	0	0	8.00	Conifer	0.00
731901	1-19-00221DEL	C	13.01	1	1	2.0	2.0	0.50	0.50	1	1	9.00	Conifer	0.00

THP #	State ID	Unit	Acres	Pre HRA #	Post HRA #	Pre green trees/ acre	Post green trees/ acre	Pre snags/ acre	Post snags/ acre	Pre scorecard trees #	Post scorecard trees #	Large woody debris/acre	Dominance	RMZ Acres
851803	1-20-00013DEL	C	26.97	0	0	2.0	3.0	2.00	2.00	24	22	2.00	Conifer	1.55
851803	1-20-00013DEL	D	30.78	0	0	2.0	2.0	2.00	2.00	3	3	2.00	Conifer	3.07
851803	1-20-00013DEL	G	28.51	0	0	2.0	2.0	2.00	2.00	2	2	2.00	Conifer	9.05
851803	1-20-00013DEL	H	20.16	0	0	2.0	2.0	2.00	2.00	2	2	4.00	Conifer	0.00
851901	1-20-00008DEL	C	22.69	0	0	2.0	2.0	2.00	2.00	0	0	2.00	Conifer	11.55
851901	1-20-00008DEL	E	11.91	0	0	2.0	3.0	2.00	2.00	0	0	3.00	Conifer	13.85
851901	1-20-00008DEL	F	14.06	0	0	2.0	2.0	2.00	2.00	7	7	2.00	Conifer	0.00
931801	1-18-00195DEL	C	18.21	0	0	2.0	2.0	2.00	3.00	18	15	2.00	Conifer	13.14
931801	1-18-00195DEL	F	12.46	0	0	5.0	5.0	2.00	2.00	7	7	2.00	Conifer	2.41
931803	1-19-00100DEL	C	24.29	0	0	2.5	2.5	0.50	0.50	8	8	0.50	Conifer	20.28
931902	1-19-00100DEL	D	27.97	0	0	2.5	2.5	0.00	0.50	11	11	0.50	Conifer	6.60
931903	1-19-00199DEL	A	14.02	0	0	3.0	3.0	0.00	0.50	23	23	1.00	Conifer	5.98
931903	1-19-00199DEL	B	30.42	0	0	3.5	3.5	1.00	0.50	50	50	1.00	Conifer	12.82
931903	1-19-00199DEL	C	13.93	0	0	3.0	3.0	0.00	0.50	18	18	1.00	Conifer	5.47
931903	1-19-00199DEL	D	10.64	0	0	3.0	3.0	0.00	0.00	9	9	0.50	Conifer	6.23
931903	1-19-00199DEL	F	11.95	0	0	3.0	3.0	0.00	0.50	5	5	0.50	Conifer	8.24
941702	1-18-071DEL	A	26.08	1	1	1.0	1.0	0.50	0.50	0	0	1.00	Conifer	0.00
941702	1-18-071DEL	B	5.31	0	0	2.0	2.0	0.50	0.50	0	0	0.00	Conifer	0.52
941702	1-18-071DEL	C	10.4	1	1	2.3	2.3	0.00	0.00	2	2	0.50	Conifer	0.00
941702	1-18-071DEL	D	16.15	0	0	2.4	2.4	0.50	0.50	3	3	0.25	Conifer	9.48
941702	1-18-071DEL	G	23.59	0	0	2.4	2.4	0.25	0.25	0	0	0.50	Conifer	12.85
941702	1-18-071DEL	H	14.34	0	0	2.1	2.1	0.50	0.50	1	1	0.25	Conifer	3.69
941702	1-18-071DEL	I	6.11	0	0	2.4	2.4	0.00	0.00	0	0	0.25	Conifer	0.80
981801	1-19-00021DEL	A	13.12	1	1	2.0	2.0	0.25	0.25	30	30	15.00	Conifer	0.00
981801	1-19-00021DEL	B	26.78	1	1	2.0	2.0	0.25	0.25	5	5	10.00	Conifer	0.51

Appendix III. Vacant and Recolonized owl sites on the Green Diamond Resource Company study area, 1993-2021.

Site Name	Year(s) Vacant	Year(s) Recolonized
4107	1997	2010
4128	1995	2010
4230 #2	1994	2010
4300	1996	2011
4800	2014	
4850	2008	
4910	2021	
6007	1994, 2000	1997, 2001
6000 CF	2019	
6400	2007	
6600	2000	2004
6610	2013	2015
7000	2005	2006
A400	2001	
Aldo Dusi	2000	2003
Arrow Mills	2009	
B.C. Powerline	1996	2014
B1200	1998	
Bald Mt. Creek	2008	
Bear Gulch	2002	
Big Lagoon Mill	2007	
Blue Creek Cabin	2009	
Boulder Creek #1	1998	2011
Boulder Creek #3	2007	2008
Boulder Creek #4	2000	2012
Boulder Creek #5	2007, 2021	2010
Boulder Creek #6	2020	2021
Boundary Creek	2002	2005
Bradshaw	2007	
Bug Creek	2000	
Butler Ridge	2010	
C2300	1998	2001
Cabin North	2001	
Cal Barrel	2012	2019
Camp Bauer	2008	2009
Canyon Creek #2	2000	
Coyote Park	2018	
Crowsfoot	2005	
D100	1999	
Dandy Creek	2005	

<b>Site Name</b>	<b>Year(s) Vacant</b>	<b>Year(s) Recolonized</b>
Deer Creek	1999	
Denman	1995, 2009	2002, 2020
Devil's Creek	1994	1999
Dolf Creek	1998	
Dolly Varden	2009	
Dominie Creek	1994	
East Goodman	2016	
Eighteen Creek	2001	
Fickle Hill Devil	2017	
Fielder Creek	2002	2020
GAP	2007	
Girls Camp	1997, 2021	2013
Girls Camp North	2001	
Graham Creek	2019	
Graham Ridge	2000, 2017	2013
Graham West	1997	
H132	1995	
Hancorne Prairie	1999	
Humbug South	1997	
Hunter 100	2017	
Hunter 110	1999	2018
Hunter 300	1999, 2008, 2015	2003, 2010
Hunter 410	1996	
Hunter 510	1996, 2019	2014
HWY 101	2013	
Jacoby Barnum	2003	
K&K 1400	2000	
K&K 400	2001	
K&K 600	2001	
Klamath Mill	2011	
L2000	1996	
Lindsay Creek	1998	
Liscom Hill	2001	
Little Boulder Creek	2018	
Little Deer Creek	1997	1998
Little River #1	2010	
Little River #2	2015	2016
Little Surpur	2001	
Lower Beach Creek	2012	2014
Lower Dolf Creek	2016	
Lower Pardee	2020	
Lower Roach	1995, 2007	1996, 2021
Lower SF Winchuck	2017	

<b>Site Name</b>	<b>Year(s) Vacant</b>	<b>Year(s) Recolonized</b>
Lower Simpson	2014	2016
Lower South Fork #1	2004	
Lower South Fork #2	2014	
Lower Stevens Creek	2012	
Lower Tulley Creek	2003, 2015	2007
Lucchesi SPI	2004	2017
Lupton Creek #2	2001, 2005	2002, 2006, 2009
M1150	1995	1996
Madrone Creek	1997, 2007	2001
Madrone South	2008, 2020	2015
Maple B.L. #1	2002	
Maple Creek Bridge	2007	2009
Mather #2	2002	2006
McDonald Creek	2001	
McGarvey Creek	1998	
Mettah Creek #1	1994	
Mettah Creek #2	1999	
Middle Ribar	2010	2015
Middle Tulley Creek	1996	
Mill West	2000, 2019	2015
Miller Ridge	2019	
M-Line Creek	2009	
Morek Creek	2007	2009
Morgan Creek	2008	2011
Mt. Andy	2018	
NF1300	2007, 2018	2009
Noisy Creek	1996, 2014	1997
Noname Creek	2015	
North Fork Maple Creek	2004	
Notchkoo	1996	1997
Nursery	2018	
Old 299 #2	2006	
Old 299 Pine Creek	2018	2020
Omagar Creek	2003	
Panther Creek	2020	
Panther East	2005	
Pardee Creek	1995	
Pecwan Creek	2015	
Pollock Creek #1	1995	
Pollnow Peak	2020	
Powerline East	2015, 2021	2017
Powerline North	2019	2021
Puter Creek	2019	

<b>Site Name</b>	<b>Year(s) Vacant</b>	<b>Year(s) Recolonized</b>
Quarry Creek	2011	2013
R-8-1	2009	2011
R13	2004	2009
R1400	2008	2021
R15	2008	
Rattlesnake Ranch	2020	
Redwood House	2006	2010
R-Line	2021	
Roach LP	1998	
Rock Ranch	2004	2017
Rocky Gulch	2000	
Rowdy Creek	1992	
S12	1999	
Salmon Creek #4	1996	2009
Sampson	1993	
SF Ah Pah Creek	2003	
Snow Camp Creek	2009	
Stevens Creek SPI	2021	
Summit West	1997	
Surpur Creek	1998	
Surpur Mouth	1996	
T300	2003,	2004
Tectah Mouth	2001	
Terwer 200	2001	
Three Cabins	2014	
Tom Creek	2002	
Toss-Off South	2006	
Tree Farm	2003, 2012	2004, 2013
Tree Farm North	1996	2003
Trouble Creek Turwar	2018	
Twin Lakes Kinsey	2019	
U10	2000	
U700	1997	
Upper Beach Creek	2016	
Upper Bear Gulch	2017	
Upper Devil's Creek	2015	
Upper Little River	2009, 2018	2015
Upper Maple BL	2011	2016
Upper Maple Creek	1995	2009
Upper Morgan	2008	
Upper Pardee	1997	2019
Upper Ribar	2002	
Upper Roach Creek	2002	2012

<b>Site Name</b>	<b>Year(s) Vacant</b>	<b>Year(s) Recolonized</b>
Upper South Fork #1	2012	
Upper South Fork #2	2002	
Upper Tulley Creek	1999	
W. Goodman Prairie	2001	
W400	1998, 2021	2008
West Fork Stevens	2006	
Weyerhauser Shop	2000	
Williams Ridge	1998, 2006	2002, 2013
Windy Point	2006	2010
Wiregrass 200	2018	
WM1600	1998	
WM200	2008	

Appendix IV. List of site names, matching state master owl numbers, site status, and barred owl influence for northern spotted owl sites located on the Green Diamond demographic study area and/or the Green Diamond ownership in 2021.

Site Name	Master Owl Number	Site Status	Barred Owl Influence
4076	HUM0207	Unoccupied Perennial	Yes
4107	HUM0201	Unoccupied Perennial	No
4128	HUM0202	Occupied Perennial	Yes
4230 #1	HUM0200	Occupied Perennial	Yes
4230 #2	HUM0206	Unoccupied Perennial	Yes
4300	HUM0208	Occupied Perennial	No
4800	HUM1016	Occupied Perennial	No
4850	HUM0217	Vacant	No
4851	HUM0182	Occupied Perennial	Yes
4910	HUM1030	Vacant	No
5700	HUM0211	Occupied Perennial	No
6000 CF	HUM0056	Vacant	No
6007	HUM0856	Occupied Perennial	No
6400	HUM0216	Vacant	No
6600	HUM0300	Unoccupied Perennial	Yes
6610	HUM0217	Occupied Perennial	No
7000	HUM0214	Unoccupied Perennial	Yes
A400	DNT0124	Vacant	No
Aldo Dusi	HUM0397	Occupied Perennial	Yes
Ambrose	HUM0682	Unoccupied Perennial	Yes
Arrow Mills	DNT0069	Vacant	No
B.C. Powerline	HUM0663	Unoccupied Perennial	Yes
B1200	HUM0431	Vacant	No
Bald Mt. Creek	HUM0291	Vacant	No
Bear Creek	HUM0465	Occupied Perennial	Yes
Bear Gulch	HUM0577	Vacant	No
Beaver Creek	HUM0409	Unoccupied Perennial	Yes
Beaver West	HUM0675	Unoccupied Perennial	Yes
Big Lagoon Mill	HUM0518	Vacant	No
Blue Blossom	HUM1029	Unoccupied Perennial	Yes
Blue Creek Cabin	HUM0073	Vacant	No
Blue Slide Creek	HUM0378	Occupied Perennial	No
Blue Slide North	HUM0740	Unknown	No
Boulder Creek #1	HUM0383	Unoccupied Perennial	Yes
Boulder Creek #2	HUM0384	Unoccupied Perennial	Yes
Boulder Creek #3	HUM0385	Unoccupied Perennial	Yes
Boulder Creek #4	HUM0663	Occupied Perennial	No

Site Name	Master Owl Number	Site Status	Barred Owl Influence
Boulder Creek #5	HUM0857	Vacant	No
Boulder Creek #6	HUM1123	Recolonized	No
Boulder Creek #7	HUM1124	Unoccupied Perennial	Yes
Boundary Creek	HUM0204	Occupied Perennial	No
Bradshaw	DNT0035	Vacant	No
Bug Creek	HUM0098	Unknown	Yes
Butler Ridge	HUM0391	Vacant	No
C2300	HUM0312	Occupied Perennial	No
Cabin North	HUM0463	Vacant	No
Cal Barrel	HUM0265	Occupied Perennial	Yes
Cal Barrel Washout	HUM0464	Occupied Perennial	No
Camp Bauer	HUM0233	Occupied Perennial	Yes
Camp Gate	HUM1022	Unoccupied Perennial	Yes
Camp Gate North	HUM0382	Occupied Perennial	Yes
Camp Gate South	HUM0380	Unoccupied Perennial	Yes
Canyon Creek #1	HUM0181	Occupied Perennial	No
Canyon Creek #2	HUM0302	Vacant	No
Canyon North	HUM0737	Unoccupied Perennial	No
Clear Creek	HUM0438	Unoccupied Perennial	Yes
Copper Creek	DNT0005	Unknown	No
Coyote North	HUM0411	Unoccupied Perennial	Yes
Coyote Park	HUM0456	Vacant	No
Crowsfoot	HUM0978	Vacant	No
Cuddeback	Not Assigned	Newly Colonized	No
D100	DNT0100	Vacant	No
Dandy Creek	DNT0123	Vacant	No
Davis Creek	HUM0449	Unoccupied Perennial	Yes
Deer Creek	HUM0309	Unknown	Yes
Delilah Creek	DNT0155	Unoccupied Perennial	Yes
Denman Creek	HUM0285	Unoccupied Perennial	Yes
Devil's Creek	HUM0215	Occupied Perennial	Yes
Dick Bird	HUM0284	Unoccupied Perennial	Yes
Dolf Creek	HUM1043	Vacant	No
Dolly Varden	HUM0334	Vacant	No
Dominie Creek	DNT0054	Vacant	No
Dominie Dogleg	DNT0159	Occupied Perennial	No
Dominie Winchuck	Not Assigned	Occupied Perennial	No
Dry Creek	HUM0210	Occupied Perennial	No
East Fork Hunter	DNT0095	Occupied Perennial	No
East Goodman	HUM1001	Vacant	No
EBF	HUM0236	Occupied Perennial	No

Site Name	Master Owl Number	Site Status	Barred Owl Influence
Eighteen Creek	HUM0919	Vacant	No
Fern Prairie	HUM1100	Unoccupied Perennial	Yes
Fernwood	HUM0487	Occupied Perennial	No
Fickle Hill Devil	HUM1093	Vacant	No
Fickle Jacoby	Not Assigned	Newly Colonized	No
Fielder Creek	HUM0337	Unoccupied Perennial	No
Freeman	HUM0301	Occupied Perennial	No
GAP	HUM0472	Vacant	No
Garrett Creek	HUM0410	Unoccupied Perennial	Yes
Garrett South	HUM0677	Unoccupied Perennial	Yes
Gilbert Creek	DNT0162	Occupied Perennial	No
Girls Camp	HUM0379	Vacant	No
Graham Creek	HUM0374	Vacant	No
Graham Ridge	HUM0578	Vacant	No
Graham West	HUM0741	Vacant	No
Guptil Gulch	HUM1028	Unoccupied Perennial	Yes
H131	HUM0416	Unoccupied Perennial	Yes
H132	HUM1044	Vacant	No
Halagow West	HUM0999	Unknown	No
Hancorne Prairie	HUM0420	Vacant	No
Hancorne Ranch	HUM0317	Unoccupied Perennial	Yes
Henderson Gulch	HUM0063	Unoccupied Perennial	Yes
Hulla Crup Turwar	DNT0156	Unoccupied Perennial	Yes
Humbug Creek	HUM0308	Occupied Perennial	No
Hunter 100	DNT0149	Vacant	No
Hunter 110	DNT0095	Occupied Perennial	No
Hunter 240	DNT0147	Unoccupied Perennial	Yes
Hunter 300	DNT0073	Vacant	No
Hunter 400	DNT0163	Occupied Perennial	No
Hunter 410	DNT0117	Vacant	No
Hunter 500	DNT0073	Occupied Perennial	Yes
Hunter 510	DNT0047	Vacant	No
Hunter CF	DNT0154	Occupied Perennial	No
HWY 101	DNT0094	Vacant	No
J1600	HUM1000	Unoccupied Perennial	Yes
Jackson Hill	HUM0672	Occupied Perennial	Yes
Jacoby Creek #1	HUM0147	Unknown	Yes
Jacoby Creek #2	HUM0394	Occupied Perennial	Yes
Jacoby SPI	HUM0393	Unknown	Yes
Jiggs Creek	HUM0292	Unoccupied Perennial	Yes
Johnson Creek	HUM0681	Unoccupied Perennial	Yes

Site Name	Master Owl Number	Site Status	Barred Owl Influence
Jurin	HUM0587	Unoccupied Perennial	Yes
K&K 1400	HUM0676	Vacant	No
K&K 400	HUM0674	Vacant	No
K&K 600	HUM0673	Vacant	No
Klamath Bar	HUM0402	Unoccupied Perennial	Yes
Klamath Mill	DNT0071	Vacant	No
Korbel Mill	HUM1125	Occupied Perennial	Yes
L2000	HUM0222	Vacant	No
Lindsay Creek	HUM0403	Vacant	No
Liscom Hill	HUM0395	Occupied Perennial	No
Little Boulder Creek	HUM1032	Vacant	No
Little River #1	HUM0549	Vacant	No
Little River #2	HUM0747	Occupied Perennial	No
Little Salmon North	HUM1111	Occupied Perennial	No
Little Surpur	HUM0429	Vacant	No
Lord Ellis Creek	HUM0400	Occupied Perennial	Yes
Lord Ellis North	HUM0792	Occupied Perennial	Yes
Lower Beach Creek	HUM0474	Unoccupied Perennial	Yes
Lower Dolf Creek	HUM0404	Vacant	No
Lower Dry Creek	HUM0209	Occupied Perennial	Yes
Lower McCloud Creek	HUM0432	Unoccupied Perennial	Yes
Lower Pardee	HUM0389	Vacant	No
Lower Quarry Creek	HUM1033	Unknown	No
Lower Roach	HUM0459	Recolonized	Yes
Lower SF Winchuck	DNT0157	Vacant	No
Lower Simpson	HUM1017	Occupied Perennial	Yes
Lower South Fork #1	HUM0750	Vacant	No
Lower South Fork #2	HUM0749	Vacant	No
Lower Stevens Creek	HUM0009	Occupied Perennial	Yes
Lower Tulley Creek	HUM0418	Vacant	No
Lupton Creek #1	HUM0297	Unoccupied Perennial	Yes
Lupton Creek #2	HUM0296	Unoccupied Perennial	Yes
Lupton Creek #3	HUM0399	Unoccupied Perennial	Yes
M-Line Creek	HUM0338	Vacant	No
M1150	HUM0403	Unknown	Yes
Mad River Overlook	HUM1102	Unoccupied Perennial	Yes
Mad River STS	HUM0205	Occupied Perennial	No
Madrone Creek	HUM0741	Possible Recolonization	No
Madrone South	HUM0657	Possible Recolonization	No
Maple B.L. #1	HUM0519	Vacant	No
Maple Creek #1	HUM0304	Unoccupied Perennial	Yes

Site Name	Master Owl Number	Site Status	Barred Owl Influence
Maple Creek #2	HUM0669	Occupied Perennial	Yes
Maple Creek Bridge	HUM0388	Unoccupied Perennial	Yes
Mather #1	HUM0736	Unoccupied Perennial	Yes
Mather #2	HUM0836	Unoccupied Perennial	Yes
McCloud Creek	HUM0307	Occupied Perennial	Yes
McDonald Creek	HUM0840	Vacant	No
McGarvey Creek	HUM0697	Vacant	No
Mettah Creek #1	HUM0419	Vacant	No
Mettah Creek #2	HUM0679	Vacant	No
Mettah Forks	HUM0425	Unoccupied Perennial	Yes
Middle Ribar	HUM0453	Unknown	No
Middle Salmon Creek	HUM0838	Unoccupied Perennial	Yes
Middle Stevens Creek	HUM0370	Occupied Perennial	No
Middle Tulley Creek	HUM0458	Vacant	No
Mill West	HUM0407	Vacant	No
Miller Ridge	HUM1035	Vacant	No
Morek Creek	HUM0421	Unoccupied Perennial	Yes
Mt. Andy	HUM0381	Vacant	No
Mule Creek	HUM0235	Unoccupied Perennial	Yes
Mynot School	DNT0148	Unoccupied Perennial	Yes
N. Goodman Prairie	HUM0376	Occupied Perennial	Yes
NF1300	HUM0234	Vacant	No
Noisy Creek	HUM0299	Vacant	No
Noname Creek	HUM0392	Vacant	No
Noname North	HUM1087	Occupied Perennial	Yes
North Fork Maple Creek	HUM0745	Vacant	No
Notchkoo	HUM0423	Unoccupied Perennial	Yes
Nursery	HUM0199	Vacant	No
Old 299 #1	HUM0295	Occupied Perennial	Yes
Old 299 #2	HUM0294	Vacant	No
Old 299 Pine Creek	HUM0287	Unoccupied Perennial	No
Omagar Creek	DNT0138	Vacant	No
Omagar East	DNT0125	Unknown	No
Panther Bridge	HUM0457	Unoccupied Perennial	Yes
Panther Creek	HUM0489	Vacant	No
Panther East	HUM0946	Vacant	No
Pardee Creek	HUM0191	Possible Recolonization	No
Pardee South	HUM1002	Unoccupied Perennial	Yes
Peacock Creek	DNT0050	Unoccupied Perennial	Yes
Pecwan Creek	HUM1045	Vacant	No
Pollnow Peak	HUM1112	Vacant	No

Site Name	Master Owl Number	Site Status	Barred Owl Influence
Pollock Creek #1	HUM0290	Vacant	No
Pollock Creek #2	HUM0396	Unoccupied Perennial	Yes
Poverty Creek	HUM0289	Unoccupied Perennial	Yes
Powerline East	HUM0981	Vacant	No
Powerline North	HUM0390	Recolonized	No
Puter Creek	HUM1009	Vacant	No
Quarry Creek	HUM0203	Occupied Perennial	No
Quiet Lane	HUM1037	Occupied Perennial	No
R-8-1	HUM0987	Unoccupied Perennial	Yes
R-Line	HUM1091	Vacant	No
R13	HUM1018	Unoccupied Perennial	No
R1400	DNT0137	Recolonized	Yes
R15	HUM0577	Vacant	No
R200	HUM0162	Occupied Perennial	No
Rattlesnake Ranch	HUM1038	Vacant	No
Redwood House	HUM0625	Unoccupied Perennial	No
Ribar Rock Pit	HUM0288	Unknown	No
Roach LP	HUM0422	Vacant	No
Rock Ranch	HUM0185	Unoccupied Perennial	Yes
Roddiscraft Powerline	HUM0305	Unoccupied Perennial	Yes
Rohner Creek	HUM1023	Occupied Perennial	No
Rowdy Creek	DNT0053	Vacant	No
Ryan Creek	HUM0921	Unoccupied Perennial	No
S12	HUM0462	Vacant	No
Salmon Creek #2	HUM0264	Occupied Perennial	No
Salmon Creek #3	HUM0238	Occupied Perennial	Yes
Salmon Creek #4	HUM0274	Occupied Perennial	Yes
Salmon Creek #5	HUM1024	Occupied Perennial	Yes
Salmon Creek East	HUM0923	Occupied Perennial	Yes
Salmon Creek Far East	HUM1025	Occupied Perennial	Yes
Sampson	HUM0306	Vacant	No
SF Ah Pah Creek	HUM0685	Vacant	No
SF Bald Mt. Creek	HUM0293	Occupied Perennial	Yes
Simpson Creek	HUM0213	Unoccupied Perennial	Yes
Snow Camp Creek	HUM0373	Vacant	No
Spring Prairie	HUM1092	Unoccupied Perennial	No
Stevens Creek East	HUM0858	Unoccupied Perennial	No
Stevens Creek SPI	HUM1126	Vacant	No
Stone Lagoon	HUM0743	Unoccupied Perennial	Yes
Substation	HUM0387	Unknown	Yes
Sullivan Gulch	HUM1026	Occupied Perennial	No

Site Name	Master Owl Number	Site Status	Barred Owl Influence
Summit West	HUM0455	Vacant	No
Sunny Slope	HUM1039	Unoccupied Perennial	No
Surpur Creek	HUM0428	Vacant	No
Surpur Mouth	HUM0687	Vacant	No
T-Line	DNT0102	Unoccupied Perennial	No
T300	HUM0427	Unoccupied Perennial	Yes
Tectah Mouth	HUM0461	Occupied Perennial	No
Terwer 200	DNT0139	Vacant	No
Three Cabins	HUM0377	Occupied Perennial	No
Tilley Slide	HUM0273	Occupied Perennial	Yes
Tilley Windy	HUM0398	Unoccupied Perennial	Yes
Tip Top Ridge	HUM1113	Unoccupied Perennial	Yes
Tom Creek	HUM0517	Vacant	No
Toss-Off South	HUM0405	Unoccupied Perennial	Yes
Toss-Up Creek	HUM0406	Unoccupied Perennial	Yes
Tree Farm	HUM0386	Unoccupied Perennial	Yes
Tree Farm North	HUM0668	Occupied Perennial	Yes
Trouble Creek Turwar	DNT0158	Vacant	No
Turwar CF	DNT0160	Unoccupied Perennial	No
Twin Lakes Kinsey	HUM0192	Vacant	No
U10	DNT0101	Vacant	No
U700	DNT0116	Vacant	No
Upper Beach Creek	HUM0476	Vacant	No
Upper Bear Gulch	HUM1088	Vacant	No
Upper Black Dog Creek	HUM1040	Unoccupied Perennial	Yes
Upper Canyon Creek	HUM0665	Unoccupied Perennial	Yes
Upper Devil's Creek	HUM1027	Vacant	No
Upper Little River	HUM0920	Vacant	No
Upper Maple BL	HUM0475	Occupied Perennial	No
Upper Maple Creek	HUM1041	Occupied Perennial	No
Upper Mynot Creek	DNT0153	Unoccupied Perennial	Yes
Upper Noisy Creek	HUM1127	Occupied Perennial	Yes
Upper Noname Creek	HUM0582	Unoccupied Perennial	Yes
Upper Palmer Creek	HUM0671	Unoccupied Perennial	Yes
Upper Pardee	HUM0452	Unoccupied Perennial	No
Upper Ribar	HUM0231	Possible Recolonization	No
Upper Roach Creek	HUM0412	Unoccupied Perennial	Yes
Upper SF Winchuck	DNT0161	Occupied Perennial	Yes
Upper South Fork #1	HUM0748	Vacant	No
Upper South Fork #2	HUM0226	Vacant	No
Upper Stevens Creek	HUM0485	Occupied Perennial	No

Site Name	Master Owl Number	Site Status	Barred Owl Influence
Upper Toss-Off	HUM0791	Occupied Perennial	Yes
Upper Tulley Creek	HUM0414	Vacant	No
Van Cleave South	HUM0824	Unoccupied Perennial	Yes
W. Goodman Prairie	HUM0375	Vacant	No
W100	DNT0104	Unoccupied Perennial	Yes
W302	DNT0072	Unoccupied Perennial	Yes
W400	DNT0105	Vacant	No
Walsh	HUM0237	Occupied Perennial	Yes
Waukell Creek	HUM0460	Unknown	No
Weyerhauser Shop	HUM0426	Vacant	No
Wiggins Pond	HUM0977	Unoccupied Perennial	Yes
Williams Ridge	HUM0283	Unoccupied Perennial	Yes
Winchuck River	DNT0152	Occupied Perennial	Yes
Windy North	HUM0589	Unoccupied Perennial	Yes
Windy Point	HUM0746	Unoccupied Perennial	No
Wiregrass 200	HUM1101	Vacant	No
Wiregrass Ridge	Not Assigned	Occupied Perennial	No
WM1600	HUM0417	Vacant	No
WM200	HUM0413	Vacant	No
WM400	HUM0984	Unoccupied Perennial	Yes
Wood Ranch	HUM1019	Unoccupied Perennial	Yes

\* **Not Assigned** – master owl number not yet issued by CNDDDB spotted owl database manager. Sites in this category were either newly colonized in the current reporting year or possible sites that warrant further investigation in the next reporting year in order to determine the site status.

\*\***Unknown** – site status unknown due to lack of protocol surveys.

Appendix V. Summary of northern spotted owls newly banded, recaptured, or resighted on the Green Diamond Demographic Study Area 2021.

Band Number	Site Name (Capture/Resight Location)	Band Class <sup>1</sup>	Sex	Age <sup>2</sup>	Auxiliary Band Type	Auxiliary Band Primary Color	Auxiliary Band Secondary Color
1177-06899	Upper Noisy Creek	RS	M	A	Dotted	Blue	White
1177-24276	5700	RS	F	A	Bicolor	Black	Yellow
1177-28831	Wiregrass Ridge	RS	F	A	Solid	Red	Red
1177-28838	Maple Creek #2	RS	F	A	Solid	Green	Green
1177-41874	Dry Creek	RS	F	A	Bicolor	Red	Yellow
1177-41878	4230 #1	RS	F	A	Dotted	Green	White
1177-41879	Little River #2	RS	F	A	Bicolor	White	Orange
1177-49401	Floater Lord Ellis Summit	RV	M	A	Diagonal	Blue	Yellow
1177-49466	Mad River STS	RS	F	A	Dotted	Red	White
1177-49480	Sullivan Gulch	RS	F	A	Dotted	White	Red
1177-49505	4128	RS	F	A	Bicolor	Red	Black
1177-49525	Walsh	RS	F	A	Solid	Pink	Pink
1177-49529	Lower Stevens Creek	RS	M	A	Solid	Pink	Pink
1177-49554	4230 #1	RS	M	A	Dotted	White	Black
1177-49563	Camp Bauer	RC	F	A	Triangles	White	Red
1177-49566	C2300	RS	F	A	Dotted	White	Red
1177-49571	Camp Bauer	RS	M	A	Dotted	Yellow	Black
1177-49596	Salmon Creek #5	RS	F	A	Bicolor	Blue	Yellow
1387-98920	Lower Roach	RS	F	A	Triangles	Red	White
1387-98922	Tectah Mouth	RS	F	A	Solid	Yellow	Yellow
1387-98998	McCloud Creek	RS	F	A	Dotted	Pink	White
1687-09303	4851	RS	M	A	Bicolor	Black	Red
1687-09324	Upper Maple Creek	RS	M	A	Bicolor	Pink	White
1687-09331	Canyon North	RV	M	A	Solid	White	White
1687-09346	Boulder Creek #6	RS	M	A	Solid	Red	Red
1687-09353	Devil's Creek	RS	M	A	Solid	Orange	Orange
1687-09371	Tectah Mouth	RC	M	A	Dotted	Pink	White
1687-13905	Cal Barrel Washout	RS	M	A	Bicolor	White	Orange
1687-13914	6007	RS	M	A	Bicolor	Yellow	Black
1687-13918	Mad River STS	RS	M	A	Bicolor	Green	White
1687-13938	Lower Dry Creek	RS	M	A	Bicolor	White	Black
1687-13945	Blue Slide Creek	RS	M	A	Bicolor	White	Yellow
1687-13950	4128	RS	M	A	Bicolor	White	Yellow
1687-13956	Hunter 500	RS	M	A	Bicolor	Yellow	Black
1687-13960	Upper Maple Creek	RS	F	A	Bicolor	White	Green

Band Number	Site Name (Capture/Resight Location)	Band Class <sup>1</sup>	Sex	Age <sup>2</sup>	Auxiliary Band Type	Auxiliary Band Primary Color	Auxiliary Band Secondary Color
1687-13978	Rohner Creek	RS	M	A	Dotted	White	Red
1687-13979	Jackson Hill	RS	M	A	Bicolor	White	Yellow
1687-13984	Boulder Creek #4	RC	M	A	Triangles	Yellow	Black
1687-13988	Winchuck River	RS	M	A	Solid	Red	Red
1687-13991	6610	RS	M	A	Solid	Blue	Blue
1687-13999	4300	RS	M	A	Solid	Pink	Pink
1687-14014	Lower Simpson	RS	M	A	Dotted	Yellow	Black
1687-14021	Little Salmon North	RS	M	A	Diagonal	Pink	White
1687-14023	5700	RC	M	A	Diagonal	Blue	White
1687-14027	Powerline North	RS	M	A	Diagonal	Pink	White
1687-14030	Liscom Hill	RS	M	A	Bicolor	White	Green
1687-14053	C2300	RS	M	A	Diagonal	Green	White
1687-14054	Bear Creek	RS	M	A	Triangles	Green	White
1687-14056	Little Salmon North	RS	M	A	Dotted	Blue	White
1687-14057	Wiregrass Ridge	RS	M	A	Triangles	Pink	White
1687-14058	Upper Toss-Off	RS	M	A	Triangles	Black	White
1687-14061	SF Bald Mt. Creek	NB	F	A	Dotted	White	Blue
1687-14074	Freeman	NB	U	J	Cohort	Blue	White
1687-14075	Sullivan Gulch	NB	M	A	Bicolor	Yellow	Red
1687-14089	Korbel Mill	RS	M	A	Bicolor	Red	White
1687-14093	Gilbert Creek	RS	M	A	Bicolor	Black	Yellow
1687-14094	Dry Creek	RS	M	A	Diagonal	Red	White
1687-14095	Cal Barrel	NB	M	A	Bicolor	Black	Yellow
1687-14097	Upper Stevens Creek	RS	M	A	Dotted	White	Black
1807-68229	Boundary Creek	RS	M	A	Dotted	Green	White
1807-68345	Quarry Creek	RS	M	A	Triangles	Yellow	Black
1807-90609	Salmon Creek #5	RS	M	A	Solid	Orange	Orange
1947-54780	6610	NB	U	J	Cohort	Blue	White
1947-54782	Freeman	NB	U	J	Cohort	Blue	White
1947-55102	Upper Toss-Off	NB	F	A	Dotted	Red	White
1947-55141	6610	NB	U	J	Cohort	Blue	White
1947-55143	Tree Farm North	NB	M	S1	Solid	White	White
1947-55196	Cuddeback	NB	M	A	Solid	Pink	Pink
1947-55197	Tectah Mouth	NB	U	J	Cohort	Blue	White
1947-55198	4300	NB	U	J	Cohort	Blue	White
1947-55199	Middle Stevens Creek	NB	M	A	Triangles	Yellow	Black
1957-00106	Hunter 500	RS	F	A	Dotted	Red	White
1957-00107	Three Cabins	RS	M	A	Diagonal	Blue	White

Band Number	Site Name (Capture/Resight Location)	Band Class <sup>1</sup>	Sex	Age <sup>2</sup>	Auxiliary Band Type	Auxiliary Band Primary Color	Auxiliary Band Secondary Color
1957-00133	Bear Creek	RS	F	A	Bicolor	Blue	White
1957-00141	Upper Noisy Creek	RS	F	A	Bicolor	Red	White
1957-00150	Salmon Creek #2	RS	F	A	Bicolor	Red	Black
1957-00161	Boundary Creek	RS	F	A	Diagonal	Purple	White
1957-00162	Salmon Creek #3	RS	F	A	Solid	Blue	Blue
1957-00163	4300	RS	F	A	Triangles	Red	White
1957-00166	Winchuck River	RS	F	A	Bicolor	Yellow	White
1957-00169	Korbel Mill	RS	F	A	Diagonal	Pink	White
1957-00172	Jackson Hill	RS	F	A	Triangles	Pink	White
1957-00195	4851	RS	F	A	Triangles	Red	White
1957-00209	Lower Dry Creek	NB	F	S2	Diagonal	Yellow	Black
1957-00216	Boulder Creek #4	RS	F	A	Dotted	Green	White
1957-00217	6007	RS	F	A	Diagonal	Blue	White
1957-00224	Boulder Creek #6	RS	F	A	Bicolor	White	Pink
1957-00227	Freeman	RS	F	A	Dotted	Pink	White
1957-00228	Liscom Hill	RS	F	A	Diagonal	Red	Black
1957-00231	Lower Simpson	RS	F	A	Solid	Blue	Blue
1957-00247	Blue Slide Creek	RS	F	A	Bicolor	Red	Black
1957-00250	EBF	RS	F	A	Dotted	Red	White
1957-00252	Cal Barrel	RS	F	A	Diagonal	Red	White
1957-00253	Cal Barrel Washout	RS	F	A	Dotted	Red	Black
1957-00256	Old 299 #1	RS	F	A	Bicolor	White	Red
1957-00258	SF Bald Mt. Creek	NB	M	A	Triangles	Black	White
1957-00259	Devil's Creek	NB	F	S1	Bicolor	Black	White
1957-00281	Old 299 #1	RS	M	A	Triangles	Green	White
1957-00295	Canyon Creek #1	RS	F	A	Diagonal	Red	Yellow
1957-18596	Salmon Creek Far East	RS	F	A	Bicolor	White	Blue
2187-14973	Fickle Jacoby	NB	F	A	Solid	Pink	Pink
2187-14974	Rohner Creek	NB	F	A	Bicolor	Yellow	Blue
2187-14975	Upper Stevens Creek	NB	F	A	Dotted	Blue	White
2187-14976	Gilbert Creek	NB	F	A	Dotted	Green	White
2187-14977	Cal Barrel	NB	U	J	Cohort	Blue	White
2187-14986	6007	NB	U	J	Cohort	Blue	White
2187-14997	4300	NB	U	J	Cohort	Blue	White
2187-14998	4128	NB	U	J	Cohort	Blue	White
2187-15002	Tree Farm North	NB	F	S2	Bicolor	Blue	Yellow
2187-15003	Cuddeback	NB	F	A	Diagonal	Blue	White
2187-15004	Salmon Creek #5	NB	U	J	Cohort	Blue	White

<b>Band Number</b>	<b>Site Name (Capture/Resight Location)</b>	<b>Band Class<sup>1</sup></b>	<b>Sex</b>	<b>Age<sup>2</sup></b>	<b>Auxiliary Band Type</b>	<b>Auxiliary Band Primary Color</b>	<b>Auxiliary Band Secondary Color</b>
2187-15005	Gilbert Creek	NB	U	J	Cohort	Blue	White
2187-15100	Humbug Creek	NB	F	A	Bicolor	Yellow	Red

<sup>1</sup>Band Class explanation: RS = Resight, RC = Recapture, and NB = Newly Banded, RV = Recovered

<sup>2</sup>Age explanation: J = juvenile (hatch year), S1 – first-year subadult, S2 = second-year subadult, A = adult

## Appendix VI. Inspection dates for all water tanks located within the Plan Area in 2021.

<b>Tank ID</b>	<b>Tank Name</b>	<b>Inspection Date</b>
1	7010	9/20/2021
2	2000 Drafting	9/9/2021
3	5000/Dry Creek	9/20/2021
4	U10 Terwar Creek Drafting	9/08/2021
5	BL1100	9/09/2021
6	BL2000	9/09/2021
7	BL3900	9/22/2021
8	C900	9/07/2021
9	Chaparrel	9/20/2021
10	CL South	10/04/2021
11	CR1300 Drafting	9/09/2021
12	CR2700 Drafting	9/09/2021
13	CR2900	9/09/2021
14	CR3000	9/09/2021
15	Crannell Well	9/22/2021
16	D1000/W1000	9/21/2021
17	D111/Ritmer Creek	9/21/2021
18	Fernwood	9/07/2021
19	Graham Creek Lower	9/27/2021
20	HC120	9/13/2021
21	HC130	9/13/2021
22	HC132	9/13/2021
23	J1100	9/28/2021
24	K&K 900	9/07/2021
25	K&K LR	9/07/2021
26	K&K North	9/28/2021
27	Little Boulder Creek	9/20/2021
28	Miller's Road	9/16/2021
29	Noisy Creek	9/13/2021
30	Old-299	9/09/2021
31	R120	10/06/2021
32	R2000	9/21/2021
33	R4	9/08/2021
34	Ravine Creek	9/21/2021
35	Ribar	9/21/2021
36	Roddiscraft	9/20/2021
37	Snow Camp Powerline	9/27/2021

<b>Tank ID</b>	<b>Tank Name</b>	<b>Inspection Date</b>
38	T100 Bridge	8/09/2021
39	Teepo Ridge	9/20/2021
40	Twin Tanks	9/27/2021
41	U100 Dandy Creek	9/20/2021
42	W2300	9/21/2021
43	Washington Gulch Drafting	9/09/2021
44	Wiregrass East	9/22/2021
45	Wiregrass West	9/13/2021
46	WM10	9/07/2021
47	WM200	9/28/2021
48	WM710	9/07/2021
49	4100	2/18/2021
50	A400 Bridge Drafting	8/09/2021
51	Arrow Mills Historic Mill	8/17/2021
52	BH1900	9/07/2021
53	BL2011	9/22/2021
54	CP2000	9/13/2021
55	D1000 Culvert Yard	9/21/2021
56	DV2400	9/09/2021
57	H400	9/28/2021
58	HC1000	11/02/2021
59	Klamath Mill	9/08/2021
60	Morgan Creek	8/25/2021
61	NF1000	9/28/2021
62	SA800	9/13/2021
63	S-Line	8/13/2021
64	Sproul East*	9/14/2021
65	Sproul West*	9/14/2021
66	T150	9/08/2021

\*Denotes tanks inspected but not located within the FHCP Plan Area, and therefore not included in the report summaries.