

2006 Annual Wildlife Report

Wildlife Program  
Wildlife-Watershed-Fisheries Department  
Mendocino Redwood Company, LLC

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## INTRODUCTION

The wildlife program provides three main services to forestry staff so that MRC can meet both its business and stewardship goals. The primary service is ensuring that all timber harvests and other operations are in compliance with the federal Endangered Species Act, the California Endangered Species Act, and the California Forest Practice Rules; the second is collecting baseline biological data for the development of a Long-term Sustainable Forest Management Plan (LTSFMP), which includes a federal Habitat Conservation Plan (HCP), a state Natural Communities Conservation Plan (NCCP), and several other management agreements with various regulatory agencies; and the third is compliance with Forest Stewardship Council certification principles and criteria as well as our own internal policies to maintain MRC's status as a sustainable timberland operator.

In 2001, the wildlife group initiated surveys to determine baseline terrestrial wildlife conditions for the MRC ownership. Since that time, we have been conducting area-wide nocturnal surveys for northern spotted owls (NSO) and other nocturnal raptors, monitoring all known NSO territories, banding adult and fledgling NSOs, using radar to assess marbled murrelet activity levels in lower Alder Creek, and delineating spatial extent of Point Arena mountain beaver burrow systems.

We have also undertaken several research projects to address certification concerns regarding biological diversity and distribution of terrestrial faunal groups (such as raptors, mesocarnivores, songbirds, and small mammals). As we gain a more precise understanding of the richness and abundance of various wildlife species on the landscape, we hope to associate these data with vegetative information to predict changes in species composition and diversity with projected forest growth and harvest. This information will eventually be incorporated into our landscape planning model to help make a variety of land management decisions.

Here, we provide summaries for all activities completed in 2006, which include nocturnal NSO surveys for THPs and LTSFMP areas, NSO banding and monitoring, marbled murrelet ground surveys, songbird and mesocarnivore surveys. Lastly, we summarize 2006 incidental wildlife sightings contributed by MRC staff.

## I. COMPLIANCE AND LTSFMP

The wildlife group conducts compliance and LTSFMP surveys for three species: the northern spotted owl (*Strix occidentalis caurina*; NSO), marbled murrelet (*Brachyramphus marmoratus*), and Point Arena mountain beaver (*Aplodontia rufa nigra*). Typically, surveys for compliance also complete requirements for the LTSFMP. For this reason, we have posted results of both survey types together.

### 1. Northern Spotted Owl Surveys

Northern spotted owl surveys include both territory<sup>1</sup> monitoring and nocturnal surveys. The goal of territory monitoring is to determine annual occupancy, nesting, and reproductive status at each NSO territory, though our ability to determine a definitive annual status is often limited, leading to an unknown status for the year for occupancy, nesting, and/or reproductive status. Occupancy is the easiest to determine because it requires only several nighttime detections in an area or a single daytime detection. However, nesting and reproductive status can be more difficult to determine because they require several visits to a territory at critical times of the year following a specific protocol. These time periods have short windows of opportunity (especially reproductive outcome), so if they are missed it often results in an unknown nesting or reproductive status.

Occupancy status provides important location information so that owl activity centers can be protected from timber operations, while nesting status and reproductive outcome serve as indicators for how the owls within a territory perform in a given year or span of time. Reproductive outcome, or productivity (mean number of fledgling produced/year), gives us an idea which territories are most likely to contribute offspring to future generations of NSOs on the landscape. Productivity will also be used in the LTSFMP to assign protection levels to NSO territories, where owls with the greatest productivity will generally receive the highest protection. We believe this is the best biological rationale outside of specific demographic information to make management decisions regarding NSOs.

Nocturnal surveys are completed for timber harvest plans, road restoration projects, and LTSFMP baseline data collection. These surveys help to monitor annual changes in the location of NSO activity centers, identify the emergence of new territories, and locate known territories not located during searches of historic activity centers. Nocturnal surveys typically cover a large area in a single evening, and often provide useful detection information to guide territory monitoring efforts. Nocturnal surveys, however, have limited ability in determining occupancy (especially identification of site centers) and are inappropriate for assessing nesting and reproductive status. Therefore, to be effective, nocturnal surveys must always be coupled with daytime visits to verify the status of the NSOs within a territory.

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<sup>1</sup> It is important to note that when discussing spotted owls we use two different terms – “territory” and “activity center”. Territory refers to the geographic space a single or pair of spotted owls inhabit while activity center refers to a central location determined for the owls within a given territory each year they are located.

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**2006 Survey Summary**

Based on historical data, 2006 was a below-average year for NSO productivity (Table 1; Fig. 1), but average for territory occupancy and status assignment. We determined status for 40.4% of our NSO territories, which had an overall occupancy rate of 62.3% (Table 1). These numbers are close to 2005, where we determined status for 44.6% of our NSO territories and had an occupancy rate of 59.4%. Mean productivity for 2006 was lower than 2005 and was substantially lower than the running average for the past 18 years (0.30 versus 0.60 fledglings/territory). Mean productivity per year was negatively correlated with spring rainfall (March-June;  $r = -0.67$ ,  $P = 0.002$ ). Significant rainfall during the initial part of the breeding season, or during the incubation and nestling phases, often results in lower than average productivity either by inhibiting nesting attempts or increasing nest failures.

For the past several years, we have set a goal of assigning status for 75% of our territories, which is something we rarely attain unless nesting rates are high (> 35%). For most years, however, this level of status assignment may be unrealistic because our ability to attain unequivocal status for NSO territories is highly influenced by multiple environmental factors. In 2007 we will re-evaluate our 75% status goal and possibly downgrade it to a reasonable and attainable percentage.

Since 2001 the wildlife program has been tracking nocturnal survey efforts, measured as the number of 10-minute surveys per year (Fig. 2). For the past six seasons the number of nocturnal surveys has fluctuated, but there has been a steady increase since 2003. This has been due to better tracking and planning of survey routes by using the NSO database and conducting more area-wide surveys to complete requirements for the LTSFMP.

Table 1: 2006 Northern Spotted Owl Monitoring Totals

Inventory Block	% Occupancy	% Nesting	% Nest Success	Fledglings
Albion	65.0 (13/20)	30.0 (6/20)	66.7 (4/6)	5
Annapolis	42.9 (3/7)	0.0 (0/7)	NA	NA
Big River	56.3 (9/16)	6.2 (1/16)	100 (1/1)	1
Garcia	50.0 (7/14)	0.0 (0/14)	NA	NA
Navarro East	52.4 (11/21)	9.5 (2/21)	0.0 (0/2)	NA
Navarro West	87.0 (20/23)	21.7 (5/23)	80.0 (4/5)	6
Noyo	68.4 (13/19)	5.3 (1/19)	0.0 (0/1)	NA
Rockport	53.8 (14/26)	3.8 (1/26)	0.0 (0/1)	NA
South Coast	69.0 (20/29)	20.7 (6/29)	100 (6/6)	9
Ukiah	0.0 (0/1)	0.0 (0/1)	NA	NA
Willow Creek	57.1 (4/7)	14.3 (1/7)	100 (1/1)	1
<b>TOTAL</b>	<b>62.3 (114/183)</b>	<b>12.6 (23/183)</b>	<b>69.6 (16/23)</b>	<b>22</b>

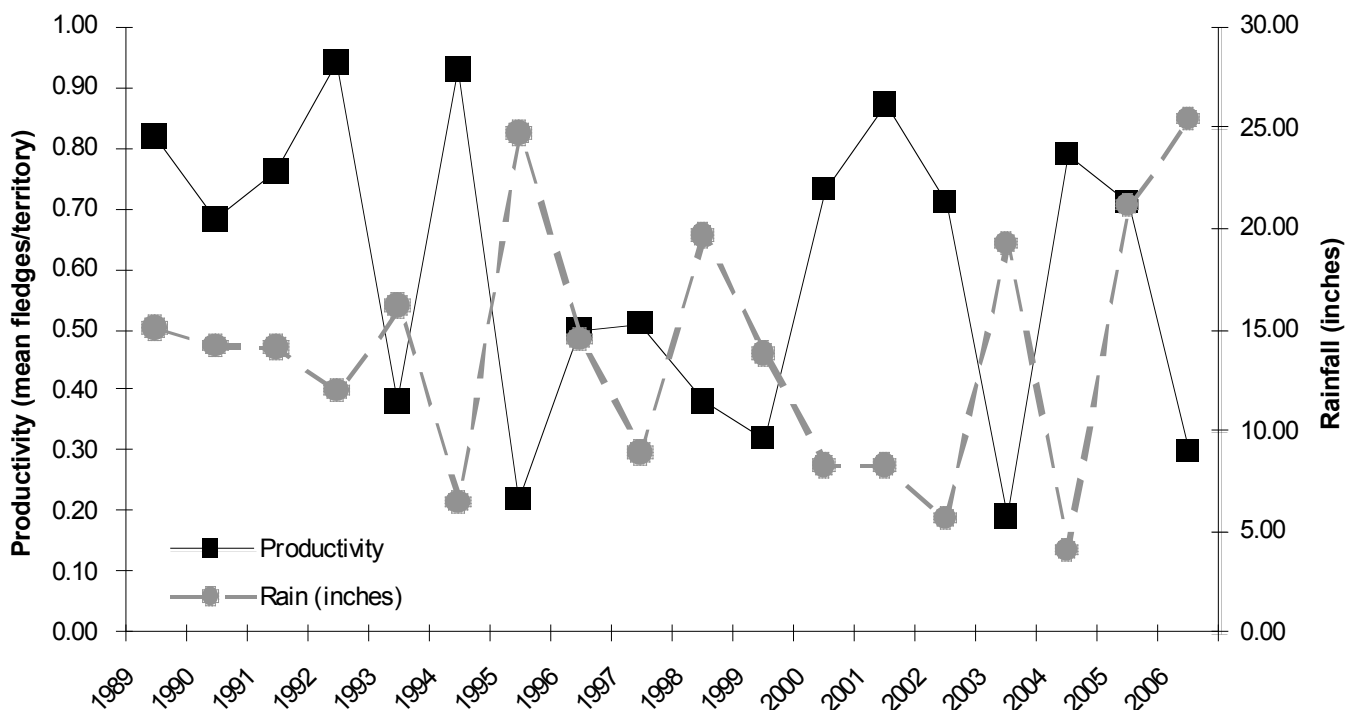


Figure 1: Northern spotted owl annual productivity (mean number of fledglings produced per territory) and spring rainfall (March-June) for the past 18 seasons. Rainfall data provided by the Shively Weather Station®.

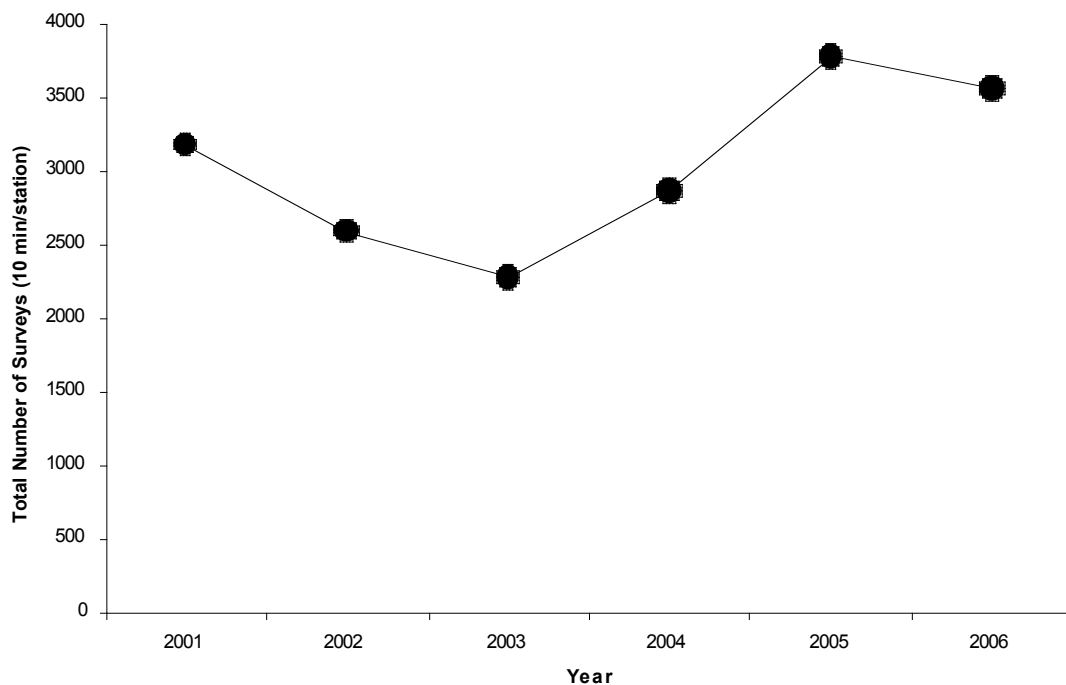


Figure 2: Nocturnal survey effort for 2001-2006

**Territory status by inventory block**

The tables below document status assessment by inventory block for all active NSO territories on or near MRC lands. These tables also list all NSO territories that would currently be covered by the LTSFMP if implemented in 2006. Acronyms for occupancy, nesting, and reproductive status are as follows: P = pair; M = male; F = female; A = not monitored or surveyed; NTP = surveyed or monitored, but Not To Protocol; X = absent (surveyed or monitored to protocol); PA, MA, or FA = audible birds only; NN = non-nesting; NF = nest failed; NI = nesting inferred; NU = nesting unknown; OU = outcome unknown; 0, 1, or 2 = number fledges produced.

<b>Albion</b>						
<b>DFG_ID</b>	<b>Occup</b>	<b>Nesting</b>	<b>Reprod</b>	<b>UTM_E</b>	<b>UTM_N</b>	<b>Mean Prod</b>
MD063	X					0.20
MD064	P	NN	0R	439280	4341571	0.71
MD065	P	NN	0R	444142	4344432	0.71
MD129	U	NU	OU	446600	4347420	0.75
MD168	M	NN	0R	445656	4342606	1.00
MD170	NTP					0.67
MD236	P	NE	2F	443058	4347556	1.50
MD241	P	NE	1F	444844	4347221	0.67
MD286	P	NE	1F	440868	4345448	0.71
MD295	P	NF	0F	450849	4348050	0.57
MD299	P	NF	0F	436764	4344003	0.00
MD321	A					1.40
MD369	X					0.00
MD439	F	NN	OU	447679	4343139	0.80
MD497	X					0.00
MD544	A					0.00
MD562	P	NN	0R	445350	4345605	0.00
MD563	P	NE	1F	438351	4343122	0.25
MD577	NTP					0.00
MD595	P	NN	0R	442840	4344085	0.00

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**Annapolis**

<b>DFG_ID</b>	<b>Occup</b>	<b>Nesting</b>	<b>Reprod</b>	<b>UTM_E</b>	<b>UTM_N</b>	<b>MeanProd</b>
SO007	NTP					0.25
SO018	X					0.00
SO019	P	NU	OU	473511	4276451	0.00
SO032	U	NU	OU	475546	4280301	0.50
SO043	M	NU	OU	468845	4282601	0.00
SO044	X					0.00
SO058	X					0.00

**Big River**

<b>DFG_ID</b>	<b>Occup</b>	<b>Nesting</b>	<b>Reprod</b>	<b>UTM_E</b>	<b>UTM_N</b>	<b>MeanProd</b>
MD062	A					1.67
MD067	X					0.67
MD068	F	NU	OU	460132	4349466	0.00
MD069	P	NN	OR	457035	4350974	0.80
MD071	P	NU	OU	452009	4350167	1.00
MD072	NTP					0.00
MD076	X					0.43
MD079	UA	NU	OU	456477	4345149	0.50
MD080	M	NU	OU	458710	4343030	0.00
MD239	X					1.00
MD301	M	NU	OU	457021	4343783	0.25
MD358	P	NE	1F	463295	4349112	1.40
MD438	P	NU	OU	454670	4349162	0.50
MD477	A					0.00
MD490	M	NU	OU	461021	4346490	0.00

**Garcia**

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DFG_ID	Occup	Nesting	Reprod	UTM_E	UTM_N	MeanProd
MD102	X					0.25
MD130	NTP					0.67
MD207	U	NU	OU	448711	4307648	0.00
MD208	A					0.00
MD213	PA	NU	OU	453488	4299635	0.67
MD214	A					0.00
MD383	U	NU	OU	452036	4301462	0.60
MD386	U	NU	OU	448536	4305767	0.00
MD447	X					0.00
MD512	X					0.00
MD542	PA	NU	OU	451881	4305992	1.67
MD573	X					0.60
MD593	F	NU	OU	450831	4301711	2.00
MD596	M	NU	OU	442535	4306155	0.00

**Navarro East**

DFG_ID	Occup	Nesting	Reprod	UTM_E	UTM_N	MeanProd
MD025	P	NN	OR	457049	4335231	0.25
MD047	U	NU	OU	453740	4335410	1.00
MD077	P	NU	OU	464887	4339930	2.00
MD078	P	NN	OR	455200	4339470	0.29
MD103	X					0.00
MD160	NTP					1.00
MD161	X					0.00
MD172	X					0.00
MD173	NTP					0.00
MD441	P	NF	OF	460024	4340144	0.60
MD445	M	NU	OU	452224	4338701	0.33
MD455	A					0.00
MD511	MA	NU	OU	460691	4336429	0.00
MD545	A					0.00
MD565	NTP					0.00
MD566	UA	NU	OU	468207	4335939	0.00
MD592	X					0.00
NEW015	P	NF	OF	463429	4335415	1.00
NEW025	FA	NU	OU	458428	4338166	0.00
NEW026	MA	NU	OU	465204	4334947	0.00
NEW029	A					0.00

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**Navarro West**

<b>DFG_ID</b>	<b>Occup</b>	<b>Nesting</b>	<b>Reprod</b>	<b>UTM_E</b>	<b>UTM_N</b>	<b>MeanProd</b>
MD022	P	NE	2F	438608	4336885	0.75
MD023	U	NU	OU	445110	4334025	0.88
MD024	P	NN	0R	449340	4334360	0.17
MD053	X					0.60
MD066	P	NU	OU	447035	4334000	1.33
MD125	P	NU	OU	448690	4331938	1.60
MD127	P	NU	OU	441850	4336932	1.25
MD141	FA	NU	OU	437812	4337477	0.00
MD178	P	NN	0R	447540	4336320	0.75
MD222	A					0.00
MD442	P	NN	0R	444593	4336403	1.00
MD443	P	NE	2F	445557	4333156	0.50
MD444	P	NN	0R	450103	4330847	1.00
MD489	UA	NU	OU	446848	4340226	1.14
MD518	U	NU	OU	442664	4333220	0.86
MD521	X					0.00
MD534	P	NN	0R	443703	4334827	0.67
MD549	P	NI	1F	439415	4335141	0.50
MD552	U	NU	OU	447170	4337692	0.50
MD575	P	NE	1F	451750	4329698	1.00
MD594	P	NF	0F	442225	4336083	0.00
NEW002	MA	NU	OU	445869	4337218	0.00
NEW030	PA	NU	OU	445520	4336650	0.00

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**Noyo**

<b>DFG_ID</b>	<b>Occup</b>	<b>Nesting</b>	<b>Reprod</b>	<b>UTM_E</b>	<b>UTM_N</b>	<b>MeanProd</b>
MD085	A					0.50
MD087	P	NN	OR	437804	4365378	1.40
MD104	P	NN	OR	456821	4365726	0.00
MD120	M	NU	OU	452769	4369946	0.00
MD121	NTP					0.50
MD122	A					1.00
MD123	a					0.00
MD176	P	NN	OR	456954	4370818	0.60
MD305	U	NU	OU	456015	4361522	1.00
MD375	X					0.67
MD415	M	NU	OU	455980	4369900	0.00
MD437	P	NN	OR	457470	4368420	0.40
MD466	F	NU	OU	462010	4367120	0.00
MD488	X					0.00
MD508	UA	NU	OU	455885	4367520	0.00
MD509	U					
MD574	P	NF	OF	455202	4363815	0.67
MD578	PA	NU	OU	463243	4364594	0.67
NEW020	P	NU	OU	457185	4366538	0.00

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**Rockport**

DFG_ID	Occup	Nesting	Reprod	UTM_E	UTM_N	MeanProd
MD098	P	NU	OU	434065	4408007	1.00
MD107	MA	NU	OU	438701	4397535	0.40
MD108	FA	NU	OU	433692	4394611	1.00
MD109	X					0.33
MD110	A					0.00
MD134	FA	NU	OU	431456	4405926	0.83
MD145	A					1.00
MD169	U	NU	OU	432587	4403668	0.00
MD227	NTP					1.00
MD229	X					0.00
MD296	A					0.00
MD297	A					0.00
MD381	P	NN	OR	435051	4397254	1.00
MD428	M	NU	OU	429515	4401965	0.25
MD429	M	NU	OU	430906	4402837	0.00
MD430	X					0.00
MD431	X					0.40
MD432	X					0.00
MD434	U	NU	OU	431428	4396693	0.20
MD436	NTP					0.33
MD481	P	NU	OU	435441	4392899	1.00
MD513	P	NE	OU	436408	4393078	0.50
MD514	F	NU	OU	435363	4396191	0.00
NEW024	X					0.00
NEW028	PA	NU	OU	436540	4396486	0.00
NEW033	P	NU	OU	429200	4403585	0.00

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**South Coast**

<b>DFG_ID</b>	<b>Occup</b>	<b>Nesting</b>	<b>Reprod</b>	<b>UTM_E</b>	<b>UTM_N</b>	<b>MeanProd</b>
MD089	FA	NU	OU	444206	4326101	0.33
MD090	X					0.00
MD143	P	NU	OU	443920	4327300	1.00
MD162	P	NE	1F	448038	4322310	0.50
MD181	P	NE	1F	440798	4329205	1.25
MD182	F	NU	OU	442095	4328343	0.80
MD183	P	NU	OU	446421	4323378	1.00
MD199	P	NI	1F	442421	4321264	1.60
MD200	P	NI	2F	443570	4321173	2.00
MD201	MA	NU	OU	444505	4316795	0.50
MD220	U	NU	OU	443438	4316037	2.00
MD221	NTP					0.00
MD260	X					0.00
MD261	X					0.60
MD288	P	NE	2F	440887	4331482	1.25
MD289	U	NN	0R	452773	4320905	1.50
MD382	P	NU	OU	448037	4316250	2.00
MD384	X					0.67
MD385	P	NN	0R	449354	4327074	0.25
MD387	P	NE	2F	444255	4329719	1.40
MD396	NTP					0.00
MD425	A					1.00
MD522	U	NU	OU	449740	4320511	0.14
MD543	UA	NU	OU	450762	4319267	1.00
MD569	M	NU	OU	450728	4325511	1.00
MD570	P	NN	0R	451091	4321562	0.50
MD571	NTP					0.67
MD572	NTP					0.00
NEW012	M	NU	OU	456260	4313174	2.00

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**Ukiah**

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<b>DFG_ID</b>	<b>Occup</b>	<b>Nesting</b>	<b>Reprod</b>	<b>UTM_E</b>	<b>UTM_N</b>	<b>MeanProd</b>
MD021	NTP					0.50

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**Willow Creek**

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<b>DFG_ID</b>	<b>Occup</b>	<b>Nesting</b>	<b>Reprod</b>	<b>UTM_E</b>	<b>UTM_N</b>	<b>MeanProd</b>
NEW011	P	NI	1F	496321	4251769	1.00
NEW013	NTP					2.00
SO011	MA	NU	OU	499077	4254837	0.00
SO021	UA	NU	OU	497674	4254301	0.33
SO022	NTP					1.00
SO093	MA	NU	OU	498548	4256266	0.00

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## Nocturnal surveys by inventory block

In this report, nocturnal surveys are divided into four categories: 1) surveys completed to allow for projects that may cause disturbance to NSOs (e.g. grant projects and/or appurtenant road-use; DIS); 2) surveys to elicit nocturnal responses from historic NSO territories where NSOs have not been located during daytime territory monitors (NOC); 3) surveys to complete baseline data collection for the Long-term Sustainable Forest Management Plan (LTSFMP); and 4) surveys for timber harvest plans (THP).

Currently, there is a network of wildlife stations scattered across the ownership. This network of points, when surveyed in its entirety, would cover the entire ownership for NSOs. To survey a wildlife station, a surveyor must remain at this location for ten minutes, hoot periodically, listen and record distance and direction to owl responses. Northern spotted owl nocturnal detections are marked with pink-and-white flagging indicating the date, time, detection-type, distance, and direction. These are used to mark areas for daytime follow-up visits or territory monitoring.

In 2006, a total of **3,570** 10-minute surveys covering **1,397** wildlife stations were completed by the wildlife crew (Table 1). Survey effort can be assessed by the number of 10-minute surveys in an inventory block (see 'No. Surveys' in Table 1). South Coast and Rockport had the highest level of survey effort as indicated by the number of station surveys; these areas were also tied for the most wildlife stations surveyed. South Coast and Rockport were the top two areas with the highest survey credit, indicating that multiple nocturnal surveys fulfilled more than one survey type simultaneously.

**Table 1: Survey Summary by Inventory Block for 2006**

Inventory Block	No. Stations Surveyed <sup>1</sup>	No. Surveys <sup>2</sup>	Survey Type				Survey Credit <sup>3</sup>
			DIS	LTSFMP	NOC	THP	
AB	141	367	0	146	162	252	560
AN	41	80	0	0	40	59	99
BR	160	349	60	0	182	232	474
GR	116	253	0	102	80	195	377
NE	137	332	0	142	174	233	549
NW	150	399	0	101	152	269	522
NY	146	328	76	25	138	221	460
RP	239	680	213	209	246	510	1178
SC	239	704	0	447	474	655	1576
UK	16	47	0	0	0	47	47
WC	12	31	0	23	28	0	51
<b>Totals</b>	<b>1397</b>	<b>3570</b>	<b>349</b>	<b>1195</b>	<b>1676</b>	<b>2673</b>	<b>5893</b>

<sup>1</sup> Total number of unique wildlife stations surveyed at least once

<sup>2</sup> Total number of 10-minute surveys per station

<sup>3</sup> The number of 10-minute surveys per station times the number of survey types it covers (e.g. a single 10-minute survey covering a THP receives only one survey credit, whereas a single 10-minute survey covering a THP, NOC, and LTSFMP receives three survey credits)

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Nocturnal surveys completed by planning watershed within an inventory block:

**Albion**

<b>Planning Watershed</b>	<b>Survey Credit</b>	<b>DIS</b>	<b>LTSFMP</b>	<b>NOC</b>	<b>THP</b>
Big Salmon Creek	6	0	0	3	3
Lower Albion River	276	0	146	82	48
Middle Albion River	82	0	0	29	53
South Fork Albion River	137	0	0	33	104
Upper Albion River	42	0	0	11	31
Upper Noyo River	17	0	0	4	13
<b>Totals</b>	<b>560</b>	<b>0</b>	<b>146</b>	<b>162</b>	<b>252</b>

**Annapolis**

<b>Planning Watershed</b>	<b>Survey Credit</b>	<b>DIS</b>	<b>LTSFMP</b>	<b>NOC</b>	<b>THP</b>
Annapolis	59	0	0	22	37
Flat Ridge Creek	15	0	0	0	15
Haupt Creek	4	0	0	4	0
Tobacco Creek	21	0	0	14	7
<b>Totals</b>	<b>99</b>	<b>0</b>	<b>0</b>	<b>40</b>	<b>59</b>

**Big River**

<b>Planning Watershed</b>	<b>Survey Credit</b>	<b>DIS</b>	<b>LTSFMP</b>	<b>NOC</b>	<b>THP</b>
East Branch North Fork Big River	24	12	0	0	12
Lower North Fork Big River	30	8	0	7	15
Mettick Creek	93	19	0	46	28
Rice Creek	31	0	0	12	19
Russell Brook	91	9	0	32	50
South Daugherty Creek	99	0	0	42	57
Two Log Creek	106	12	0	43	51
<b>Totals</b>	<b>474</b>	<b>60</b>	<b>0</b>	<b>182</b>	<b>232</b>

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**Garcia**

<b>Planning Watershed</b>	<b>Survey Credit</b>	<b>DIS</b>	<b>LTSEMP</b>	<b>NOC</b>	<b>THP</b>
Doty Creek	5	0	0	1	4
East of Eureka Hill	20	0	0	0	20
No Name South	19	0	16	3	0
North Fork Garcia River	4	0	0	0	4
Point Arena Creek	48	0	2	12	34
Rolling Brook	194	0	75	47	72
South Fork Garcia River	78	0	0	17	61
Upper Brush Creek	9	0	9	0	0
<b>Totals</b>	<b>377</b>	<b>0</b>	<b>102</b>	<b>80</b>	<b>195</b>

**Navarro East**

<b>Planning Watershed</b>	<b>Survey Credit</b>	<b>DIS</b>	<b>LTSEMP</b>	<b>NOC</b>	<b>THP</b>
Dutch Henry Creek	59	0	0	29	30
John Smith Creek	8	0	0	5	3
Little North Fork Navarro River	18	0	0	11	7
Lower South Branch Navarro River	31	0	0	14	17
Middle South Branch Navarro River	382	0	142	101	139
Mill Creek	25	0	0	5	20
North Fork Indian Creek	6	0	0	3	3
Upper South Branch Navarro River	20	0	0	6	14
<b>Totals</b>	<b>549</b>	<b>0</b>	<b>142</b>	<b>174</b>	<b>233</b>

**Navarro West**

<b>Planning Watershed</b>	<b>Survey Credit</b>	<b>DIS</b>	<b>LTSEMP</b>	<b>NOC</b>	<b>THP</b>
Floodgate Creek	12	0	12	0	0
Flynn Creek	36	0	0	17	19
Hendy Woods	42	0	18	0	24
Lower Navarro River	61	0	8	17	36
Middle Navarro River	87	0	0	32	55
North Fork Navarro River	127	0	63	31	33
Ray Gulch	121	0	0	52	69
Upper Navarro River	36	0	0	3	33
<b>Totals</b>	<b>522</b>	<b>0</b>	<b>101</b>	<b>152</b>	<b>269</b>

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**Noyo**

<b>Planning Watershed</b>	<b>Survey Credit</b>	<b>DIS</b>	<b>LTSFMP</b>	<b>NOC</b>	<b>THP</b>
Hayworth Creek	119	7	0	35	77
McMullen Creek	43	0	25	18	0
Middle Fork Noyo River	181	57	0	41	83
North Fork Noyo River	46	6	0	19	21
Olds Creek	39	6	0	12	21
Redwood Creek	32	0	0	13	19
<b>Totals</b>	<b>460</b>	<b>76</b>	<b>25</b>	<b>138</b>	<b>221</b>

**Rockport**

<b>Planning Watershed</b>	<b>Survey Credit</b>	<b>DIS</b>	<b>LTSFMP</b>	<b>NOC</b>	<b>THP</b>
Cottoneva Creek	148	8	0	52	88
Dutch Charlie Creek	3	0	0	0	3
Hardy Creek	54	0	0	22	32
Howard Creek	57	0	0	25	32
Juan Creek	133	0	0	57	76
Low Gap Creek	10	0	0	0	10
Lower Hollow Tree Creek	70	31	0	8	31
Middle Hollow Tree Creek	568	165	209	47	147
Upper Hollow Tree Creek	135	9	0	35	91
<b>Totals</b>	<b>1178</b>	<b>213</b>	<b>209</b>	<b>246</b>	<b>510</b>

**South Coast**

<b>Planning Watershed</b>	<b>Survey Credit</b>	<b>DIS</b>	<b>LTSFMP</b>	<b>NOC</b>	<b>THP</b>
Lower Alder Creek	22	0	0	14	8
Lower Elk Creek	591	0	194	203	194
Lower Greenwood Creek	309	0	126	42	141
North Fork Alder Creek	24	0	0	0	24
Upper Elk Creek	343	0	26	114	203
Upper Greenwood Creek	287	0	101	101	85
<b>Totals</b>	<b>1576</b>	<b>0</b>	<b>447</b>	<b>474</b>	<b>655</b>

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**Ukiah**

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<b>Planning Watershed</b>	<b>Survey Credit</b>	<b>DIS</b>	<b>LTSFMP</b>	<b>NOC</b>	<b>THP</b>
Lower Ackerman Creek	15	0	0	0	15
Upper Ackerman Creek	32	0	0	0	32
<b>Totals</b>	<b>47</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>47</b>

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**Willow Creek**

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<b>Planning Watershed</b>	<b>Survey Credit</b>	<b>DIS</b>	<b>LTSFMP</b>	<b>NOC</b>	<b>THP</b>
Freezeout Creek	49	0	23	26	0
Willow Creek	2	0	0	2	0
<b>Totals</b>	<b>51</b>	<b>0</b>	<b>23</b>	<b>28</b>	<b>0</b>

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## 2. 2006 Northern Spotted Owl Banding Report

### Introduction

The Northern Spotted Owl (*Strix occidentalis caurina*; NSO) continues to be a species of strong scientific interest in the Pacific Northwest primarily because of its association with economically valuable timber. The NSO was listed as federally threatened in 1990 because of rapid and continued habitat loss throughout its range (USDI 1990). Over 20 years of demographic research has been conducted in multiple study areas yielding different conclusions regarding population stability. In 2004, a status review of the NSO found that eight of 14 study areas (four in Washington, three in Oregon, and one in California) exhibited evidence of population declines (Blakesley et al. 2004). Whether these results actually represent a range-wide decline or are artifacts of using mark-recapture methods, which make assumptions that are routinely violated is debatable. However, strong evidence for population declines exists in the northern part of the NSO's range where barred owls have been displacing NSOs for more than a decade. Although there are many uncertainties with current NSO demographic data, it is clear that continued demographic research will be necessary to address future NSO population status. Threats to the NSO vary throughout its range, thus, future research should not only focus on the effects of barred owls, but also the effects of prey dynamics, wildfire, and the relationship between demographic parameters and habitat distribution (USFWS 2004).

In California, there are four NSO demographic study areas that reported information in the 2004 status review: Willow Creek in the Klamath physiographic province, Green Diamond Resource Company in Humboldt and Del Norte counties, Hoopa tribal lands in Humboldt County, and National Park Service lands in Marin County (Franklin et al. 1996a; Diller and Thome 2000; USFWS 2004). These areas represent major landholdings within the NSO's range in northwestern California. A substantial information gap on demographic performance exists for the southern part of the NSO's range in Mendocino County, where commercial timber harvest is still prevalent and little old growth forest remains on the landscape. Louisiana-Pacific (L-P) and Georgia-Pacific Corporations had NSO banding programs in the late 1980's and early 1990's, but none of this information was ever published in peer-reviewed journals, which limited the ability of the scientific panel to incorporate demographic information from Mendocino County into the 2004 status review. Historical records inherited by Mendocino Redwood Company indicate that L-P initiated and maintained a strong NSO banding program during the first half of the 1990's, but it rapidly waned soon after.

Mendocino Redwood Company, LLC (MRC) initiated its NSO banding program with clearly outlined goals and objectives in 2003. For the past four years, we have continued with our NSO banding program on commercial timberlands in Mendocino and Sonoma counties to generate mark-recapture data that will be used to estimate demographic parameters such as recruitment rate, survival, and fecundity (Franklin et al. 1996b). We are still in the first phase of our banding program and are primarily focused on training employees and banding the entire adult NSO population within the density study area (DSA). Here, we provide an update on our 2006 banding efforts compared to the objectives laid out in 2003. We have also re-evaluated our NSO

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banding resight data based on queries generated from our revised NSO database, and present updated numbers for the past four seasons. Lastly, we discuss some directions for the future of our banding program.

### Objectives

The primary objective of this study is to assess NSO population trends, relate them to habitat distribution and timber operations on managed timberlands, and provide information to assist in the recovery of the species. Specifically, we will examine relationships between 1) NSO reproductive success and/or survivorship and the intensity of timber operations (i.e., net change in suitable owl habitat per unit time for a given area), and 2) NSO reproductive success and/or survivorship and habitat distribution. Furthermore, we hope to examine NSO dispersal patterns. This will allow us to assess trends in the NSO population on our forestlands in Mendocino County. Ultimately, this study will link demographic parameters with information on timber harvest and habitat quality and assist us in designing and using land management practices that promote population stability and hopefully, population increases across our lands.

### Study area

The study area is located in Mendocino and Sonoma counties in northwestern California and consists of 228,800 acres of coastal redwood and mixed coniferous forests owned and managed by MRC for commercial timber production (Figure 1). These forests are largely comprised of coastal redwood (*Sequoia sempervirens*), Douglas fir (*Pseudotsuga menziesii*), and various hardwoods such as tanoak (*Lithocarpus densiflora*), madrone (*Arbutus menziesii*), and in some areas, true oaks (*Quercus* spp.). Other trees species found include shade-tolerant conifer species such as grand fir (*Abies grandis*) and western hemlock (*Tsuga heterophylla*), and hardwoods such as red alder (*Alnus rubra*), California bay (*Umbellularia californica*), and big leaf maple (*Acer macrophyllum*). Vegetation patterns vary across the landscape and are the result of an interaction between precipitation gradients, soil type, fire history, past agricultural use, and more significantly, timber harvest. Past timber harvests, combined with a failure to manage pioneer species such as tanoak, have resulted in a landscape consisting of more tanoak than pre-settlement times. Current estimates indicate that hardwoods—primarily tanoak—comprise 36% of the basal area on MRC lands; and MRC’s forest managers are actively working towards restoring stands to a species mix more representative of pre-settlement times with less of a tanoak component than currently exists.

The NSO demography study is focused on the 145,000-acre DSA because this area maximizes the amount of contiguous acreage owned by MRC (Figure 1) and is adjacent to other private and public lands containing banded NSOs. The area for the DSA was also selected because it comprises forestlands having different logging histories, stocking levels, and tree species composition, which are thought to represent forest stand variation in Mendocino County. The greater area encompassing the DSA (square outline in Figure 1) consists of approximately 181 NSO territories, 100 of which reside on MRC land (please note: these numbers include both active and inactive NSO territories). While the majority of our demographic parameters will be

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estimated using NSO territories within the DSA, satellite areas owned by MRC, but outside the DSA, will also be used for banding NSOs to examine dispersal patterns.

## Methods

Every year, from 01 March—31 August, known NSO territories within the DSA are monitored to assess pair status and reproductive success. Areas with apparent gaps in NSO territories are surveyed a minimum of three times at night, with at least one survey in June, during the nesting and fledging periods (15 March—30 June). In order for surveys to count, they must be conducted at least 5 days apart. Survey stations are typically spaced at 0.2-0.4-mile intervals and topographically situated to maximize survey coverage. At each station, surveyors imitate NSO vocalizations periodically and listen for territorial responses for at least 10 minutes; direction and distance of NSO responses from the survey station are recorded. Areas with nocturnal NSO responses are visited within 48 hours during the daytime to locate NSOs and assess pair and reproductive status.

During daytime monitoring of nests or roost sites, surveyors assess pair and reproductive status by feeding live mice to the owls following methods outlined in the protocol endorsed by USFWS (1992). Owls are visually assessed for the presence of conspicuous color bands on their tarsometarsi. To avoid bias in color band identification, surveyors submit band resight information to another person for comparison with information contained in a database. Birds deemed to be non-nesting that are either unbanded, need cohort band replacement, or have ambiguous color bands are lured with mice and captured via hand-grab technique, bal-chatri, mist-net, or with a noose-pole. Once captured, unbanded birds receive a metal USFWS lock-on band on one leg and a vinyl color band on the other. Adult birds receive unique color bands and juveniles receive striped cohort bands representing year of hatching (Forsman 1984). Following banding, tarsus depth, wing chord, toe pads, and mass are measured. Sex of adult birds is determined by either the pitch of their vocalizations, toe pad length (Pyle 1997), or mass (Blakesley et al. 1990). Birds are aged by plumage characteristics and classified into four age-classes: juvenile (J), first-year subadult (SA1), second-year subadult (SA2), and adults (A)  $\geq 3$  years old (Forsman 1984). Before release, the bird's health (e.g. eye discharge, parasites, etc.) and reproductive condition (presence of brood patch) are assessed. Handling time should not exceed 30 minutes for adults, and 10 minutes for fledglings.

## Results

We captured and banded 21 unbanded NSOs (10 adults, 1 subadult, and 10 juveniles) during the 2006 NSO breeding season (Table 1). We recaptured only one previously banded bird in 2006, a female which was originally banded within that same territory. Of the adults captured, five were males, four were females, and the subadult was a male (Table 2); sex for two owls were undetermined, but mass suggested one of each sex. Two sets of paired owls were banded, both of which comprised territories located in the GDSA. One of the pairs was located within the DSA; the other was just off property. Of the newly captured adults, one was a subadult and the other 10 were  $\geq 3$  years-old (Table 1).

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Overall results of our NSO monitoring efforts for the entire MRC ownership plus adjacent, off-property areas in 2006 were similar to previous years. In total, we visited and/or nocturnally surveyed for 178 territories, of which 163 were active. In the Greater Density Study Area (GDSA; including off-property territories), we visited at least 98 NSO territories; and within the DSA (MRC property only), we visited 87 territories. We located a total of 176 birds. This is fewer than in 2004 and 2005, but more than was located in 2003. Late spring rains probably led to decreased overall nesting attempts in 2006, resulting in fewer territorial owls being located.

MRC biologists have banded a total of 153 NSOs during the past four seasons, covering 97 adult and subadult birds, and 56 juveniles (Table 3). Total banding success dropped substantially in 2006 compared to other years, though all 21 bands were placed on birds located within the GDSA. In 2006, within the GDSA, total banding effort was nearly the same as 2003. Half as many adults and subadults were banded within the DSA in 2006 as were banded in 2003; 15 NSOs (9 adults/subadults and 6 juveniles) were banded within the study area on MRC land. Confirmed resight status (banded and unbanded) was similar to the past four years, but had the second fewest unknown and unbanded birds.

Handling time for adult birds fell within the federally mandated time limit of 30 minutes. All fledglings, except one, were banded within the self-imposed time limit of 10 minutes. It was banded in 12 minutes.

One NSO was found dead on Highway 128 on 28 October 2006, apparently the victim of a collision with an automobile. It was a hatch year subadult, originally banded on 26 July as a juvenile, approximately seven miles away at MD525.

## **Discussion**

Mendocino Redwood Company's NSO banding program may be starting to experience some leveling-off of unbanded adult birds, but it may be too early in the banding program to say this with confidence. Many birds within the study area are unbanded and further effort is necessary to band the entire adult NSO population here. A combination of factors, such as nesting rates, climate, survey effort, and follow-up times, affect our ability to successfully locate, capture and band, and/or resight NSOs. A higher than normal nesting rate assisted our banding program in 2004 and a slightly lower but above-average nesting rate assisted us in 2005. A lower nesting rate contributed to our lower banding success in 2006. While life-history patterns such as nesting rates can contribute towards banding success, the factors we are able to control that best predict encounters with owls are survey effort and follow-up times. Solid efforts in these two areas during the 2006 season suggest surveyors should step up efforts to resight encountered birds in the future.

If an owl is nesting or has young to feed, they are typically easier to find and more willing to take food in close proximity to a surveyor, which makes color-band identification easier and more reliable. It is also possible we have had an increase in the number of owls having limited

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exposure to people and the mousing routine. We suspect that similar situations have been affecting our ability to locate and/or obtain status on several territories throughout the ownership.

Improvement on color-band resights is needed to generate demographic data suitable for analysis. A strategy we will employ in 2007 is to make the most of first encounters with owls early in the season both for banding and resight purposes, weather permitting. Often a surveyor will have only one opportunity to band and/or resight an NSO during the season. This will require training several new people to capture and band NSOs, and even hiring technicians with prior NSO banding experience. Prior to the 2007 season, we will review and train all wildlife personnel in making accurate resights and discuss ways to improve the quality of information collected. We will be working closely with all staff to ensure more accurate resight information.

Our specific goals for the 2007 survey season are to band more unbanded adult NSOs within the GDSA, improve resight status for all NSOs encountered, and lastly, organize a demographic data matrix for the study area. By focusing on these three areas, we will be able to better track data quality and ensure we are collecting data to estimate NSO demographic performance to assist in future status reviews and recovery of the species.

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