2010-2011
Annual Wildlife Report

I. Northern Spotted Occupancy and Reproduction Patterns.

Mendocino Redwood Company monitors northern spotted owl (NSO) occupancy and reproduction on its property (and up to 1000' beyond property lines if necessary) every year to assess population trends over time. Over the past twelve years, MRC has annually surveyed most of its historic and active NSO territories. In 2010 and 2011, MRC made an effort to survey much of its 228,000-acre ownership after a poor survey effort in 2009. Here are occupancy trends for MRC lands:

- From 2000-2011, occupancy patterns have been relatively stable (Fig. 1; purple line), with the exception of 2003, when the nesting rate was one of the lowest on record; and 2009, when survey effort was curtailed as result of the economic recession.

- Although most territories are occupied every year (81% average from occupancy modeling, 2001-2008), a higher proportion of sites were occupied by pairs when nesting rates were above-average (Fig. 1, blue line; 2001, 20004, 2005, 2008), compared to years when nesting rates were below-average (Fig. 1, green line; 2003, 2006, 2007). Interestingly, this pattern was not evident in 2010 and 2011.

- In 2010, uncorrected occupancy rates appear higher than previous years. This may be due to the fact that nocturnal survey effort was the highest on record and many of the owl territories were identified as occupied by nighttime vocals as opposed to more robust daytime locations (Fig. 2 & 3). In the future, occupancy modeling will be used to account for survey effort and spotted owl detection probabilities.

- Spotted owl nesting and reproductive rates ("productivity"--mean number of fledges per pair) are cyclic and correlated with spring rainfall patterns. Spotted owls have comparably higher productivity in years when there is little or no rainfall during the early nesting period (March-April) compared to years with higher rainfall (Fig. 4 & 5). This is a common pattern seen on a variety of ownerships throughout northwestern California.

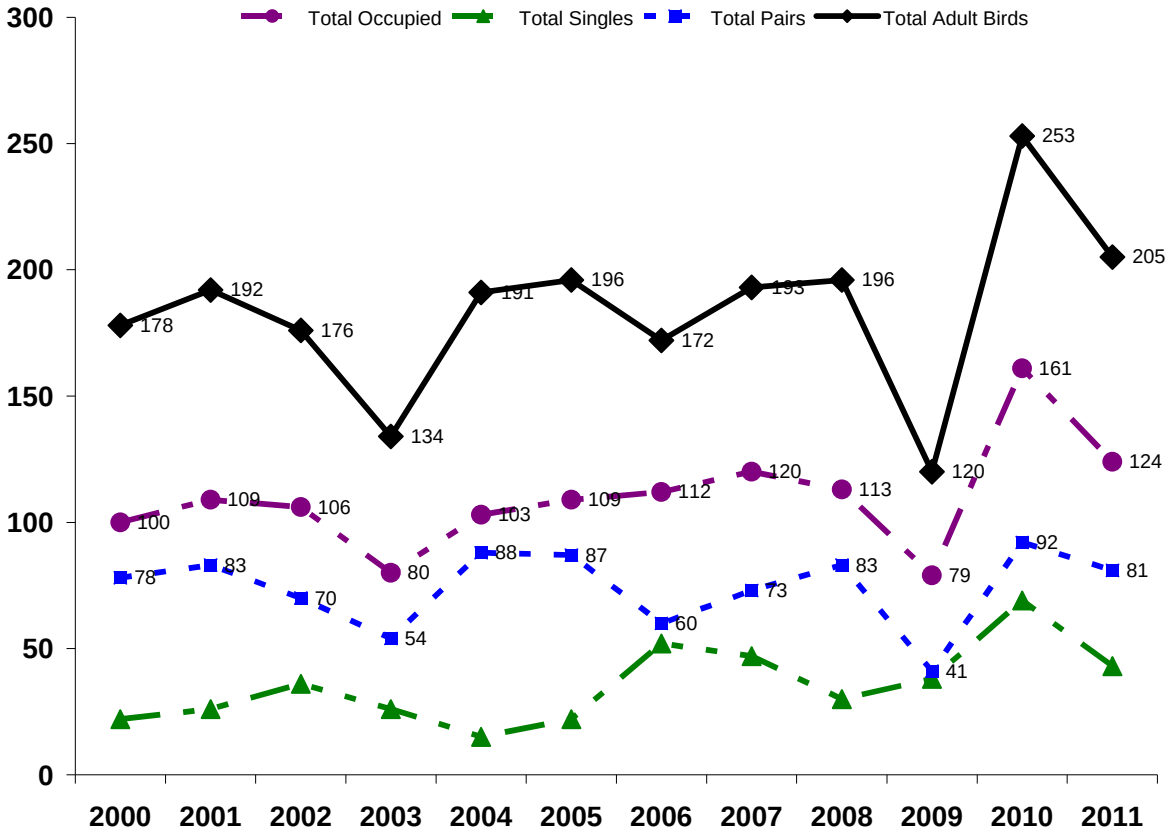

Figure 1: Northern spotted owl occupancy patterns for territories on and/or near MRC property from 2000-2011 (up to 1000 feet off-property). Results for 2009 are low compared to previous years primarily because of survey effort. However, an above-average number of occupied territories were detected in 2010 (many of which were single birds detected at night), and an average number of territories occupied in 2011.

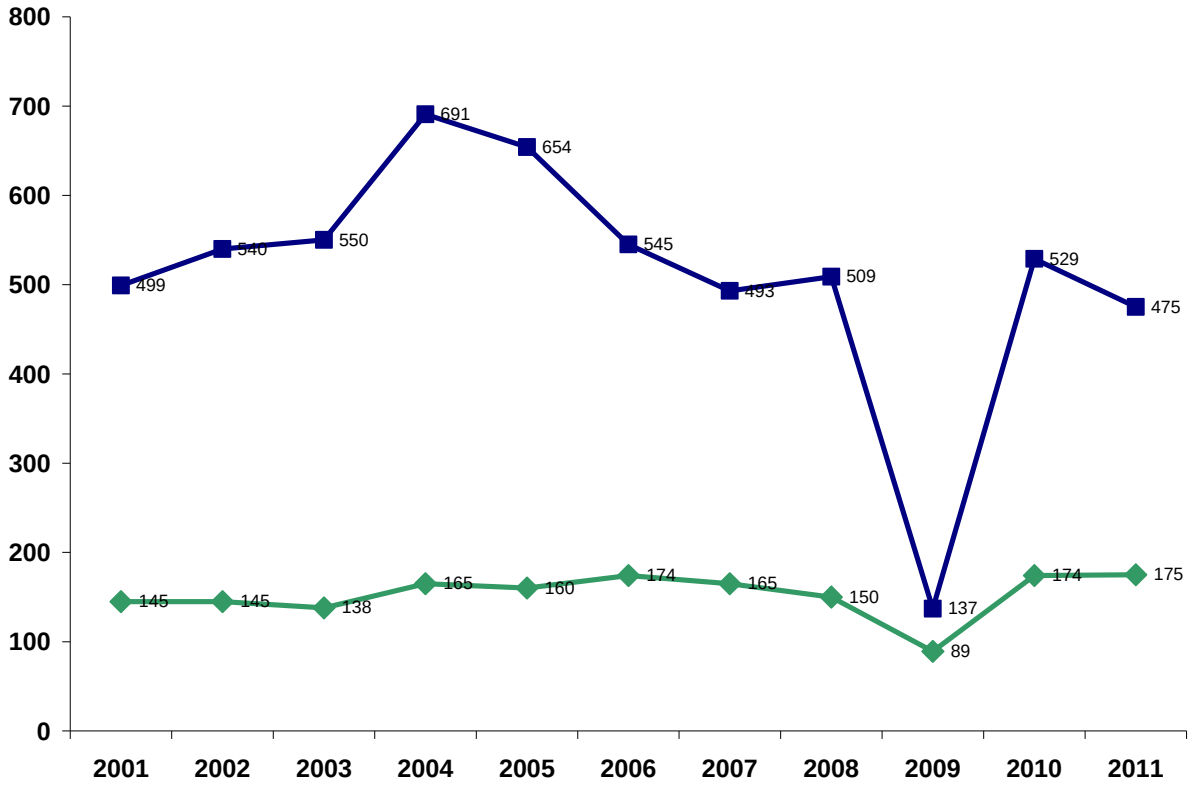

Figure 2: Northern spotted owl daytime survey effort for 2001-2011. Total number of daytime surveys and unique spotted owl territories covered in surveys decreased substantially in 2009, and rebounded in 2010 and 2011 with a focused survey effort.

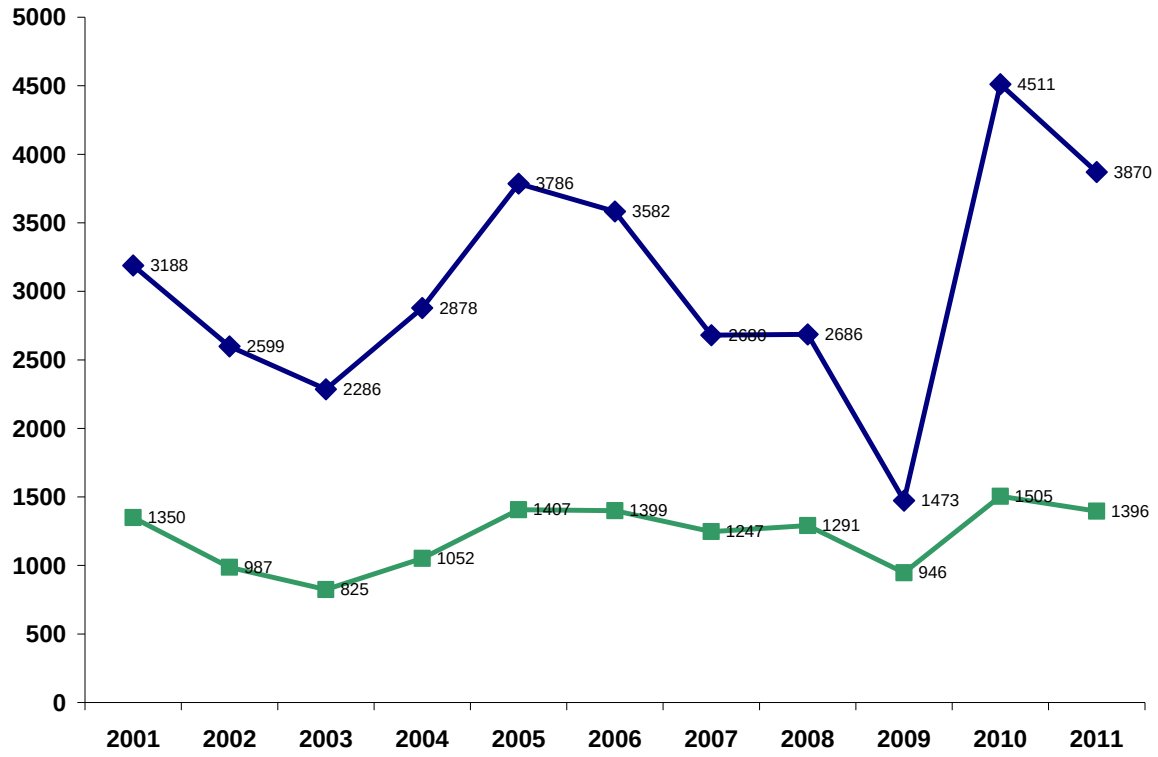

Figure 3: Northern spotted owl nighttime survey effort for 2001-2011. Total number of 10-minute surveys and unique wildlife stations surveyed also decreased substantially in 2009 but rebounded in 2010 and 2011. The unique number of stations surveyed provides a metric of relative spatial coverage by nighttime surveys across the landscape between years.

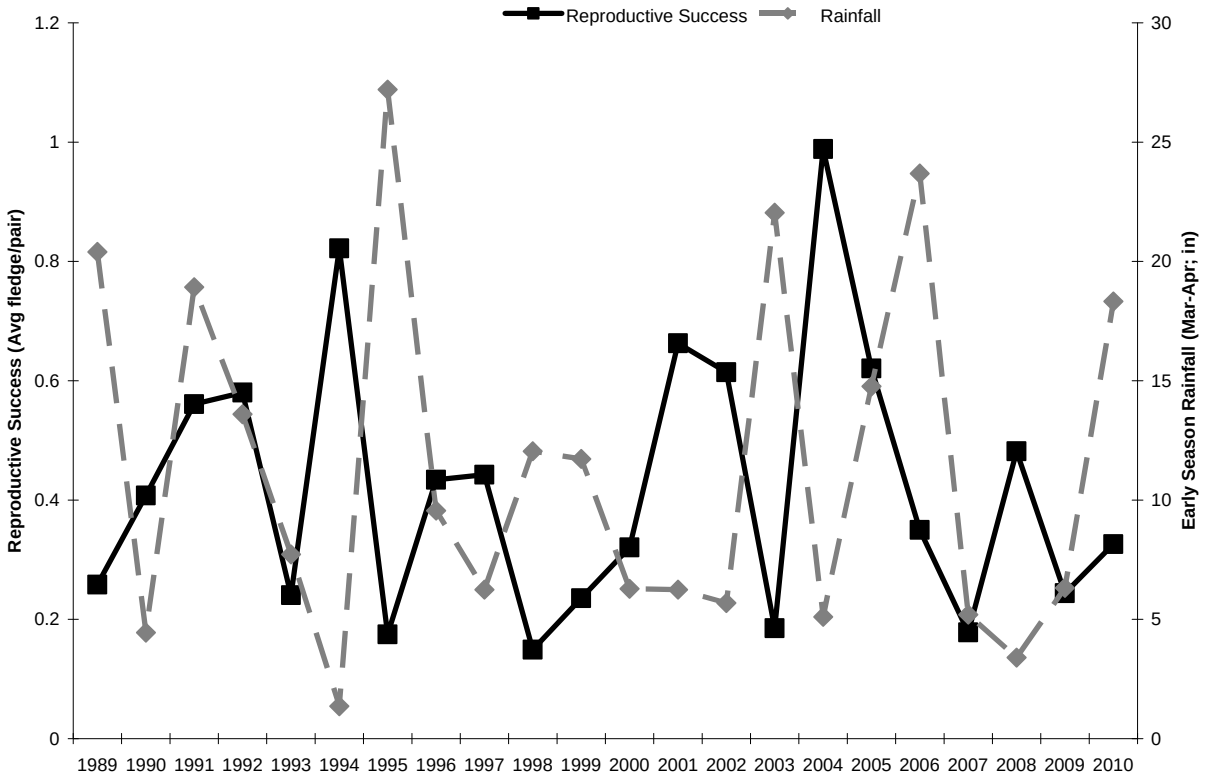

Figure 4: Northern spotted owl annual productivity (mean number of fledglings produced per territory) and early spring rainfall (March-April;) for the past 22 years.

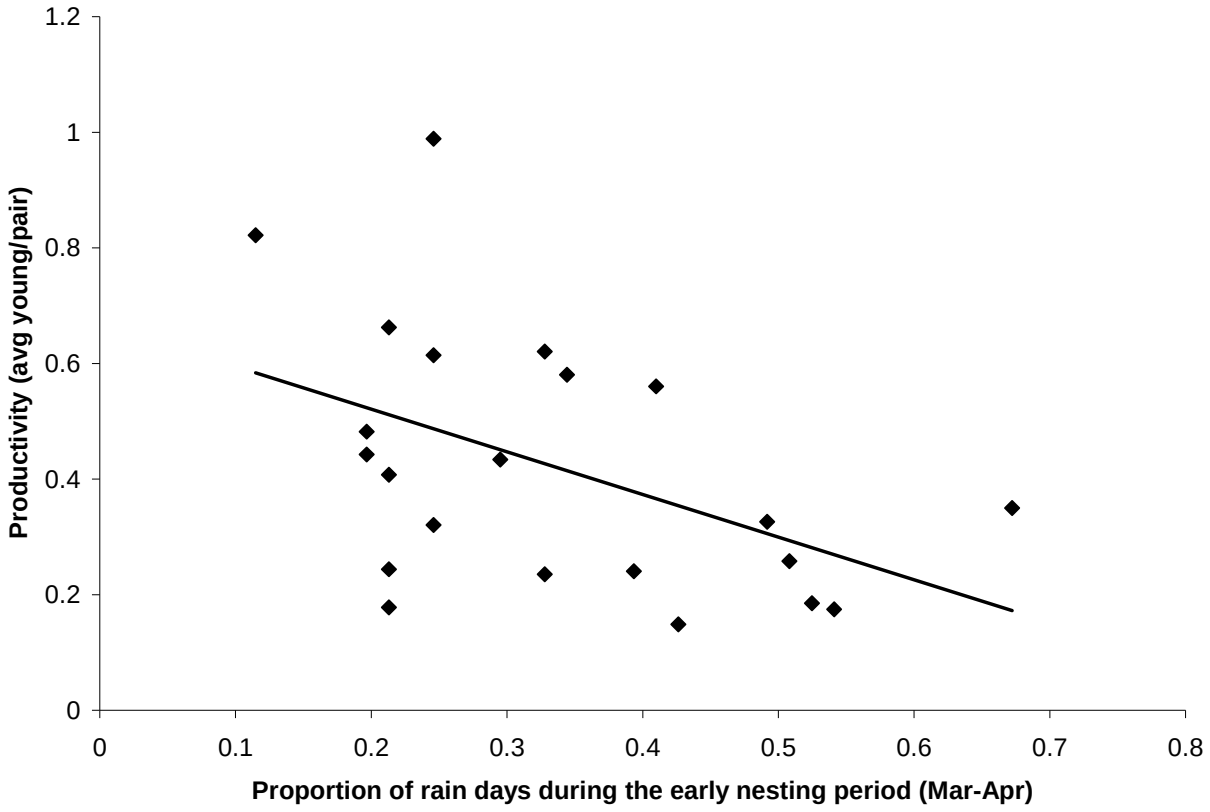

Figure 5: Spotted owl productivity has a negative relationship with the proportion of rain days during the early nesting season. Data depicted here are from 1989-2010.

- Adaptive Management: In lieu of demographic information, landscape-wide annual monitoring of NSO occupancy and reproduction is an appropriate method for assessing the health of the population, evaluating cumulative effects of timber harvest, and identifying the reproductive capacity of individual territories on MRC lands. Additionally, continued monitoring of productivity and spring rainfall is also necessary to distinguish environmental factors (climate versus habitat) that may be influencing the recruitment potential of the spotted owl population in the future. This level of monitoring exceeds the effort required to avoid take of spotted owls, and more importantly, provides biological data to feed back into our land management and decision-making processes.

II. Northern Spotted Owl Banding

Bird banding is a method employed to generate mark-recapture data for estimating population size and various demographic, or life history parameters that are responsible for population trends. It involves uniquely marking birds and tracking their individual recapture histories during territory monitoring. With mark-recapture data, it is possible to determine the mechanisms underlying the maintenance of our spotted owl population.

A population may be stable, increasing, or decreasing over a specific period of time; and the underlying mechanisms that produce these patterns, such as adult survival and turnover (or adult replacement), can be estimated from the mark-recapture data. For example, a stable population of owls may be maintained by high adult survival and low turnover, or by low adult survival and high adult turnover. Similarly, there are various combinations of survival and turnover rates that may also show a population to be increasing or decreasing. Here are some spotted owl banding facts regarding Mendocino Redwood Company's timberlands:

- From 1990-2011, a total of 726 spotted owls (494 adults and 232 juveniles) have been banded. A total of 316 spotted owls have been banded since MRC was formed in 1998.

- The oldest confirmed northern spotted owl on MRC lands is at least 18 years-old (Female associated with territory MD025, banded as an adult in 1991 and recaptured in 2007).

- The longest recorded juvenile dispersal distance recorded for MRC lands is 34.5 km. A female owl banded as a juvenile in Willow Creek (along the Russian River, Sonoma County) was recaptured two years later as a nesting sub-adult in Annapolis, Sonoma County.

- As of the beginning of August 2011, a total of 45 spotted owls were banded (32 adults and 13 juveniles) on MRC lands. This is the highest number of spotted owls banded in a year when reproduction was very low. This number will increase as banding efforts continue on MRC and adjacent lands.

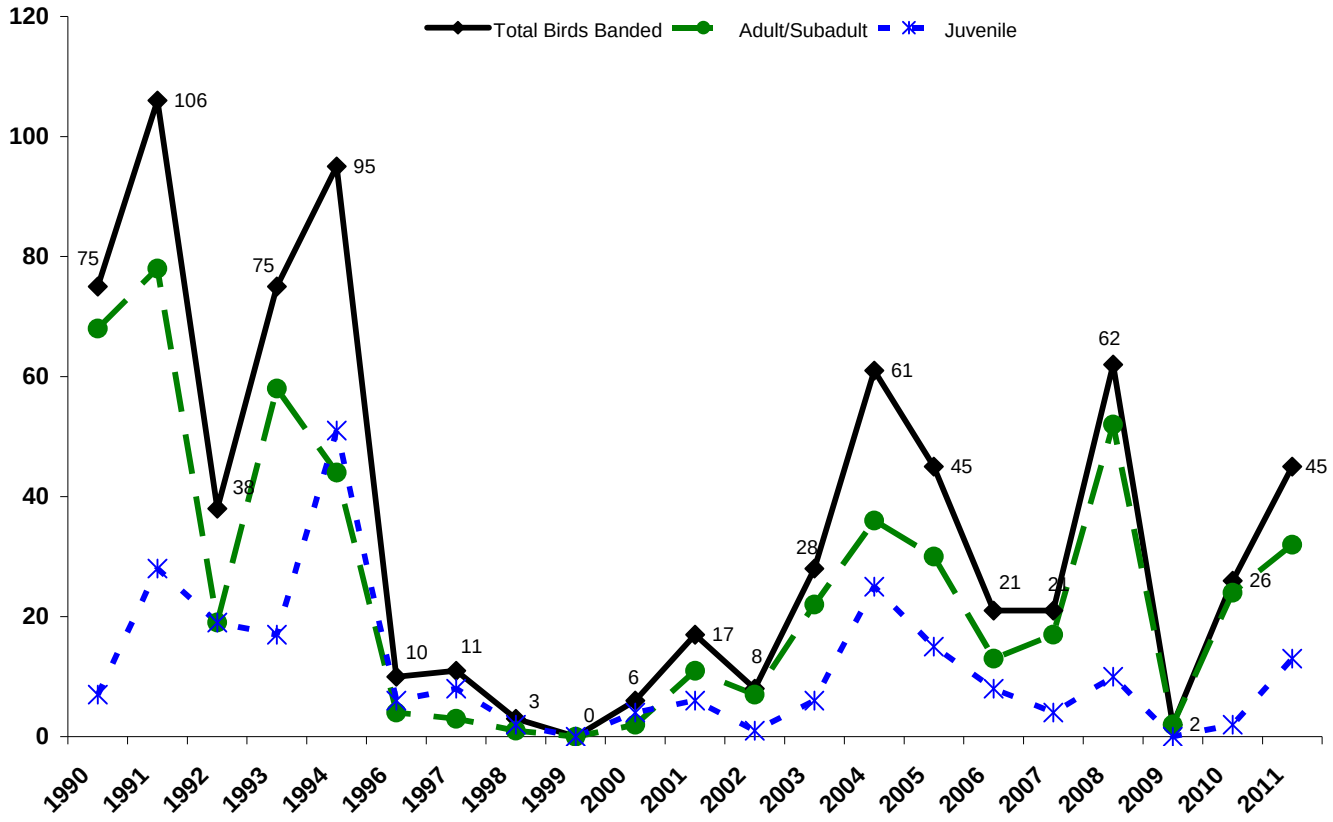

Figure 1: Annual number of northern spotted owls banded on Mendocino Redwood Company timberlands from 1990-2011. Data shown above include birds banded by Louisiana-Pacific Corporation prior to 1998.

- Adaptive Management: Currently, we are continuing to collect mark-recapture data for the spotted owls on our timberlands to gain a more precise understanding of their population dynamics. Ultimately, these demographic parameters will be evaluated with habitat distribution and configuration to assess whether our forest management trajectory over the landscape is appropriate for maintaining spotted owls over time, and hence, aid in their recovery. Furthermore, we are also working with adjacent landowners and independent researchers who have banding programs of their own to further our knowledge of spotted owl population dynamics at a county-wide scale.

III. Barred Owl Invasion on MRC Lands

The barred owl (*Strix varia*) has migrated west from the eastern United States and has rapidly colonized forests of the Pacific Northwest occupied by the federally threatened northern spotted owl (*Strix occidentalis caurina*). Over the past decade there has been increasing evidence that Barred Owl presence negatively affects spotted owl social behavior, detectability, occupancy, and reproduction. In some regions of Oregon and Washington, it appears the larger and more aggressive barred owl is displacing the spotted owl. Furthermore, because spotted owl populations are declining in many areas of its range, understanding the behavioral dynamics of barred/spotted owl interactions is a top priority for research and management efforts.

The Northern Spotted Owl Recovery Plan identified the barred owl as the number one threat to the spotted owl, and researchers have made a strong case for studying the effectiveness of barred owl removal experiments before implementing large-scale control plans. Anecdotal accounts of removal conducted in two areas of northern California suggest that: 1) spotted owls remain in their territory or nearby when barred owls colonize, but become reticent and less detectable by standard survey methods; 2) removal of barred owls during the initial phase of colonization increases the probability of site re-occupancy by spotted owls; and 3) targeted removal of a few adult barred owls prior to the spotted owl nesting season has a positive effect on spotted owl re-occupancy and nesting.

Until the numerous regulatory dilemmas are resolved regarding the barred/spotted owl conflict, MRC is continuing to monitor the status of the barred owl invasion on its forest lands. Here are some facts regarding barred owl distribution on MRC lands:

- Barred owl detections have increased exponentially every year on MRC lands since 2005 (Fig. 1). As of August 2011, barred owls have been detected at 39 unique spotted owl territories (Figs. 2 & 3).

- In areas where barred owls have been seen or heard for at least three seasons, spotted owls have become less vocally responsive and more difficult to find. Also, we are seeing a rise in the number of new spotted owl territories, which may be a sign that increased displacement is occurring.

- In 2011, two—maybe three—spotted owl territories successfully reproduced and fledged young where barred owls were detected within one mile radius of their site center. Most of these territories were either undetected or failed to exhibit nesting behaviors during surveys for most of the breeding season, but were later detected in late July or August with young.

- In 2009, survey effort was reduced because of the recession so there appears to be decline in barred owl detections and barred owl associated with spotted owl territories. This was probably not the case as 2010 and 2011 survey data show a significant increase in barred owl detections (Figs 1 & 2).

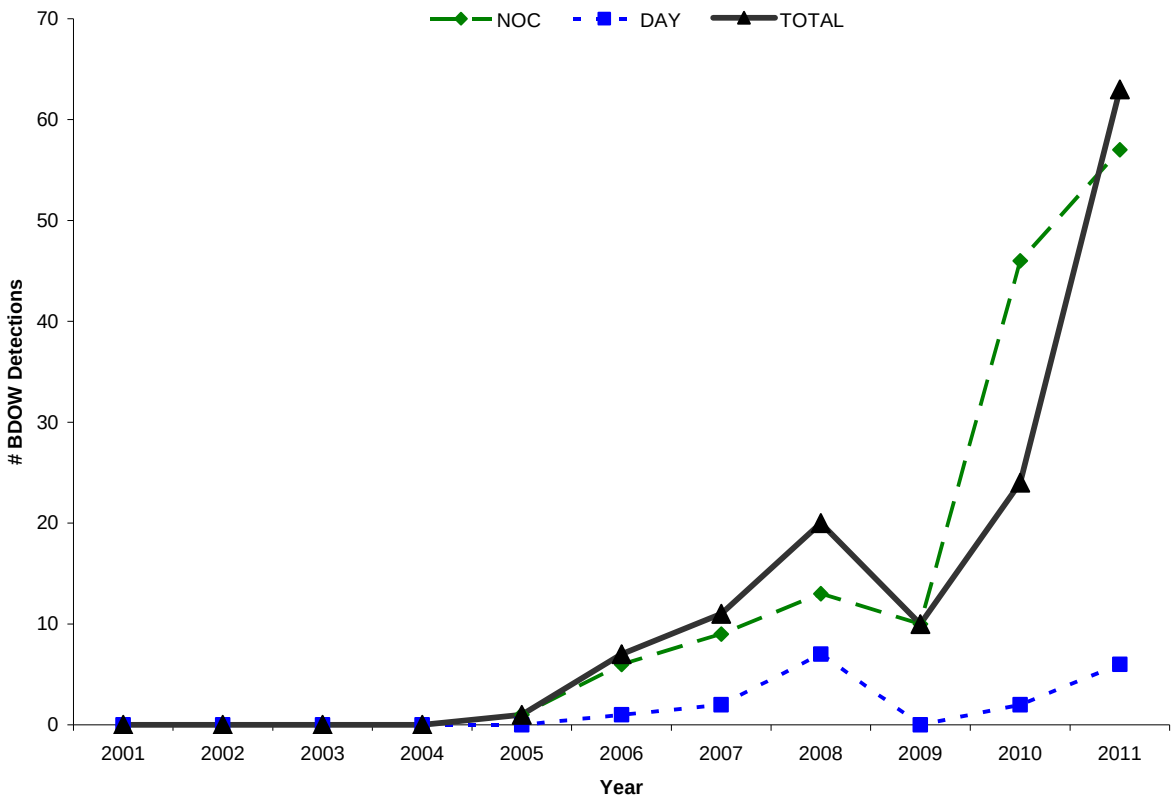
NOC
DAY
TOTAL
BDOW Detections
70
60
50
40
30
20
10
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Year

Figure 1: Barred owl detections by year from 2001-2011.

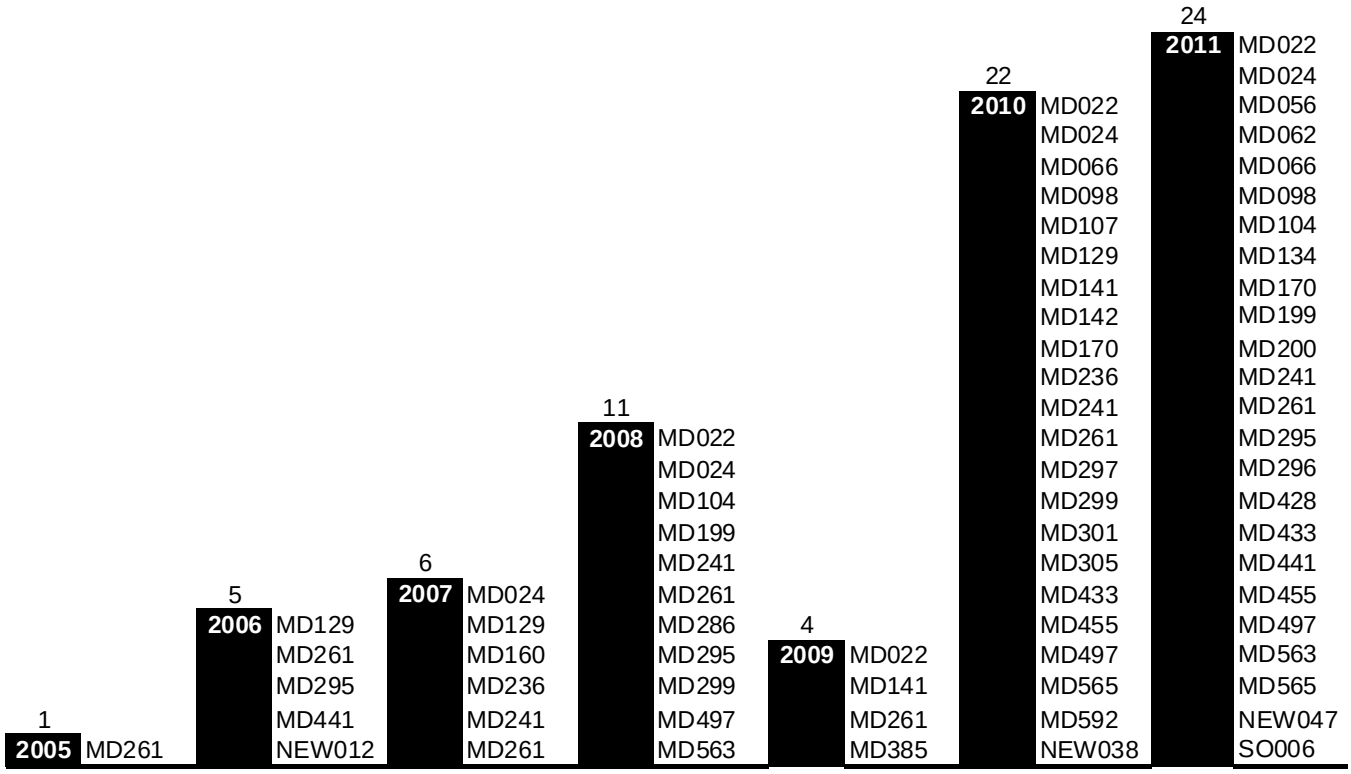

Figure 2: Number of spotted owl territories with barred owl detections, 2005-2011. Thirty-nine unique spotted owl territories have barred owl detections within 1-mile of their site center. In 2009, barred owl detections were low because of reduced survey effort related to the economic downturn.

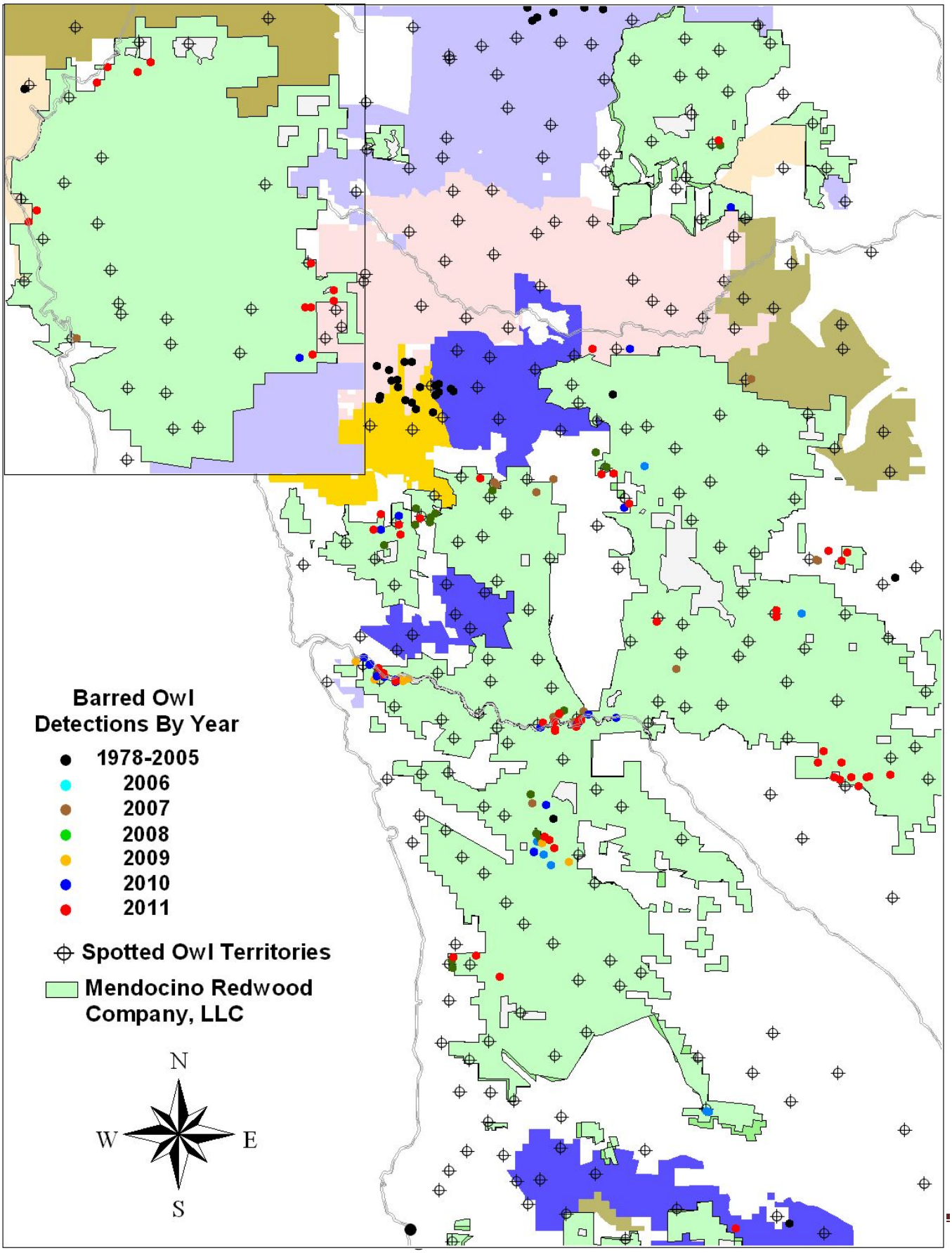
Barred Owl
Detections By Year
1978-2005
2006
2007
2008
2009
2010
2011
Spotted Owl Territories
Mendocino Redwood
Company, LLC
N
W
E
S

Figure 3: Barred owl detections and spotted owl territories from the California Natural Diversity Database and Mendocino Redwood Company survey records.

Adaptive Management: There has been a significant increase in the number and spatial extent of barred owl detections since 2006. The rapid invasion of spotted owl sites by barred owls in such a short time suggests that a population threshold may have been reached locally or in other areas within dispersal distance. We are continuing to survey and monitor barred owl detections on our landscape to annually assess the state of barred owls on our landscape and how they may be affecting our spotted owls. Additionally, we are working very closely with state and federal agencies to develop management solutions to this increasingly important biological issue.

IV. Marbled Murrelet Surveys and Radar Monitoring

The marbled murrelet (*Brachyramphus marmoratus*; MAMU) is a small Pacific seabird found in coastal nearshore waters of western North America ranging from the Aleutian Islands in the north to northern Mexico in the south. This species is unique among members of the Alcidae in that it typically nests in trees associated with late-seral and old growth coniferous forests and may travel substantial distances inland to nest sites. Since murrelets do not construct their nests, they must rely upon the presence of old and/or mature trees with large limb diameters, deformities, canopy epiphytes, mistletoe brooms, or debris accumulations for suitable nesting platforms.

Declines in murrelet population numbers throughout their geographic range have been attributed to the species' low fecundity, increased at-sea mortalities from oil spills and gill nets, reduced prey-base from over-fishing, and the removal of suitable nesting habitat (i.e. late-seral and old growth habitat). In 1992, these factors prompted the U.S. Fish and Wildlife Service and the State of California to list the Marbled Murrelet as threatened and endangered, respectively.

Mendocino Redwood Company conducts audio-visual surveys around suitable murrelet habitat within 0.25-mile of timber operations proposed during the breeding season, and uses radar to monitor a known murrelet population in Lower Alder Creek. Recent radar monitoring has been focused on development of a radar survey protocol that distinguishes marbled murrelets from other fast flying bird species during the survey period. Murrelet survey results for 2010 are as follows:

- In 2010, a total of 10 radar surveys were conducted on Lower Alder Creek. Five surveys were conducted at Station 1 (0.5-miles east of Highway 1), and five surveys were conducted at Station 2 (2.3 miles east of Highway 1).

- Mean number of radar detections (pre- and post-sunrise, total detections) are significantly higher at station 1 compared to station 2 (Tables 1 & 2). Radar detections are consistently different between the two stations, as they differ in proximity to the ocean, topography, radar coverage, and daily murrelet activity (Fig. 1).

- Annual trends in radar detections between stations do not appear to be correlated (Tables 1 & 2). Station 1, which is very close to the mouth of the Alder Creek drainage, may provide the best radar view to monitor murrelet activity because the radar has a wide view. Station 2, which is located in a very incised portion of Alder Creek, has a much narrower view than station 1 and commonly has more vocal detections of marbled murrelets than radar detections. Regardless, station 2 is very close to occupied habitat, and thus, radar surveys in this area best serve to identify forested areas that are likely used by nesting murrelets.

- An ongoing effort to monitor data quality of radar surveys is being done by using ground observers to verify targets detected on radar. In 2009-2010, we measured flight speeds of band-tailed pigeons and found they were the most common fast-flying bird post-sunrise that could be mistakenly counted as a murrelet-type target (> 40 mph) if not confirmed by a ground observer (Table 3). High abundance of band-tailed pigeons after sunrise may necessitate using only the pre-sunrise murrelet-type radar detections for assessing trends in murrelet activity in the watershed. More research on this question will be conducted during 2011 radar surveys.

- In 2010, we conducted 10 audio-visual murrelet surveys covering two proposed timber harvest plans, plus ten additional ground surveys in conjunction with the radar truck.We completed the first year of surveys for the Gulch 5 (Noyo) and Clearbrook THPs with no murrelets detected in or within 0.25-mile of potential habitat.

Table 1: Pre- and post-Sunrise MAMU-type targets detected on radar from 2003-2010 at Station 1 on Alder Creek

	2003	2004	2005	2006	2007	2008	2009	2010
Pre-Sunrise	**17.00**	**10.50**	**11.00**	**NS**	**4.60**	**7.00**	**5.00**	**6.60**
SE	1.00	1.50	5.00	NS	1.40	1.98	1.95	1.46
Post-Sunrise	**16.50**	**14.50**	**14.00**	**NS**	**6.80**	**25.00**	**15.40**	**15.6**
SE	1.50	0.50	2.00	NS	2.18	4.33	2.93	2.13
Total	**33.50**	**25.00**	**25.00**	**NS**	**11.40**	**32.00**	**20.40**	**22.2**
SE	2.50	1.00	3.00	NS	1.50	6.15	2.82	3.27
Sample Size	2.00	2.00	2.00	NS	5.00	6.00	5.00	5.00

Table 2: Pre- and post-Sunrise MAMU-type targets detected on radar from 2003-2010 at Station 2 on Alder Creek

	2003	2004	2005	2006	2007	2008	2009	2010
Pre-Sunrise	**2.50**	**7.50**	**1.50**	**NS**	**1.40**	**0.20**	**2.60**	**3.00**
SE	1.50	1.50	0.50	NS	0.51	0.20	1.08	0.94
Post-Sunrise	**3.00**	**4.50**	**0.00**	**NS**	**1.40**	**0.20**	**3.80**	**5.20**
SE	0.00	4.50	0.00	NS	0.51	0.20	1.02	1.49
Total	**5.50**	**12.00**	**1.50**	**NS**	**2.80**	**0.40**	**6.40**	**8.20**
SE	1.50	6.00	0.50	NS	0.58	0.24	1.72	1.82
Sample Size	2.00	2.00	2.00	NS	5.00	5.00	5.00	5.00

Table 3: Band-tailed Pigeon Flight Speed on Radar during Marbled Murrelet surveys, 2009-2010

Date	Mean Flight Speed (mph)	SE	Min	Max	N
7/25/2009	42.78	1.71	41.07	47.91	4
7/28/2009	53.11	0.87	47.91	54.76	9
7/30/2009	49.16	1.16	41.07	54.76	11
7/8/2010	44.49	0.00	44.49	44.49	2
7/22/2010	47.29	1.86	34.22	54.75	14
7/26/2010	39.92	1.14	37.64	41.06	3
7/29/2010	47.39	1.76	34.22	58.18	11
Total	**47.81**	**0.79**	**34.22**	**58.18**	**54**

V. Mesocarnivore Distribution on Commercial Timberlands in Mendocino County

Historic timber harvests have significantly reduced the amount of old growth and late-seral forest in northwestern California which has incited concern over the population status and distribution of several animal species in the region. While much attention has been focused on the northern spotted owl and marbled murrelet, increasing attention is now being focused on the distribution and status of forest carnivores, specifically the Pacific fisher (*Martes pennanti pacifica*) and Humboldt marten (*Martes americana humboldtensis*).

The Pacific fisher currently exists in two disjunct populations in California—one in northwestern California, and the other in southern Sierra Nevada mountains. Compared to its historic range in California (as outlined in Grinnell et al. 1937), the Pacific fisher has become increasingly isolated during the past century due to trapping, habitat fragmentation, and other anthropogenic pressures. Because of a widespread decline and increasing isolation of Pacific fisher populations throughout its western range, the United States Fish and Wildlife Service considered the Pacific fisher for listing under the Endangered Species Act (ESA) as "warranted but precluded." Although this decision did not result in listing the Pacific fisher as threatened or endangered, it did, however, maintain the Pacific fisher's status as a candidate species for listing which will be reviewed annually. Thus, a future listing under the ESA is highly probable.

In January 2008, the Center for Biological Diversity submitted a petition to the California Fish and Game Commission to list the Pacific fisher under the California Endangered Species Act (CESA), citing many of the reasons listed above, as well as the existence of numerous threats which have no regulatory mechanisms of control at this time. Although this petition was initially denied after review in July 2008, additional information was subsequently provided to the Commission sufficient to make the Pacific Fisher a candidate species under CESA. This triggers a 12-month review period to determine whether listing under CESA is warranted.

Because Pacific fisher and Humboldt marten remain an important conservation issue in northwestern California, Mendocino Redwood Company initiated sooted track-plate surveys in 2004 to document the distribution of these species, as well as the distribution of some of the more common carnivore species on its landscape. Here is a summary of the survey results:

- A total of 47 track-plates site were surveyed from 2004-2008, covering MRC's landscape (Fig. 1). The methods used were designed to detect Pacific fisher and Humboldt marten (Zielinski and Kucera, 1995).

- Pacific fisher and Humboldt marten were not detected at any of the track-plate sites during the five-year survey effort (Fig. 2).

- Ten carnivore species were detected at track-plate sites. Spotted and striped skunks comprised the majority of the detections across the entire landscape, followed by opossum, gray fox, and black bear (Fig 2). These top five species accounted for almost 90% of the site detections at track-plate sites.

- In 2010, we initiated cameras surveys at select locations with residual old growth-trees and/or late seral conditions to continue monitoring carnivore presence on MRC lands. At these sites, cameras are run for two months and checked on a weekly basis to replace or replenish bait. To date, 2010-2011 camera surveys at six sites have detected the following species: black bear, coyote, opossum, bobcat, gray fox, raccoon, gray squirrel, mule deer, and turkey vulture.

- Differences in species detections by survey method are very apparent. So far, no skunks have been detected during camera surveys, whereas skunks are the most detected species in track-plate surveys. However, black bears comprise the majority of the detections, which is consistent with results from other camera surveys in the region.

Adaptive Management: Historical records indicate that both Pacific fisher and Humboldt marten were present in coastal Mendocino County in 20th Century. However, it is unknown how abundant these species were at the time and if this region represented the southern fringes of their ranges. While our current survey effort indicates that Pacific fisher and Humboldt marten are either absent, or exist in such low densities to elude detection by our methods, future systematic survey efforts will be necessary to re-assess this conclusion and also examine any changes in carnivore species composition that may be a response to habitat changes over time. Prior to undertaking another landscape-wide survey effort, we will continue to monitor select areas on the landscape considered to be the best available habitat for Pacific fisher and Humboldt marten using motion activate/infra-red digital cameras. Furthermore, we envision conducting a landscape-wide survey effort every 15-20 years to reassess carnivore distribution.

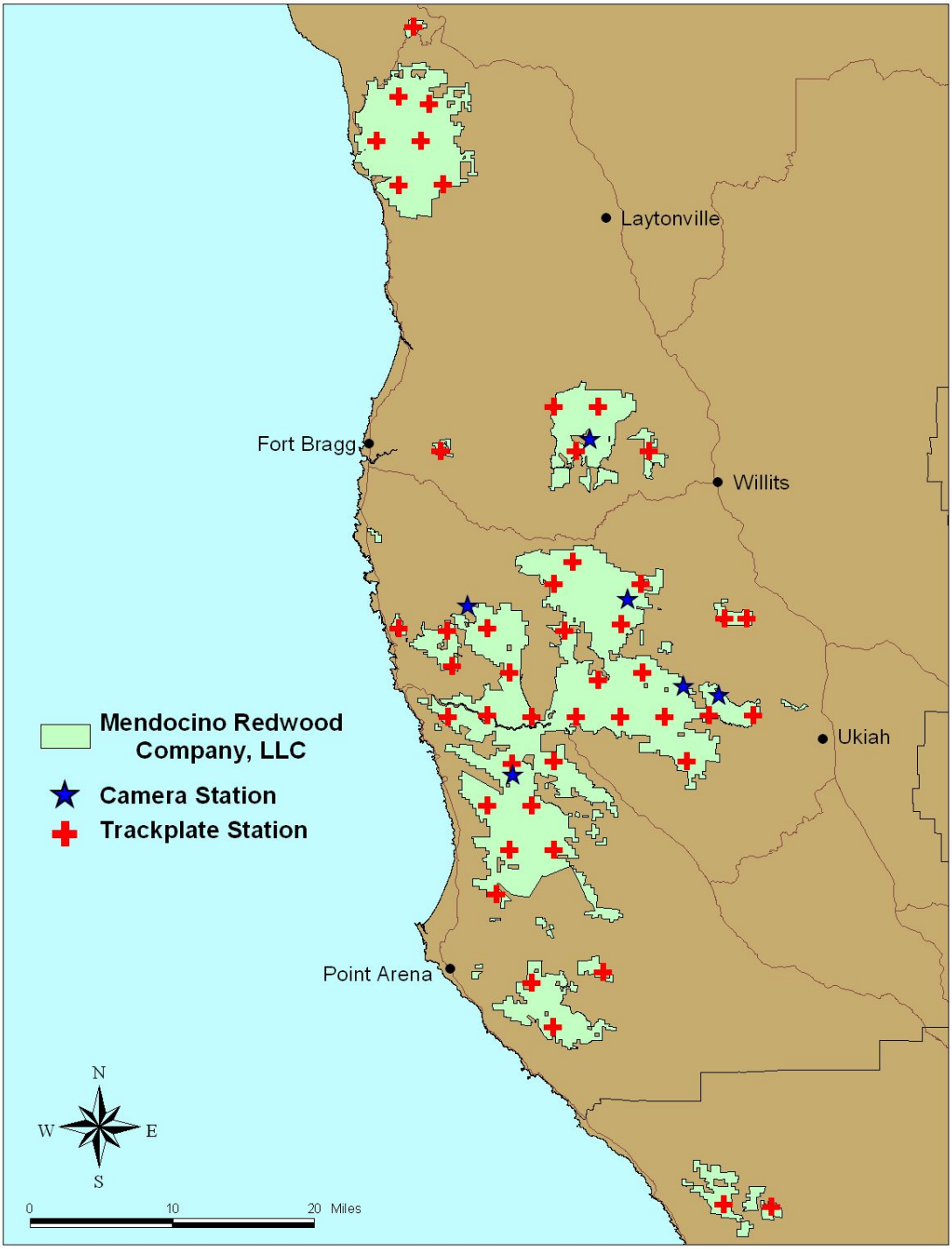

Figure 1: Survey locations for 47 track-plate sites surveyed from 2004-2008 and six camera stations surveyed from 2010-2011. Neither Pacific fisher nor Humboldt marten were detected during these surveys.

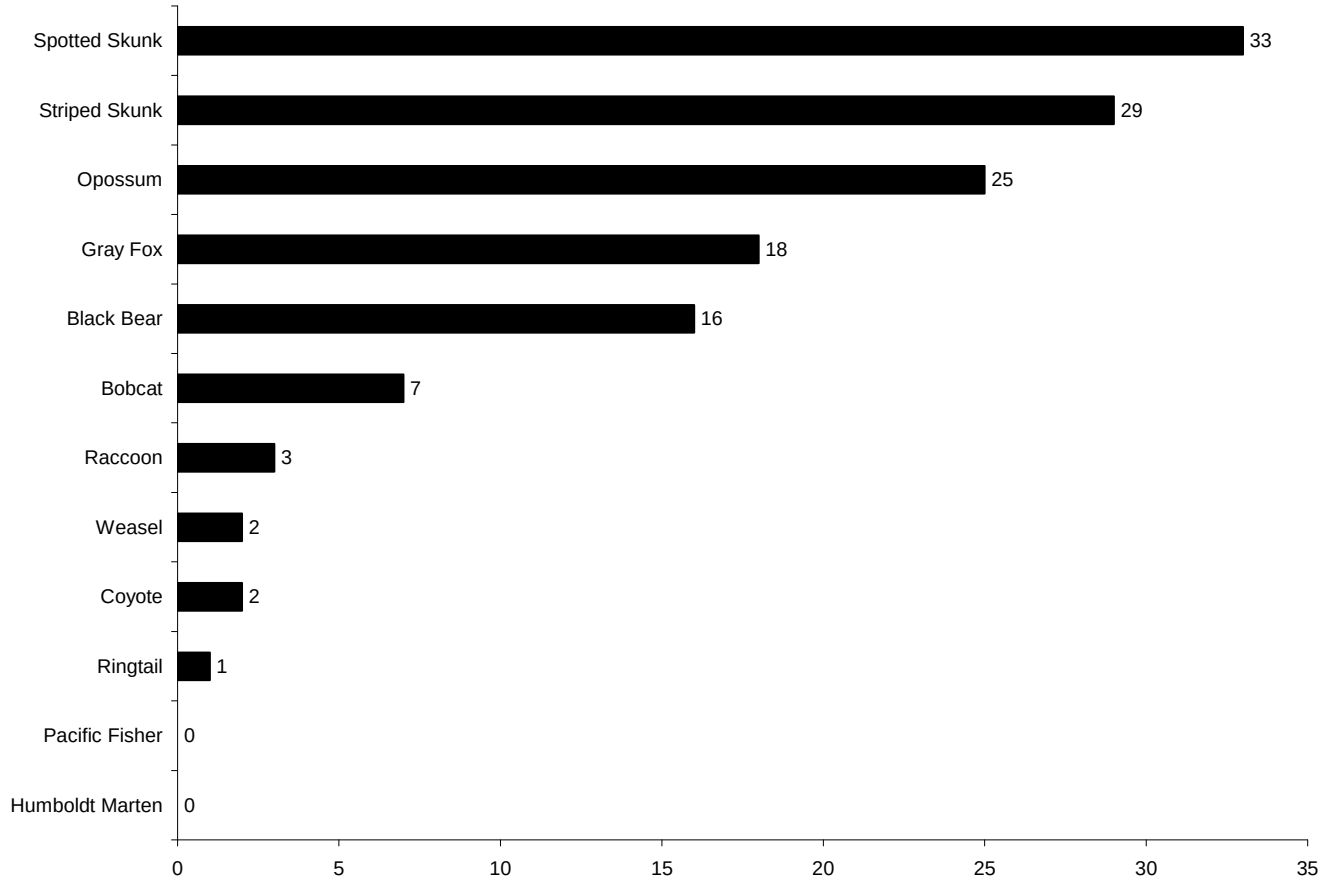

Figure 1: Number of site detections by species for track-plate surveys conducted at 47 sites from 2004-2008.

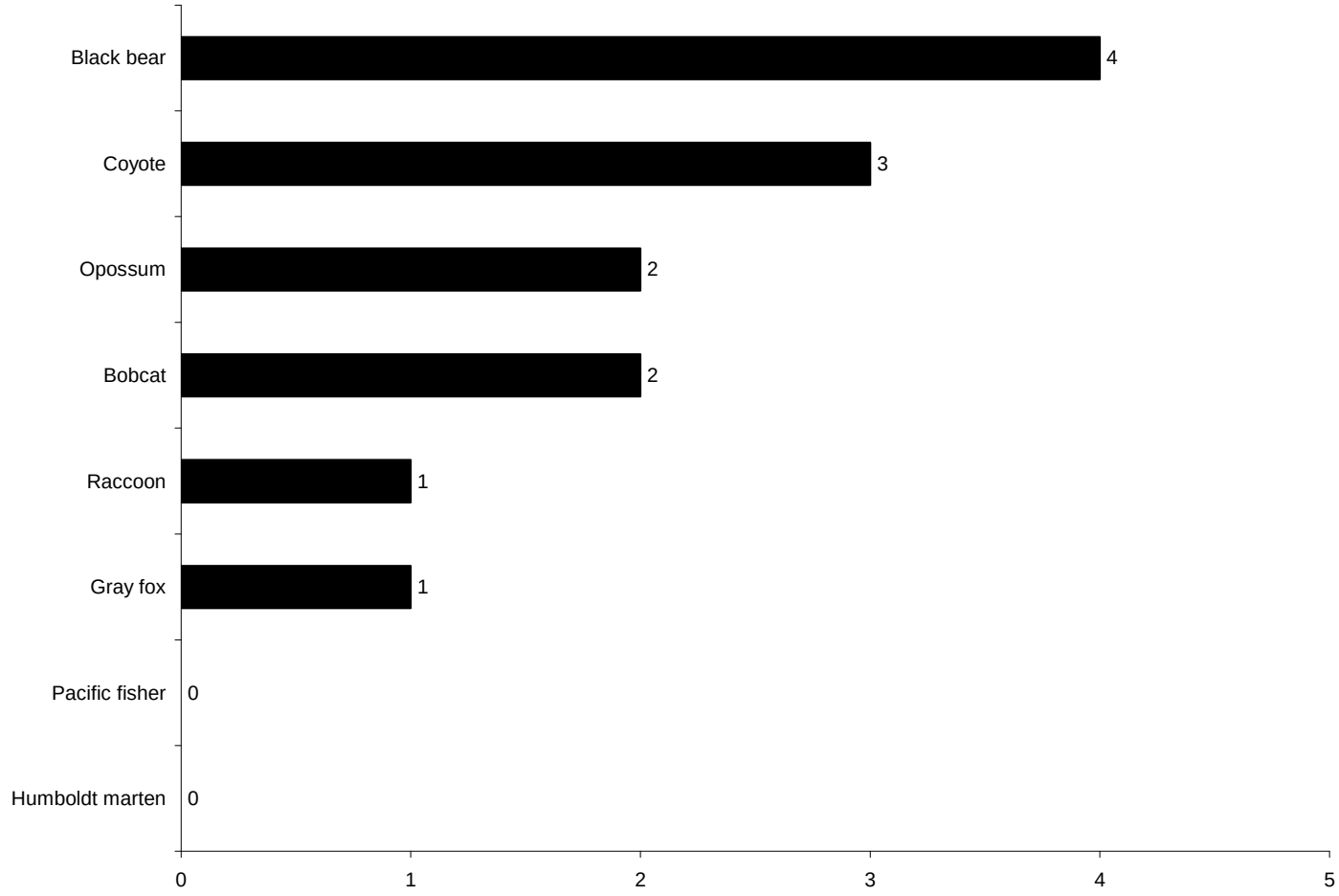

Figure 2: Number of carnivore site detections by species for camera surveys conducted at six sites from 2010-2011

Mule deer **Gray squirrel**

Raccoon

Turkey vulture

Gray fox

Bobcat

Coyote

Black bear and cubs

Opossum