LANDOWNER COOPERATIVE AGREEMENT FOR THE MILLER TREE FARM NTMP UNDER THE BLENCOWE PROGRAMMATIC SAFE HARBOR AGREEMENT, MENDOCINO COUNTY CALIFORNIA

This is a voluntary agreement that recognizes the unique and important role that private landowners in California can play in helping wildlife valued by the people of the State and of the nation. The purpose of the Agreement is to enable land management activities beneficial to northern spotted owl to be carried out on privately owned land while minimizing the impact of such activities on the right and ability of the owner or manager thereof to use it as he or she wishes. The terms of the agreement are as follows:

1. INVOLVED PARTIES

This Cooperative Agreement, between Registered Professional Foresters Craig Blencowe and Christopher Blencowe, and Miller Baker LP (Cooperator), is intended to promote good land stewardship by assisting the Cooperator in carrying out actions to benefit northern spotted owl (*Strix occidentalis caurina*) on land owned by the Cooperator. Participation in this Cooperative Agreement is a prerequisite for obtaining a Certificate of Inclusion [reference attachment to this Cooperative Agreement] from the Service as part of the agreement between the Service and Craig and Christopher Blencowe titled, *Programmatic Safe Harbor Agreement with Craig Blencowe and Christopher Blencowe for Northern Spotted Owl, Mendocino County, California* (Blencowe SHA).

Safe Harbor Agreements do not release landowners from the responsibility to avoid taking any listed species that already occupy portions of the property.

2. ENROLLED PROPERTY

The Cooperator owns the property, known as the Miller Tree Farm, a 1,849-acre property located in Sections 2, 3, 4, 5, 9, 10, and 11, Township 20 North, Range 17 West; and Sections 34 and 35, Township 21 North, Range 17 West, M.D.B. & M., in Mendocino County, California. Timber management activities for the property are described in the Miller Tree Farm Non-industrial Timber Management Plan (NTMP), 1-92NTMP-001 MEN. The property contains habitat that is used by northern spotted owl. The Service will enroll 1,849 acres of this property under the Agreement, as shown on the attached property map (Figure 1). No other federally-listed species of plants or animals are known to occur on the property, and no incidental take of species other than northern spotted owl is authorized or permitted under this Cooperative Agreement.

3. BASELINE RESPONSIBILITIES

The baseline for this property is set at 1,849 acres of forested habitat suitable for nesting, foraging and sheltering by northern spotted owls (reference map is attached to this Landowner Cooperative Agreement; see Figure 1). Specifically, based primarily on tree size, basal area and canopy cover, the entire 1,849-acre property has been categorized as northern spotted owl nesting/roosting habitat. A summary of the stand inventory data for each management unit is included in Appendix A outlining the basal area for conifers and hardwoods, percentage of species, and volume and percentage of tree size classes.

There are two historical NSO territories associated with the Miller Tree Farm NTMP, MEN0112 and MEN0482. There is no known location for a nest tree associated with MEN0112 on the Miller Tree Farm property, as of the start of this Agreement. The nest tree and activity center for territory MEN0112 is located at the following geographic location (in decimal degrees, NAD83): 39.61971 latitude, -123.718793 longitude, approximately 150 feet south of the Miller Tree Farm property boundary.

There are three nest trees associated with territory MEN0482 at the start of the permit term for the Miller Tree Farm SHA (Table 1, Figure 1).

Table 1. Nest trees associated with northern spotted owl territory MEN0482 and the Miller Tree Farm NTMP and SHA.

MEN0482 Nest Tree	**Brief Description**	**Geographic location (decimal degrees, NAD83)**
Nest Tree #1	discovered in 1997, located on the Miller Tree Farm property	39.622825 latitude, -123.767177 longitude
Nest Tree #2	discovered in 2003 and located on the Miller Tree Farm property	39.619660 latitude, -123.762124 longitude
Nest Tree #3	discovered in 1997 and located off the Miller Tree Farm property, approximately100 feet south of the property boundary	39.621892 latitude, -123.767142 longitude

Nest trees #1 and #2 for MEN0482, which occur on the Miller Tree Farm property, will be considered as part of the Blencowe SHA baseline. Since the aforementioned nest tree for MEN0112, and nest tree #3 for MEN0482 do not occur within the boundaries of the Miller Tree Farm property, the trees themselves will not be considered part of the Blencowe SHA. However, in coast redwood forests, suitable northern spotted owl nests typically occur in older, larger trees, and/or trees with defects such as cavities, or platforms formed by mistletoe infections. Trees with these characteristics have been observed in stands that contain trees as young as 40 years old. Therefore, any northern spotted owl nest tree(s) found on the Miller Tree Farm property subsequent to the issuance of the permit for the Blencowe SHA will be considered to be suitable (but not known) nest trees at the start of the Blencowe SHA permit term and will be considered part of baseline retroactively. Any northern spotted owl nest tree(s) found off the Miller Tree Farm property that are associated with northern spotted owl territories with activity on the Miller Tree Farm property subsequent to the issuance of the permit for the Blencowe SHA will not be considered part of baseline retroactively.

“Force majeure” events such as severe storms, severe drought, fires, or insect/disease epidemics are beyond the reasonable control of the Cooperator. Such events could either extirpate northern spotted owl from enrolled lands or render northern spotted owl habitat on enrolled lands unsuitable for continued occupation. These events may reduce northern spotted owl numbers or habitat below original baseline conditions through no fault of or negligence of the Cooperator. In

such circumstances, the Cooperator, the Permittee or Registered Professional Forester (RPF) holding the permit, the Service, and the California Department of Fish and Wildlife (since northern spotted owl is also State-listed) may agree to coordinate and revise the Cooperative Agreement's baseline conditions to reflect the new circumstances.

4. CONSERVATION MEASURES

The Miller Tree Farm NTMP (1-92NTMP-001 MEN) describes in detail, and this document summarizes timber management techniques to be implemented on the Miller Tree Farm property that will serve as the conservation measures for northern spotted owl and are expected to benefit the species.

4.1 Habitat Retention

In general, the management goals will improve functionality of northern spotted owl habitat by: 1) increasing the average quadratic mean diameter (QMD) of the conifer trees on the Property after each harvest entry until Maximum Sustained Production (MSP) is attained, at which time QMD shall be maintained and not decrease; 2) retaining a greater average post-harvest basal area (square feet per acre) for trees greater than 12 inches diameter at breast height (dbh) as compared to the post-harvest basal area for trees of these dimensions from the previous harvest entry. This will be accomplished until the MSP is attained, at which time basal area shall be maintained and not decrease; 3) increasing the average number of legacy trees on the property with a minimum of one legacy tree per acre, including trees with basal hollows, broken tops, complex crowns, large limbs, epicormic branching, furrowed and loose bark, fire scarring, cavities, bole deformities, defects, and/or mistletoe infections, and the surrounding habitat; and 4) retaining downed cull logs and snags. The proposed harvest schedules for the 12 management units on the Miller Tree Farm are described in Appendix A of this document. To prioritize the identification and retention of decadent trees with characteristics most suitable for northern spotted owls, an example of a wildlife tree retention strategy is included in Appendix B with metrics for evaluating decadent trees with characteristics optimal for wildlife.

In addition, timber management on the Miller Tree Farm property will adhere to the following conditions:

- No-cut buffer of 500 feet around the active activity center (i.e., highest-ranking site-use detection [e.g. nest, then daytime pair, then daytime single, etc.]) during a particular timber harvest entry.

- From 500 feet to 1000 feet from the active activity center, no more than 25% of the standing volume shall be harvested in any one entry.

- To provide insulation to nesting owls, a multi-storied canopy will be retained to serve as protection for northern spotted owls against storms and predators. To ensure a multi-storied canopy, from 500 feet to 1000 feet,, timber harvest shall be limited within each tree size class as follows:

12-16 inch dbh	No more than 20% of the volume
18-24 inch dbh	No more than 25% of the volume
26-34 inch dbh	No more than 25% of the volume
36 inch + dbh	No more than 30% of the volume

- Nesting and roosting habitat will remain as nesting and roosting habitat before and after harvest
- No openings shall be created larger than ½ acre
- The only silviculture shall be single-tree selection
- No operations within 0.25-mile of a Safe Harbor Activity Center until after 15 July

The following late seral features will be retained to provide potential NSO nesting structure:

- All legacy (i.e., old growth) trees
- All 90 to 100-year-old Douglas-fir with more than 50% conk
- All green culls, regardless of species or size
- All trees with broken tops, complex crowns, large limbs and other nesting platforms, deformities, and/or cavities
- All snags, where worker safety is not a concern
- The large tree diameter class (i.e., 36 inch + dbh) will be managed to continually comprise at least 15% of the stand volume.

4.2 Northern Spotted Owl Activity Center Protection

Northern spotted owl habitat will be protected on the Enrolled Lands through the establishment of three protection areas or zones around each Safe Harbor Activity Center, as described below.

(1) *Nest Protection Area*. A Nest Protection Area will be established around each Safe Harbor Activity Center that includes all forested areas within 500 feet and contiguous to the Safe Harbor Activity Center. The Nest Protection Area may not be entirely circular (but will comprise 18 acres) and may be adjusted slightly (through coordination between the RPF and the Service) to account for topographical habitat features ("topographic nest protection area"). Allowable timber harvest activities are described in Table 2.

Table 2. Activity center protection areas for the Miller Tree Farm NTMP under the Blencowe Programmatic Safe Harbor Agreement.

Protection Area	**Distance (in feet) around Activity Center**	**Allowable Silviculture Activities**

Nest Protection Area[1]	500	No timber harvest or yarding.
Roost Protection Area[1]	501 to 1,000	Single-tree selection only, which does not reduce the pre-harvest canopy closure of trees at least 12 inches DBH below 60%. Trees slated for harvest will be felled in a direction away from the Nest Protection Area, to the extent practicable. No more than 30% of the standing volume shall be harvested in any one entry, and trees of each tree class size will be retained (see section 4.1).
Support Habitat Area[1]	greater than 1,000	Single-tree selection and/or group selection.
Screen Tree Protection Area[2]	100	No timber harvest or yarding.
Screen Tree Support Area[2]	101 to 1,000	Single-tree selection only. No more than 30% of the standing volume shall be harvested in any one entry, and trees of each tree class size will be retained (see section 4.1).

Footnotes –[1] – active nest tree; [2] – inactive nest tree (defined as a previously-used nest tree determined [through coordination between RPF, Service and CDFW] not to be occupied by northern spotted owls during a particular timber harvest entry, likely because of concurrent use by northern spotted owls of another nearby nest tree).

(2) *Roost Protection Area*. Includes all forested areas on the Enrolled Lands between 501 feet and 1,000 feet from each Safe Harbor Activity Center. Geometrically, a ring between 501 and 1,000 feet of a radius would comprise approximately 54 acres. However, based on the geographic location of each Safe Harbor Activity Center (as of 2016), 54 acres of Roost Protection Area may or may not occur entirely on the Enrolled Lands. The Roost Protection Area may not be entirely circular and may be adjusted slightly (through coordination between the RPF and the Service) to account for topographical habitat features ("topographic roost protection area"). Allowable timber harvest activities are described in Table 2.

(3) *Support Habitat Area.* Includes all forested areas on the Enrolled Lands greater than 1,000 feet from each Safe Harbor Activity Center. Allowable timber harvest activities are described in Table 2.

During the permit term, if northern spotted owls are determined to be nesting within the Enrolled Lands at a location greater than 500 feet from the geographic location of each Safe Harbor Activity Center (location at the start of permit term), habitat at the new nesting location will be protected through the establishment of the three protection areas described in items 1 through 3 above. The three protection areas described above do not apply to the previous nesting location, which will instead receive the following protection measures:

(4) *Screen Tree Protection Area.* A Screen Tree Protection Area will be established around the inactive nest tree that includes all forested areas within 100 feet of and contiguous to the nest tree. Implementation of protection measures around the inactive original nest tree will run concurrently with implementation of protection measures around the new nest tree. Allowable timber harvest activities are described in Table 2.

(5) *Screen Tree Support Area.* Includes all forested areas on the Enrolled Lands between 101 feet and 1,000 feet from each inactive Safe Harbor Activity Center. Allowable timber harvest activities are described in Table 2.

Establishment of Roost Protection and Support Habitat areas around an inactive nest tree may not be necessary due to the establishment of protection areas established around the new nest tree. Only uneven-aged forestry practices will occur outside the Screen Tree Core Area. However, the Service and RPF will coordinate to evaluate additional necessary protection measures around an inactive nest tree. In addition, the re-designation of the status of any activity center will be determined through prior coordination between the RPF and the Service.

4.3 Northern Spotted Owl Surveys

Northern spotted owl surveys and monitoring will be conducted as follows:

1) Surveys will adhere to current Service northern spotted owl survey protocol and will commence no later than 2 years prior to proposed timber harvest operations within the NTMP;

2) For any year when timber harvest activities are proposed to occur within the NTMP, survey data will be provided (electronic mail is acceptable) to the appropriate AFWO biologist and CDFW Spotted Owl Observation Database at the end of each survey season and a minimum 15 days prior to the start of operations;

3) For any year when timber harvest operations are not proposed to occur in the NTMP, surveys may occur but are not required, and information regarding whether surveys were conducted or not (including survey results, if surveys were conducted) will be provided (electronic mail is acceptable) to the appropriate AFWO biologist and to the CDFW Spotted Owl Observation Database by 31 July;

4) Survey information from adjacent landowners may be used in conjunction with survey information from the NTMP.

5. RESPONSIBILITIES OF THE PARTIES

The Cooperator and the Permittee or RPF agree to carry out certain responsibilities under this Cooperative Agreement. The Cooperator understands that in order to fulfill the responsibilities of the Safe Harbor Agreement, the Permittee or RPF must report to the Service all implementation and monitoring activities related to northern spotted owl management in accordance with the Safe Harbor Agreement. Responsibilities of the Parties (Permittee and Service) are described in detail in section 7 of the Blencowe SHA.

6. AGREEMENT DURATION

Obligations under this Cooperative Agreement will be in effect from the date the Cooperative Agreement is executed until the permit term (45-year permit term) and the Blencowe Programmatic SHA (40-year term) expires. Upon signing the Cooperative Agreement, the Permittee or RPF will issue a Certificate of Inclusion to the Cooperator under the Federal Permit [permit reference number] the Permittee holds, authorizing the incidental take of northern spotted owl on the Enrolled Lands.

7. INCIDENTAL TAKE

The Service's responsibilities include administering the Endangered Species Act of 1973, as amended (Act). Section 3(19) of the Act defines take to mean harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Incidental take is defined as take that is incidental to, but not the purpose of, carrying out an otherwise lawful activity. "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. "Harass" is further defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns including, but not limited to, breeding, feeding, or sheltering. Incidental take is any take of federally listed wildlife or State listed wildlife and plants that is incidental to, but not the purpose of, otherwise lawful activities.

Under the terms of this Cooperative Agreement, the Cooperator is authorized to make use of his/her Enrolled Property in any manner that does not result in reducing the population and/or occupied habitat of northern spotted owl below the established baseline conditions, as described in section 10 of the Blencowe Safe Harbor Agreement.

8. TERMS AND CONDITIONS

This Cooperative Agreement is subject to all the terms and conditions described in the *Programmatic Safe Harbor Agreement with Craig Blencowe and Christopher Blencowe for Northern Spotted Owl, Mendocino County, California*.

8.1 Termination of the Cooperative Agreement

As provided for in Part 12 of the Service's Safe Harbor Policy (64 FR 32717), Cooperators may terminate implementation of their Cooperative Agreements before their expiration date for circumstances beyond the Cooperator's control. In such instances, Cooperators will provide 90 calendar days prior written notice to the Permittee, who will notify the Service. In such circumstances, the Cooperator may return the Enrolled Property to baseline conditions even if the expected net conservation benefit has not been realized, provided that baseline conditions have been maintained and as long as agreed upon conservation measures were implemented. Cooperators must provide the Permittee the opportunity to locate northern spotted owl(s), possibly with the assistance of the Service, within 60 calendar days of receiving that notice. The Cooperator also may terminate his/her Cooperative Agreement at any time for any other reason, but termination for reasons other than uncontrollable circumstances shall terminate the Cooperator's permission to take northern spotted owl, and the Cooperator must relinquish his/her Certificate of Inclusion to the Permittee.

8.2 Certificate of Inclusion Suspension or Revocation

The Service or Permittee may suspend or revoke a Cooperator's Certificate of Inclusion if a Cooperator has breached his/her obligations under a Cooperative Agreement and has failed to cure the breach in a timely manner. This effect of the breach will diminish the likelihood that the Cooperative Agreement will achieve its goals.

8.3 Succession and Transfer

The rights and obligations under this Cooperative Agreement shall run with the ownership of the Enrolled Property and are transferable to subsequent private property owners pursuant to 50 CFR 13.25. The Certificate of Inclusion issued to the Cooperator will be extended to the new owner. By becoming a party to the original Cooperative Agreement and permit, the new owner will have the same rights and obligations with respect to the Enrolled Property as the original owner at the original baseline. The Cooperator shall notify the Permittee of any transfer of ownership at least 90 calendar days prior to the intended transfer, so that the Permittee can attempt to contact the new owner, explain the baseline conditions and management responsibilities applicable to the property, and seek to interest the new owner in signing the existing Cooperative Agreement or a new one to benefit northern spotted owl on the property.

8.4 Remedies

Each party shall have all remedies otherwise available to enforce the terms of the Cooperative Agreement and the Certificate of Inclusion, except that no party shall be liable in damages for any breach of this Agreement, any performance or failure to perform an obligation under this Cooperative Agreement or any other cause of action arising from this Cooperative Agreement.

9. NOTIFICATION

Communication and correspondence required by this Cooperative Agreement should be directed to the addresses below. Names and addresses may be changed upon written notice to all Parties.

Miller Baker LP
26221 Omar Dr.
Fort Bragg, California 95437

Craig Blencowe, Registered Professional Forester (#2003)
2339 Mill Creek Lane
Healdsburg, California 95448

Christopher Blencowe
Registered Professional Forester (#2905)
32001 O'Bayley Drive
Fort Bragg, California 95437

IN WITNESS WHEREOF, each party hereto has caused this Cooperative Agreement to be executed by an authorized official on the day and year set forth opposite their signature.

COOPERATOR

By: _____

Date: _____

CRAIG BLENCOWE

By: _____

Date: _____

Registered Professional Forester (#2003)

CHRISTOPHER BLENCOWE

By: _____

Date: _____

Registered Professional Forester (#2905)

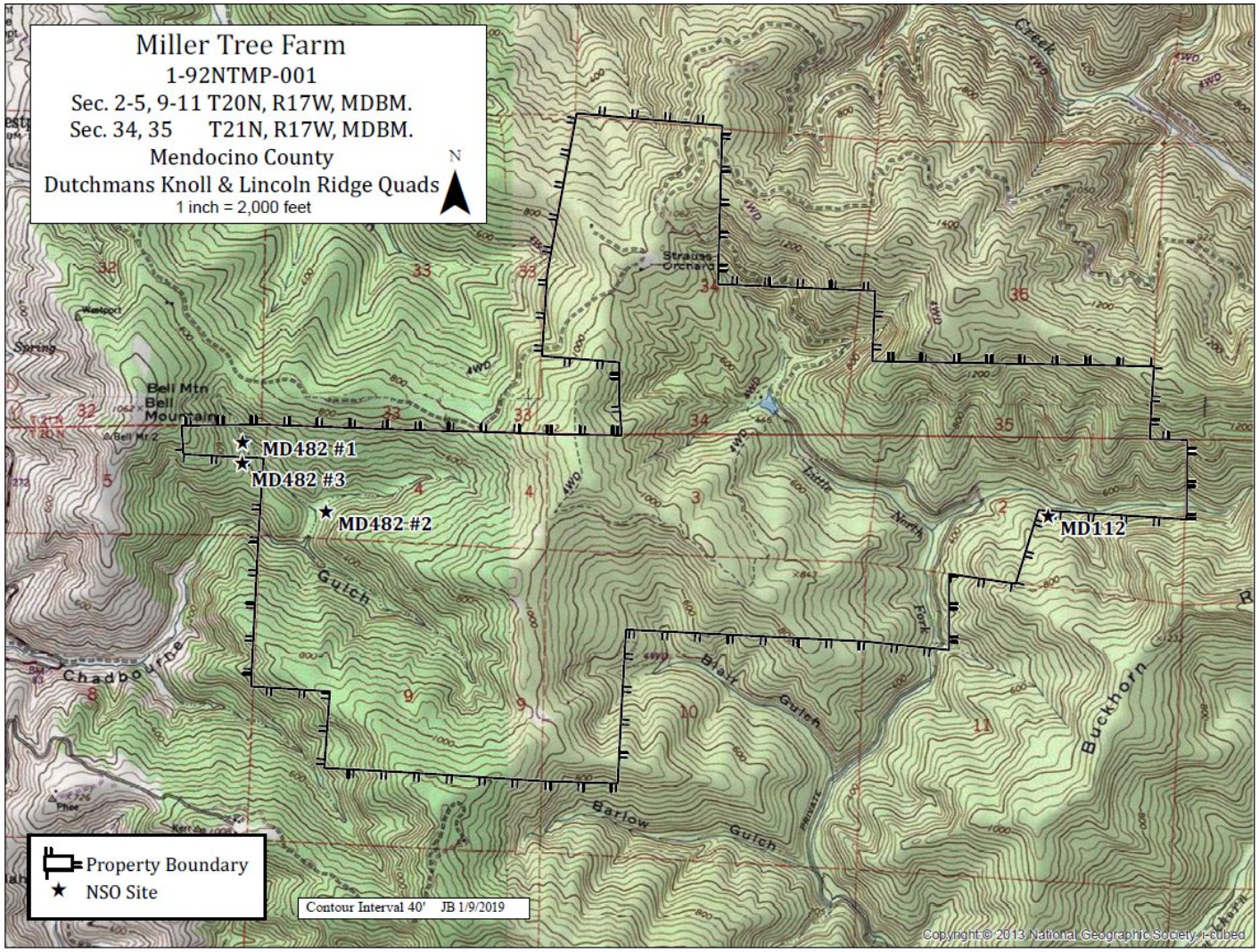

Figure 1. Map of Miller Tree Farm NTMP (1-92NTMP-001 MEN) and activity centers associated with northern spotted owl territories MEN0112 and MEN0482, Mendocino County, California.

Appendix A. Proposed harvest schedule and stand inventory data for the 12 management units within the Miller Tree Farm NTMP (1-92NTMP-001 MEN), Mendocino County, California.

Unit 1---Osprey---229 acres

Unit 1—Potential Harvest Schedule--- (Volume in net board feet Scribner log scale)

Year	Pre-harvest Volume	Harvest Volume	Post-harvest Volume	Growth next 10-year period Volume	Growth Annual Percent
2014	7,068,000	0	7,068,000	198,000	2.8
2015	7,266,000	1,600,000	5,666,000	1,972,000	2.9
2027	7,638,000	1,745,000	5,893,000	1,768,000	3.0
2039	8,014,000	2,122,000	SUSTAINED		

Note: Totals are rounded

		Unit 1 Volume by Species and Diameter Class				
		12-16"	**18-24"**	**26-34"**	**36"+**	**Total**
redwood		462	1,750	2,224	865	5,301
Douglas-fir		77	275	260	95	707
grand fir/hemlock		110	390	410	150	1,060
Total		649	2,415	2,894	1,110	7,068

Basal Area:
Conifers 195 sq. ft.
Hardwoods 53 sq. ft.

Unit 2---Chadbourne---136 acres

Unit 2—Potential Harvest Schedule--- (Volume in net board feet Scribner log scale)					
Year	Pre-harvest Volume	Harvest Volume	Post-harvest Volume	Growth next 10-year period Volume	Growth Annual Percent
2014	3,853,000	0	3,853,000	539,000	2.8
2019	4,392,000	1,000,000	3,392,000	1,181,000	2.9
2031	4,573,000	1,073,000	3,500,000	1,050,000	3.0
2043	4,760,000	1,260,000	SUSTAINED		
Note: Totals are rounded					

		Unit 2 Volume by Species and Diameter Class				
		12-16"	**18-24"**	**26-34"**	**36"+**	**Total**
redwood		159	445	938	1,040	2,582
Douglas-fir		89	135	297	173	694
grand fir/hemlock		62	230	258	28	578
Total		309	810	1,493	1,241	3,853

Basal Area:
Conifers 173 sq. ft.
Hardwoods 86 sq. ft.

Unit 3---Joan Gulch---160 acres

Unit 3—Potential Harvest Schedule--- (Volume in net board feet Scribner log scale)					
Year	Pre-harvest Volume	Harvest Volume	Post-harvest Volume	Growth next 10-year period Volume	Growth Annual Percent
2014	5,628,000	0	5,628,000	315,000	2.8
2016	5,943,000	1,508,000	4,435,000	1,543,000	2.9
2028	5,979,000	1,861,000	4,118,000	1,235,000	3.0
2040	5,600,000	1,482,000	SUSTAINED		
Note: Totals are rounded					

		Unit 3 Volume by Species and Diameter Class				
		12-16"	**18-24"**	**26-34"**	**36"+**	**Total**
redwood		305	902	1,645	1,200	4,052
Douglas-fir		67	278	315	240	900
grand fir/hemlock		159	230	258	28	675
Total		532	1,410	2,218	1,468	5,628

Basal Area:
Conifers 208 sq. ft.
Hardwoods 41 sq. ft.

Unit 4---Strauss Orchard---246 acres

Unit 4—Potential Harvest Schedule--- (Volume in net board feet Scribner log scale)					
Year	Pre-harvest Volume	Harvest Volume	Post-harvest Volume	Growth next 10-year period Volume	Growth Annual Percent
2014	7,501,000	0	7,501,000	630,000	2.8
2017	8,131,000	1,900,000	6,231,000	2,168,000	2.9
2029	8,400,000	2,069,000	6,331,000	2,279,000	3.0
2041	8,609,000	2,279,000	SUSTAINED		
Note: Totals are rounded					

		Unit 4 Volume by Species and Diameter Class				
		12-16"	**18-24"**	**26-34"**	**36"+**	**Total**
redwood		418	1,500	2,308	650	4,876
Douglas-fir		425	625	580	170	1,800
grand fir/hemlock		202	365	220	38	825
Total		1,045	2,490	3,108	858	7,501

Basal Area:
Conifers 201 sq. ft.
Hardwoods 68 sq. ft

Unit 5---Old Man Shack---54 acres

Unit 5—Potential Harvest Schedule--- (Volume in net board feet Scribner log scale)					
Year	Pre-harvest Volume	Harvest Volume	Post-harvest Volume	Growth next 10-year period Volume	Growth Annual Percent
2014	1,352,000	0	1,352,000	189,000	3.5
2018	1,541,000	300,000	1,241,000	492,000	3.3
2030	1,733,000	343,000	1,390,000	500,000	3.0
2042	1,890,000	500,000	SUSTAINED		
Note: Totals are rounded					

		Unit 5 Volume by Species and Diameter Class					
		12-16"	**18-24"**	**26-34"**	**36"+**	**Total**	
redwood		106	135	145	155	541	
Douglas-fir		182	255	185	27	649	
grand fir/hemlock		63	65	15	19	162	
Total		351	455	345	201	1,352	

Basal Area:
Conifers 191 sq. ft.
Hardwoods 55sq. ft.

Unit 6---Five Points---139 acres

Unit 6—Potential Harvest Schedule--- (Volume in net board feet Scribner log scale)					
Year	Pre-harvest Volume	Harvest Volume	Post-harvest Volume	Growth next 10-year period Volume	Growth Annual Percent
2014	4,687,000	0	4,687,000	731,000	2.6
2020	5,418,000	1,500,000	3,918,000	1,317,000	2.8
2032	5,235,000	1,658,000	3,577,000	1,288,000	3.0
2044	4,864,000	1,288,000	SUSTAINED		
Note: Totals are rounded					

		Unit 6 Volume by Species and Diameter Class					
		12-16"	**18-24"**	**26-34"**	**36"+**	**Total**	
redwood		259	1,450	1,650	578	3,937	
Douglas-fir		88	171	225	125	609	
grand fir/hemlock		31	28	70	12	141	
Total		378	1,649	1,945	715	4,687	

Basal Area:
Conifers 226 sq. ft.
Hardwoods 103 sq. ft.

Unit 7---72 Landing---95 acres

Unit 7—Potential Harvest Schedule--- (Volume in net board feet Scribner log scale)					
Year	Pre-harvest Volume	Harvest Volume	Post-harvest Volume	Growth next 10-year period Volume	Growth Annual Percent
2014	3,406,000	0	3,406,000	620,000	2.6
2021	4,026,000	1,200,000	2,826,000	949,000	2.8
2033	3,775,000	1,331,000	2,444,000	880,000	3.0
2045	3,324,000	880,000	SUSTAINED		
Note: Totals are rounded					

		Unit 7 Volume by Species and Diameter Class					
		12-16"	**18-24"**	**26-34"**	**36"+**	**Total**	
redwood		287	525	734	395	1,941	
Douglas-fir		101	445	534	112	1,192	
grand fir/hemlock		37	135	85	15	272	
Total		426	1,105	1,353	522	3,406	

Basal Area:
Conifers 211 sq. ft.
Hardwoods 61 sq. ft.

Unit 8---Wolf Tree---155 acres

Unit 8—Potential Harvest Schedule--- (Volume in net board feet Scribner log scale)					
Year	Pre-harvest Volume	Harvest Volume	Post-harvest Volume	Growth next 10-year period Volume	Growth Annual Percent
2014	5,022,000	0	5,022,000	1,045,000	2.6
2022	6,067,000	1,600,000	4,467,000	1,501,000	2.8
2034	5,967,000	1,978,000	3,989,000	1,436,000	3.0
2046	5,426,000	1,436,000	SUSTAINED		
Note Totals are rounded					

		Unit 8 Volume by Species and Diameter Class					
		12-16"	**18-24"**	**26-34"**	**36"+**	**Total**	
redwood		376	805	745	485	2,411	
Douglas-fir		238	675	820	75	1,808	
grand fir/hemlock		188	315	225	76	804	
Total		801	1,795	1,790	636	5,022	

Basal Area:
Conifers 190 sq. ft.
Hardwoods 39 sq. ft.

Unit 9---Lost Acres---78 acres

Unit 9—Potential Harvest Schedule--- (Volume in net board feet Scribner log scale)

Year	Pre-harvest Volume	Harvest Volume	Post-harvest Volume	Growth next 10-year period Volume	Growth Annual Percent
2014	2,386,000	0	2,386,000	558,000	2.6
2023	2,944,000	800,000	2,144,000	720,000	2.8
2035	2,865,000	857,000	2,007,000	723,000	3.0
2047	2,730,000	723,000	SUSTAINED		

Note: Totals are rounded

	Unit 9 Volume by Species and Diameter Class				
	12-16"	**18-24"**	**26-34"**	**36"+**	**Total**
redwood	170	410	575	205	1,360
Douglas-fir	71	285	432	71	859
grand fir/hemlock	23	72	62	10	167
Total	264	767	1,069	286	2,386

Basal Area:
Conifers 177 sq. ft.
Hardwoods 24 sq. ft.

Unit 10---Blair Gulch---146 acres

Unit 10—Potential Harvest Schedule--- (Volume in net board feet Scribner log scale)

Year	Pre-harvest Volume	Harvest Volume	Post-harvest Volume	Growth next 10-year period Volume	Growth Annual Percent
2014	3,558,000	0	3,558,000	1,195,000	2.8
2026	4,753,000	1,100,000	3,653,000	1,271,000	2.9
2038	4,925,000	1,168,000	3,757,000	1,353,000	3.0
2050	5,110,000	1,353,000	SUSTAINED		

Note: Totals are rounded

		Unit 10 Volume by Species and Diameter Class					
		12-16"	**18-24"**	**26-34"**	**36"+**	**Total**	
redwood		101	405	675	456	1,637	
Douglas-fir		142	485	703	307	1,637	
grand fir/hemlock		70	110	95	10	285	
Total		312	1,000	1,473	773	3,558	

Basal Area:
Conifers 180 sq. ft.
Hardwoods 30 sq. ft.

Unit 11—Buck Gulch---137 acres

Unit 11---Potential Harvest Schedule--- (Volume in net board feet Scribner log scale)					
Year	Pre-harvest Volume	Harvest Volume	Post-harvest Volume	Growth next 10-year period Volume	Growth Annual Percent
2014	2,100,000	0	2,100,000	672,000	3.2
2024	2,772,000	500,000	2,272,000	872,000	3.2
2036	3,144,000	626,000	2,518,000	907,000	3.0
2048	3,425,000	907,000	SUSTAINED		
Note: Totals are rounded					

		Unit 11 Volume by Species and Diameter Class					
		12-16"	**18-24"**	**26-34"**	**36"+**	**Total**	
redwood		188	390	625	225	1,428	
Douglas-fir		112	287	185	25	609	
grand fir/hemlock		19	34	8	2	63	
Total		319	711	818	252	2,100	

Basal Area:
Conifers 135 sq. ft.
Hardwoods 64 sq. ft.

Unit 12---Bear Landing---274 acres

Unit 12—Potential Harvest Schedule--- (Volume in net board feet Scribner log scale)

Year	Pre-harvest Volume	Harvest Volume	Post-harvest Volume	Growth next 10-year period Volume	Growth Annual Percent
2014	3,679,999	0	3,679,000	1,177,000	3.2
2025	4,856,000	1,000,000	3,856,000	1,481,000	3.2
2037	5,337,000	1,100,000	4,237,000	1,525,000	3.0
2049	5,762,000	1,229,000	4,533,000	1,632,000	3.0
2061	6,165,000	1,632,000	SUSTAINED		

Note: Totals are rounded

		Unit 12 Volume by Species and Diameter Class				
		12-16"	**18-24"**	**26-34"**	**36"+**	**Total**
redwood		235	707	942	471	2,355
Douglas-fir		279	455	410	70	1,214
grand fir/hemlock		33	40	25	12	110
Total		547	1,202	1,377	553	3,679

Basal Area:
Conifers 128 sq. ft.
Hardwoods 73 sq. ft.

Appendix B. California Department of Fish and Wildlife's "Wildlife Tree Retention Strategy."

Wildlife Tree Retention Strategy

Key to Wildlife Tree Retention/Late Seral Element Scorecard

Trees and Snags with obvious wildlife value that may not need to be evaluated with the Scorecard

Residual tree (Legacy tree): A tree that existed in a stand prior to the most recent harvest entry. This is clearly most distinct and applicable if the stands were managed under even-aged silviculture methods – however, the concept still applies in selection systems.

Description: Structure and appearance varies substantially depending on residual tree age, species, and harvest history of the stand. For conifers, the residual tree will almost always exhibit a greater age and diameter (i.e. predominant tree) than the trees regenerated by the prior harvests. If the residual has a live top it will likely project well above the surrounding canopy.

Two types of residual trees may be recognized:

Old-growth residual (Legacy tree): A tree that was dominant or co-dominant at the time of the original harvest. Minimum age varies by species. For practical purposes, these trees are irreplaceable features in most forests under current management programs.

Description: Usually has a greater diameter than the second-growth trees in the stand and often relatively tall (at "true" site potential height for site class). In addition to large size, old-growth residual trees usually exhibit one to several readily observable features of "old-growth" including: broken top; large reiterations and large-diameter limbs; thick bark that may have deep furrows; fire scars; a basal cavity; other cavities; and possibly well-developed duff layers, moss, or lichen accumulations on horizontal limbs or platforms. Crown architecture visible from the air may include emergent crown (where the surrounding stand is relatively young), irregular or flat-topped shape (as opposed to conical top), obvious dead or spike top (note these may also occur in large second-growth trees), and/or multiple leaders due to large reiterations (which may give the crown the appearance of a cluster of tall young trees).

"Mature" residual ("Bastard-growth"; Legacy tree): A tree that was sub-canopy at the time of the initial harvest. These trees are variably replaceable under current management timber management programs.

Description: Usually at or above the maximum dbh of the second-growth trees in the stand. Other characteristics (height and defect) vary depending on age, age relative to other trees in the stand, fire history, and whether the tree was damaged to the residual during the initial entry. Typically, "mature" residuals show a much smaller dbh than an old-growth residual for the site class and exhibit fewer of the structural features listed above for old-growth residuals. From the air, the crown of a "mature" residual tree may emerge above the surrounding canopy (where the surrounding stand is relatively young) or may not be particularly evident if the surrounding stand is mature second-growth. A "mature" residual that grew for an extended period above a regenerating stand may exhibit a relatively broad crown and high degree of taper, but otherwise be relatively free of physically induced defect.

Snag: A standing dead tree.

Description: Snags vary tremendously in appearance and function for wildlife depending on species, size, and decay class.

Wildlife Tree Scorecard Definitions and Values

For all trees larger than 36 inches in diameter at breast height, assess the base, bole and canopy for the elements, features, and structures described below. Calculate a wildlife tree score by entering the associated value for each applicable feature; then add all the associated tree values to determine a score for the assessed tree. A structural element may score under several categories, include all applicable values for the feature (i.e. a reiterative limb may have epiphytic growth and epicormic branching, or a tree with minor conk may have a cavity and sloughing bark).

BOLE FEATURES

Cavities and Hollows

Cavity: Cavity (or void within a tree bole or large limb) with a relatively small entrance suitable for use by a variety of wildlife species, such as small to large woodpeckers, secondary cavity-nesting birds, wood ducks, Vaux's swift, Purple Martin, bats, Douglas squirrel, owls, wood rats, Pacific fisher, or American marten. The small entrance precludes the entry of larger predators into the cavity. Cavities with larger entrances may also be used by these species. A cavity may be as large as several feet deep with an entrance size ranging from about 1.5 to 6 inches diameter. Entrance height is often at least 10 feet above the ground, but lower entrances may also be used. In practice, interior dimensions will usually just be a guess based on entrance size and appearance, as well as the characteristics of the tree, plus any observations of wildlife use of the cavity. More than a single entrance hole suggests more extensive internal cavity development.

- CAVITY SMALL (**1** per opening) Opening 1.5 inches to 3 inches in diameter
- CAVITY LARGE (**3** per opening) Opening >3 inches in diameter

Hollow: A large cavity with an entrance or opening greater than 6 inches diameter. Description: Hollows have similar interior dimensions as large cavities and may be used by the same suite of species for cover; however, the larger entrance size of a hollow may not prevent larger predators from entering the hollow.

- HOLLOW MINOR (**3**) – A bole hollow with an opening > than 6 inches diameter and less than 2 feet[2]
- HOLLOW MAJOR (**5**) – A bole hollow with an opening > than 2 feet[2]

Basal hollow (Goose pen/cat faces): A hollow at or near ground level typically created by fire that destroys the cambium on a portion of the bole's circumference. Repeated fires play an important role in maintaining and enlarging basal hollows[1].

Description: A basal hollow is a hollow that extends into the bole near the buttress. A cavity may have formed above the opening. Basal hollows are used by a large assortment of wildlife.

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[1] Fire Cavities: Indicators of Past Fire Regimes in Coast Redwood provides a discussion of the role of fire and basal hollow formation, as well as a Redwood Cavity Index (RCI) classification system.

- BASAL HOLLOW MINOR (**1**)– cat face or basal burn scar, 2 feet^2 with no opening or cavity (RCI 1 or potentially 2)

- BASAL HOLLOW MEDIUM (**3**)– basal hollow with an opening > 2 feet^2 and/or with a cavity extending > 6 inches above the top of the hollow opening (RCI 2 and potentially 3)

- BASAL HOLLOW MAJOR (**5**)– basal hollow with an opening >4 feet^2 and/or with a cavity extending >2 feet above the top of the basal hollow opening (RCI 3, 4, and 5)

Crack (Fissure): A longitudinal gap in the bole of a tree caused either by physical damage (including wind, lighting, or fire) or by growth of two trees or leaders into each other where the gap provides cover for wildlife.
Description: Cracks must be sufficiently deep relative to their width to provide partial cover for foraging birds or complete cover for nesting birds, roosting bats, or small- to medium sized mammals. Longitudinal indentations in which the deepest portions are visible from outside the tree are not considered cracks unless they are capable of providing cover for foraging or roosting small vertebrates.

- CRACK SMALL (**0.5** per crack) Crack >2 feet in length, >1 inch deep and >0.5 inch wide

- CRACK MEDIUM (**1** per crack) Crack >5 feet in length, >1 inch deep and >0.5 inch wide

- CRACK LARGE (**2** per crack) Crack >10 feet in length, >1 inch deep and >0.5 inch wide

- CRACK EXTRA-LARGE (**3**) Crack >20 feet in length, >4 inch deep and >0.5 inch wide

Internal decay (Heart rot): Widespread or localized heart rot fungus infection within the bole of a tree. Decayed, softened wood encompasses at least enough volume to allow excavation of a small cavity.
Description: Decayed wood in old scars may be visible at ground level or with binoculars well above the ground. Good indicators of internal decay include fungal fruiting bodies, such as conk, cavity entrances, and sloughing wood and bark. In practice, it may be difficult to discern the extent of internal decay in some cases.

- DECAY MINOR (**1**) Trees with obvious decay over less than 25% of the bole. May show minimal conk in only a small portion of the bole.

- DECAY MEDIUM (**3**) Trees with 25% to 75% effected boles. They may show evidence of conk over a portion of the bole's length. Increased likelihood to be a cull tree.

- DECAY MAJOR (**5**) Trees with more than 75% effected boles. They may show evidence of extensive conk and have sloughing bark or wood. Most likely to be a cull tree.

Epicormic branching and structures: Re-sprouting limbs from dormant, damaged, or scarred branch nodes. Often associated with decadent tree
Description: Epicormic branching may be develop ledges and/or platforms at the branching node/s. These structures may support epiphytic growth and/or provide resting and nesting habitat for various wildlife species.

- EPICORMIC BRANCH – MINOR (**1**) Early epicormic branching – 3 branches (or more) < 1 inch in diameter at a single node.
- EPICORMIC BRANCH – MEDIUM (**2**) Developing epicormic branching – 3 branches (or more) >1 inch and < 3 inches in diameter at a single node.
- EPICORMIC BRANCH – MAJOR (**4**) Developed epicormic branching with a high potential for ledges and/or platforms – 3 branches (or more) >3 inches in diameter at a single node.

Furrowed bark: A relatively deep linear indentation in the bark of a tree capable of providing cover for roosting bats or foraging bole-gleaners.
Description: Furrowed bark occurs where an underlying defect (crack, old lightning or fire scar, narrow strip of removed cambium) or the line of contact between two trees growing into each other has been covered by bark. The furrow is sufficiently deep and narrow to be capable of providing cover for small vertebrates or colonies of invertebrates.

- FURROWED BARK (**3**)

Loose bark: A discrete, large piece of bark that has separated from the underlying tree bole but remains attached to the tree.
Description: "Loose bark" refers to a portion of a tree's bark that provides cover for roosting bats, nesting birds, or possibly foraging bole gleaners. Typically, such bark pieces provide relatively tight, stable cover for small animals. The distance of separation from the underlying tree should be 2 inches or less and should not be so loose that the bark piece flaps in the wind. As a general rule, loose bark is attached along at least one edge at least 1 foot long. Although some bear-stripped trees may meet the definition of "loose bark", most recently bear-stripped trees have bark that has been pulled away from the bole along most of the strip's edges, flaps against the underlying wood in the wind, and only provides a small amount of cover at one end of the strip. Such recent bear-stripped bark should not be scored as "loose bark".

- LOOSE BARK – MINOR (**1**) Bark segment <3 feet in length
- LOOSE BARK – MAJOR (**3**) Bark segment >3 feet in length

Deformities/Scarring: Basal fire scars and burls resulting from damage to the bole. These deformities may provide ledges, cracks/crevices, or cavities.

- SCAR – SMALL (**1** each) Scarring or burls up to 2 feet^2 extending out from the >4 inches

- SCAR – MEDIUM (**2** each) Scarring or burl up to 4 feet^2 extending out from the bole >6 inches

- SCAR – LARGE (**4** each) Scarring or burl > 4 feet^2 extending out of the bole > 6 inches

CROWN FEATURES

Epiphytic growth: Fern, Mistletoe (Witch's broom), moss, lichen, other growth supported within on limbs, forks, and nodes within the canopy. A compact spray of branches infected with mistletoe.
Description: A tree should be scored for mistletoe broom if the structure is large and solid enough to provide an opportunity for resting or nesting of vertebrate wildlife, or if smaller brooms occur in multiple locations within the tree.

- EPIPHYTE MINOR (**0.5** each patch) Epiphytes/Ferns/Mistletoe present in lesser amounts (patch size is < 16 inches^2 (4 inch by 4 inch area) on larger limbs, deformities, broken top/s, branch nodes or within the canopy structure.

- EPIPHYTE MAJOR (**2** each patch) Epiphytes/Ferns/Mistletoe or other growth present in patch size of > 16 inches^2 (4 inch by 4 inch area) on larger limbs, deformities, broken top/s, branch nodes or within the canopy structure.

Complex Crown

Dead top (Spike): A dead tree leader.
Description: "Dead top" refers to dead leaders that are evidenced by leaf die-back along at least the top one-fifth of the tree height or with a minimum diameter at the lowest extent of leaf die-back of about 12 inches.

- DEADTOP (**5**)

Broken top: A tree with the original leader broken off.
Description: "Broken top" refers to broken-topped trees with a minimum diameter at the original break of about 12 inches.

- BROKEN TOP (**5**)

Reiteration (Reiterated top, Bayonet, "Schoolmarm", Candelabra): A sprouted leader or limb that exhibits apical dominance.
Description: Reiterations vary greatly depending on relative age and position on tree. All reiterations include some vertical growth that gives them the appearance of a "tree-on-a-tree". Reiteration can provide opportunities for resting, denning, or nesting, and may support epiphytes.

- REITERATION SMALL (**2** each) Reiterative limbs < 6 inches in diameter

- REITERATION MEDIUM (**3** each) Reiterative limbs >6 inches and <12 inches in diameter

- REITERATION LARGE (**5** each) Reiterative limbs > 12 inches in diameter

Forked top: A split in a tree's leader.
Description: A tree should be scored for a forked top if the structure provides an opportunity for resting or nesting for vertebrate wildlife, or if defect associated with the fork suggests that other structures may be present (such as internal rot or cavity).

- FORKED TOP (**3**)

Large limb (Platform limb): A relatively horizontal limb of sufficient girth for vertebrate wildlife to use the structure for resting or nesting (but not including bird perches).

- LARGE LIMB – MINOR (**0.5** each) Limb/s with a diameter >6 inches

- LARGE LIMB – MEDIUM (**2** each) Limbs with a diameter >8 inches

- LARGE LIMB – MAJOR (**5** each) Limbs with a diameter >12 inches

Intermingled limbs with HIGH VALUE WILDLIFE TREE: Trees with limbs intermingled with HIGH VALUE WILDLIFE trees and/or residuals provide cover (screening) and can maintain microclimates favorable to wildlife such as daytime shading and/or wind shielding or cover from precipitation.

- INTERMINGLED LIMBS – MINOR (**1**) Tree that intermingles less than 1/3 of the HIGH WILDLIFE TREE canopy radius.

- INTERMINGLED LIMBS – MAJOR (**5**) Tree that intermingles greater than 1/3 of the HIGH WILDLIFE TREE canopy radius.

ACTIVELY USED WILDLIFE TREES

Trees associated to raptor nesting and/or Sonoma red tree vole: A tree used by nesting raptors or that has Sonoma red tree vole, including perch and/or screen trees.

- NEST TREE (**5**) Tree containing the nest of raptor or Sonoma red tree vole, or tree providing screening or associated raptor perch tree.

Granaries

- GRANARY SMALL (**3**) Tree with less than 100 holes that are either filled with acorns or capable of containing acorns.

- GRANARY LARGE (**5**) Tree with 100 or more holes that are either filled with acorns or capable of containing acorns.

Wildlife Tree Retention Strategy

WILDIFE TREE SCORECARD – Side A

Feature/ Structure		Category	Score/Value						Tree Tally						
			0.5	1	2	3	4	5	Tree 1	Tree 2	Tree 3	Tree 4	Tree 5	Tree 6	Tree 7
Bole opening	Cavity	Small		1											
		Large				3									
	Hollow	Minor				3									
		Major						5							
	Basal Hollow	Minor		1											
		Medium				3									
		Major						5							
	Crack	Small	0.5												
		Medium		1											
		Large			2										
		Extra-large				3									
Evidence of Decay		Minor		1											
		Medium				3									
		Major						5							
Epicormic Branching		Minor		1											
		Medium			2										
		Major					4								
Deep furrowed bark						3									
Loose Bark		Minor		1											
		Major				3									
Scarring/deformities		Minor		1											
		Medium			2										
		Major					4								
Epiphytic Growth		Minor	0.5												
		Major			2										
Dead Top								5							
Broken Top								5							
Side A (bole feature) total To be added to Side B for total wildlife tree score															

Wildlife Tree Retention Strategy

WILDLIFE TREE SCORECARD – Side B

Feature/ Structure	Category	Score/Value						Tree Talley						
		0.5	1	2	3	4	5	Tree 1	Tree 2	Tree 3	Tree 4	Tree 5	Tree 6	Tree 7
Limb Reiteration	Small			2										
	Medium				3									
	Major						5							
Split bole/forked top					3									
Large Limb	Minor	0.5												
	Medium			2										
	Major						5							
Intermingling limbs with HIGH VALUE WILDLIFE TREE	< 1/3 canopy radius		1											
	>1/3 canopy radius						5							
Raptor/tree vole nest trees							5							
Granary	small				3									
	large						5							
Side B (Canopy feature) total														
TOTAL WILDLIFE TREE SCORE/S (Side A + Side B)														

Trees with a score equal to/or greater than 5 are HIGH VALUE WILDLIFE trees and shall be retained.

If there are less than 6 HIGH VALUE WILDLIFE trees per acre in the area under the planned NTO, the 6 highest scoring trees per acre shall be retained.

Note: Trees not meeting the minimum retention score but exhibiting high potential defect (standing slash) or high harvesting costs so as to negate their value should also be considered as prime candidates for meeting green tree retention guidelines if high-scoring trees are not available