SPOTTED OWL SURVEYS - 2005

Cedar River Watershed
North Bend, Washington

December 27, 2005

RAEDEKE ASSOCIATES, INC.

Report To:	City of Seattle Cedar River Watershed 19901 Cedar Falls Road, S.E. North Bend WA 98045
Title:	Spotted Owl Surveys in the Cedar River Watershed – 2005
Project Number:	2005-014-001
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Date:	December 27, 2005

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1.0 INTRODUCTION

The Cedar River Watershed consists of over 90,000 acres of mountainous and mostly forested lands extending from the Cascade Crest, just south of Snoqualmie Pass in central Washington, westward to just south of North Bend, Washington. The watershed provides one of the main sources of water for the city of Seattle and contains a large reservoir, Chester Morse Lake, as well as smaller lakes. Much of the forest in the watershed has been previously harvested and now occurs in multi-age stands of second-growth timber. Approximately 14,000 acres or 6.5% of the forest land has not been harvested and occurs as mature and old-growth forest.

The majority of old-growth forest occurs in 6 distinct patches primarily located in the upper reaches of the watershed (Figure 1). There are historic northern spotted owl (*Strix occidentalis caurina*) responses within these 6 patches of old forest, however none of these sites have had documented detections of a spotted owl since 1997. No organized surveys for spotted owls have been conducted since 2000 (D.R. Herter, S. Nickelson, pers. obs.).

In 2005, Raedeke Associates, Inc. staff conducted a series of calling surveys for northern spotted owls covering all 6 patches of old forest within the Cedar River Watershed.

This survey program was initiated as part of the requirements set forth under the Cedar River Watershed Habitat Conservation Plan (HCP; City of Seattle 2000) established in 2000. This agreement, between the City of Seattle, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service was developed to protect habitat within the watershed for selected birds, mammals, and fish. According to the plan, a thorough survey for spotted owls at old forest patches within the watershed would occur within 3-10 years following acceptance of the plan.

This 2005 survey constitutes the initial survey of the watershed for the purpose of determining the presence or absence of spotted owls following the establishment of the HCP.

2.0 METHODS

The 2005 spotted owl survey procedures followed recommended U.S. Fish and Wildlife Service guidelines (USFWS 1992). The 6 survey areas were selected by watershed biologists and represented the largest blocks of old forest habitat remaining within the watershed.

Spotted owls are known to prefer territories with a large block of old forest surrounding a selected nest tree or trees (Ripple et al. 1991, Swindle et al. 1999, Dugger et al. 2005). All of the 6 survey blocks in the watershed contained historic spotted owl responses and/or known spotted owl territories. We restricted surveys to these blocks of old-growth conifer forest, rather than survey the entire watershed. This was based on the reasoning that if spotted owls were not detected in these patches, which represent the best available habitat, then they were unlikely to occur in other areas which were typified by second-growth conifer or mixed forest with few, if any, remaining old-growth patches or remnant old-growth trees.

The survey areas consisted of a series of mapped calling stations placed in and on the edge of spotted owl habitat stands to attain complete coverage of suitable habitat, in this case, old forest patches (Figures 2 – 7). Road stations were surveyed during hours of darkness and hiking stations were surveyed during the day (typically in late afternoon prior to night surveys). Surveys done at night were initiated after civil twilight, generally when the forest became dark enough to ensure that potential diurnal spotted owl predators [primarily goshawks (*Accipiter gentilis*)and red-tailed hawks (*Buteo jamaicensis*)] were no longer active.

Surveys were completed within the suggested survey season of March 15th to August 31st (which has been extended to September 15th in Washington), which corresponds to the active breeding period for the species. Six surveys were conducted at each of the 6 survey areas and were spaced throughout the season in order to detect any potential nesting birds early in the season, and later to detect owls that may have moved into territories during the later half of the breeding period.

Surveys were halted and rescheduled if rain was moderate or heavy, or if tree-drip or winds greater than 10 mph interfered with hearing. We also rescheduled surveys if human activity was present near calling stations, particularly for those done at night. We did not initiate a night of surveys if weather conditions appeared to be severe enough to preclude most survey areas.

Survey personnel remained outside of their vehicles at each station for at least 10 minutes, broadcasting spotted owl calls and listening for responses alternately during this period. Surveyors used their voices, "hoot-flutes," and tapes of spotted owl calls to elicit responses. Vocal and either hoot flute or tapes were used in combination at each station. All owls heard during each 10-minute survey were noted. If a great horned owl (*Bubo virginianus*; another potential predator) responded, the surveyor listened for the

remainder of the 10-minute period but did not broadcast any additional spotted owl calls. Stations with great horned owl responses were repeated later in the evening, in hopes the larger owl had moved on. If a barred owl (*Strix varia*) responded, surveyors listened until the owl stopped calling, then gave additional spotted owl calls following a 2-5 minute period of silence. Barred owls are not known to prey on spotted owls, but may initiate aggressive encounters with spotted owls. Spotted owls are known to respond to barred owl calls, however, so we did not reschedule stations at which we heard this species.

A typical evening survey, conducted under appropriate weather conditions, consisted of two or more observers driving to separate survey areas and initiating surveys after the forest was dark enough for the surveyors to be confident that diurnal raptors were no longer active. A route to the stations to be surveyed was predetermined for the evening and surveys began with initial calls given at the first station. Observers drove between stations and typically covered each survey area in a "wave" from one end of the survey area to the other. We typically surveyed from 8-12 stations per evening, requiring 3 to 6 hours per survey night per observer. All six survey areas were covered within a one-week period, each consisting of a "visit". Six visits were done to all six survey areas in 2005 (Table 1).

3.0 RESULTS

We detected no spotted owls during any survey within the Cedar River Watershed during the 2005 survey period.

3.1 Weather

Although the allowable survey period extends from mid-March through mid-September, we delayed the start of surveys until mid-May, primarily due to cold, wet weather in early spring. We attempted to initiate surveys in early April because the 2004-2005 snow pack was extremely light, allowing access to the upper watershed where most surveys took place. However, cold rain and snow at higher elevations in April and early May prevented access to several call stations during this time period. As it turned out, we encountered light rain or mist on one-third of all survey days (6 of 18 survey days), reflecting the generally wet pattern of spring and summer 2005.

There were no survey days when precipitation was too heavy to conduct the survey visit. We encountered a few heavy rain showers on May 16, but were able to wait out the showers until the weather improved. Two-thirds of all surveys were done during clear or high overcast days with no precipitation. High winds were generally not a problem in the watershed in 2005. Although the weather was not always ideal for some visits, we nonetheless obtained responses from other owl species during a variety of weather conditions, indicating that other species of owls were responding during these periods.

3.2 Responses

We obtained 14 responses from owls at 14 stations during the surveys (Table 2). All but one of these responses was from a barred owl. The only other species of owl heard was a single male great horned owl heard on August 30 on a mostly open ridge southwest of Findley Lake. All but one of the barred owl responses was obtained in August. In June, a pair of barred owls was detected during a dusk survey at Findley Lake. Based on proximity of responses and the fact that barred owl territories are typically much smaller than spotted owl territories, we estimate that we were detecting barred owls from 9 different territories (Figure 8), which included observations of juveniles at 3 of these 9 territories in 2005. Seven of the barred owl responses occurred within the 6 blocks of old forest habitat that were surveyed for spotted owls. Two observations of barred owls were located in second-growth habitat away from the survey areas and occurred as we transited to and from survey areas. We expected, but did not obtain responses from any small owls during the surveys. In similar habitats in areas immediately adjacent to the Cedar River Watershed (e.g., the Green River Watershed; Figure 9), we regularly obtain responses from northern saw-whet owls (*Aegolius acadicus*) and northern pygmy owls (*Glaucidium gnoma*), and at lower elevations we would expect some western screech owls (*Otus kennicottii*). Although likely present, we did not detect any of these species during our surveys in the Cedar River Watershed in 2005. Other wildlife heard at night during the surveys included common loons (*Gavia immer*), common nighthawks (*Chordeiles minor*), and coyotes (*Canis latrans*).

4.0 DISCUSSION

4.1 Survey Results

The year of 2005 was a poor reproductive year for spotted owls in the western Cascade Mountain range of Washington (D. Herter, pers. obs.). On the surrounding Rainier Demography Study Area (DSA; Figure 9), which includes that portion of the Cascade Range west of the crest from I-90 south through and including Mt. Rainier National Park, no spotted owl nests were located in 2005 at any of the 30 sites that had spotted owl detections this year.

Spotted owls sometimes fail to respond to surveyors in years when they are not nesting. However, on the Rainier DSA in 2005, observers received responses at 93% of the territories that had singles or pairs of spotted owls one year earlier, which had been a good nesting year (17 nests found). Sites on the DSA are visited only 3 times over the breeding season as opposed to the 6 visits per season done on the Cedar River Watershed in 2005. Probability of detection increases with the increased number of visits, even in non-breeding years. This provides some confidence that we should have heard a spotted owl if one had established residency in the Cedar River Watershed in 2005, despite the generally poor weather and the fact that it was a non-breeding year.

4.2 Cedar River Watershed Survey History

Prior to the late 1970's in western Washington, the spotted owl was known to be present but was thought to be a rare and very secretive bird (Jewett et al. 1953) that was only occasionally encountered when hikers came upon them in the forest along trails and roadsides. Concern over the status of the species increased following the work of Eric Forsman and others in the mid-1970's who found that northern spotted owls favored old-growth forests and were becoming rare due to timber harvest (Forsman et al. 1984). Surveys were begun to detect spotted owls on most National Forests in the Pacific Northwest by the late 1970's or early 1980's.

These initial surveys were primarily designed to detect spotted owls that may have established territories in areas proposed for logging, although some general inventory surveys were also taking place. At this time, much of the upper Cedar River Watershed was still under U. S. Forest Service (USFS) ownership, with a checkerboard pattern of ownership existing in which every other section was owned by a private landowner. In the Cedar River Watershed, private land was mostly owned by the Weyerhaeuser Corporation. Some USFS surveys for spotted owls date back to 1979 on the surrounding Mt. Baker-Snoqualmie National Forest, but the earliest surveys found for the Cedar River Watershed were in 1981.

Most spotted owl surveying done in the watershed in the 1980's was accomplished by the USFS or by City of Seattle employees. Few organized surveys were done prior to 1986. Surveys at timber sales, general inventory surveys, and surveys at Spotted Owl Habitat Areas (SOHA's) were done by the USFS in the late 1980's. If a pair was located, a "Pair

Protection Area" was established, and many of these became SOHA's in which an inviolate core area was established and an outer ring of habitat was also given partial protection from timber harvest.

In the summer of 1986 and the spring/summer of 1987, Lisa Egtvedt was employed by the City of Seattle to conduct spotted owl (and other owl) surveys in the watershed. In July 1987, a male spotted owl was radio-tagged near Meadow Mountain and tracked for 11 months through May 1988 when its transmitter battery failed. Data for this owl was used as part of the research for her master's thesis (Egtvedt 1988). This owl carried its back-pack transmitter until summer 1990 when it was removed by USFS-Pacific Northwest Research Lab employees who also banded the bird along with its mate and fledgling. Some surveying for spotted owls by USFS and City of Seattle extended into the early 1990's as well.

Surveys by private timber company contractors were initiated in 1990 and continued intensively through 1993. Following the listing of the northern spotted owl in 1990, surveys out to a 1.8-mile radius from each timber sale were required by State of Washington forest practices rules. This extensive surveying located additional spotted owls in the watershed.

From 1994 through 2000, only occasional spotted owl surveys were conducted in the watershed. Contractors for Plum Creek Timber Company performed occasional surveys near known spotted owl site centers that impacted their lands and relocated the pair of spotted owls at Meadow Mountain (Figure 5). A new male was banded at the site in 1994 and the female that had been banded here in 1990 was also seen. This pair nested and produced 2 young in 1995. The male was identified in 1996 and the female was heard but her band was not seen. The male was detected again in 1997, but no female was heard. The site was surveyed annually and found to be vacant from 1998 through 2000. This female eventually abandoned the site and was relocated just south of the Green River at the Kelly Butte site in 2001. She was recaptured here and her USFWS metal band read to confirm her identity.

This female may have been pushed out by barred owls that aggressively responded near the site center in 1997. We do not know what eventually happened to the male from this site. The 1997 sighting of this male was the last known spotted owl response in the watershed.

The history of surveys and historic responses of owls are summarized by site in Appendix B. A map showing the approximate locations of spotted owls found in the watershed from 1981 through 1997 (except for radio-telemetry locations given in Egtvedt 1988) is also provided. Barred owl responses in the watershed date back only to 1987.

4.3 Regional Spotted Owl Population Trends

It was not surprising that no spotted owls were detected in the Cedar River Watershed in 2005. Populations of spotted owls in the Washington Cascades have been experiencing a

severe decline since the early 1990's when intensive studies of this species began. Two spotted owl demography study areas occur near the watershed, the Rainier DSA which actually surrounds the watershed (Figure 9), and the Cle Elum DSA which includes most of Kittitas county, immediately east of the watershed. Numbers of adult spotted owls on both of these study areas have declined by approximately 60% to 70% since 1992, the year most active spotted owl territories had been discovered.

Annual rates of decline calculated at the most recent meta-analysis workshop of 14 spotted owl DSA's across the range of the subspecies indicated that declines averaged 7.2% annually on the Cle Elum DSA and 10.4% annually on the Rainier DSA (Anthony et al. 2004). Declines were evident but of lesser magnitude on the Olympic Peninsula and in northern Oregon. Northern spotted owl populations in southern Oregon and northern California were generally stable.

Causes of the declines seen in Washington have not been fully determined. It is commonly held that past declines were caused by the relatively rapid harvest of old forest habitat through the 1980's, but recent declines in spotted owl numbers may be linked to some other cause besides habitat loss. Because little loss of old forest habitats on federal lands in the Washington Cascades has occurred since the species was listed as threatened in 1990, suspicion has turned primarily to the barred owl as a probable cause of recent declines. While barred owls have been present in Washington since the early 1970's, numbers may only recently have increased to the point where overcrowding among barred owls has occurred and competition with spotted owls has become common.

Barred owls arrived in the state via a natural range expansion across southern Canada from the Midwest during the 1900's. Causes of the expansion are not fully understood and may include some anthropogenic factors such as protection of forests in southern Canada from frequent fire, allowing the trees to mature to the point where barred owls were able to establish nest sites in these large, mature trees. It is also possible that gradual warming of the continent since the last ice age has occurred to the point where the southern boreal forest has now attained a stature sufficient to permit this large owl to nest in its preferred nest sites, relatively large tree cavities. These were not present in past centuries due to the small stature of the forest in this cold climate region. Fairly rapid range expansions of other bird species in North America are known to occur, so the barred owl expansion is not unprecedented; however, additional research into historical habitat changes in the southern Prairie Provinces and Prairie States may shed light on how this competitor was able to reach the Pacific Northwest.

4.4 Habitat Conditions in the Cedar River Watershed

Spotted owls in the Washington Cascades, at least in the latter half of the 1900's and early 2000's, favor moderate elevation range and prefer to establish nest sites in fairly large patches of old forest habitat. A large, contiguous patch of old forest habitat often surrounds the nest site (Dugger et al. 2005). The average amount of old forest within a 1-mile radius around spotted owl sites in the western Cascades of Washington was found to be 450 acres (Herter and Hicks 2000).

In the western Cascades, spotted owls prefer forest types dominated by Douglas-fir (*Pseudotsuga menziesii*), and most nest sites occur in this tree species. Sites dominated by western hemlock (*Tsuga heterophylla*) and western red cedar (*Thuja plicata*), which occur on cooler, wetter sites, appear to be less preferred. Forest stands dominated by high elevation species such as Pacific silver fir (*Abies amabilis*) and mountain hemlock (*Tsuga mertensiana*) are rarely used. Some old forest patches in the Cedar River Watershed appear to provide ideal habitat conditions, but others do not. Of the 6 patches that we surveyed, 4 may not provide enough moderate-elevation old forest habitat to meet all of the needs of a breeding pair of spotted owls. The Goat Mountain (Figure 3) and Findley Lake (Figure 2) blocks have significant continuous patches of old forest, however much of it occurs above 3500 ft. in elevation, with the largest patches in both areas facing north, which means much of the habitat above approx. 3800 ft. is dominated by silver fir or mountain hemlock.

Two other patches, near the Rex River (Figure 6) and McClellan Butte (Figure 4) do not contain unbroken blocks of old forest habitat greater than 450 acres in size and appear too small and fragmented to provide ideal habitat for the species. The two remaining patches, Tinkham/Abiel/Baldy (Figure 7) and Meadow Mountain (Figure 5) appear to have sufficient appropriate habitat at moderate elevations and would appear the most likely to attract colonizing spotted owls in the future. As surrounding forest regenerates, some of the above patches may become suitable for spotted owl reoccupation, but given the age of the surrounding stands, attainment of habitat conditions suitable for spotted owls could take more than 50 years, beyond the term of the HCP.

4.5 Recommendations for Future Studies

It appears that at present there is a small likelihood that spotted owls still remain in the Cedar River Watershed as permanent residents. The watershed is likely still used by spotted owls, however. Juvenile owls dispersing in the fall and winter from nearby territories to the north, east, and south probably transit the watershed during their wanderings before locating a permanent territory. Also, adult owls that are moving between territories, because of the death of a mate or because they have not been able to establish themselves in a permanent territory (often termed 'floaters'), may be moving through the area as well.

Because there is potential spotted owl nesting habitat still present in the watershed, and barred owls do not appear to have established territories over all portions of this habitat, surveys for spotted owls should probably be repeated periodically to monitor occupancy status. Surveys in the watershed for spotted owls should aim to provide the highest likelihood of detecting a resident spotted owl. As this project represents, surveys surrounding old forest habitat should provide the highest likelihood because this type appears to be a key factor in determining spotted owl territory establishment. A resurvey of the same areas included in this report, with at least 3 visits per year, at some future date would provide a high amount of confidence that spotted owls are or are not resident in the watershed.

5.0 LITERATURE CITED

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FIGURES AND TABLES

Figure 1.

Map of the Cedar River Municipal Watershed: showing the six patches of old forest where spotted owl surveys were conducted in spring and summer, 2005.

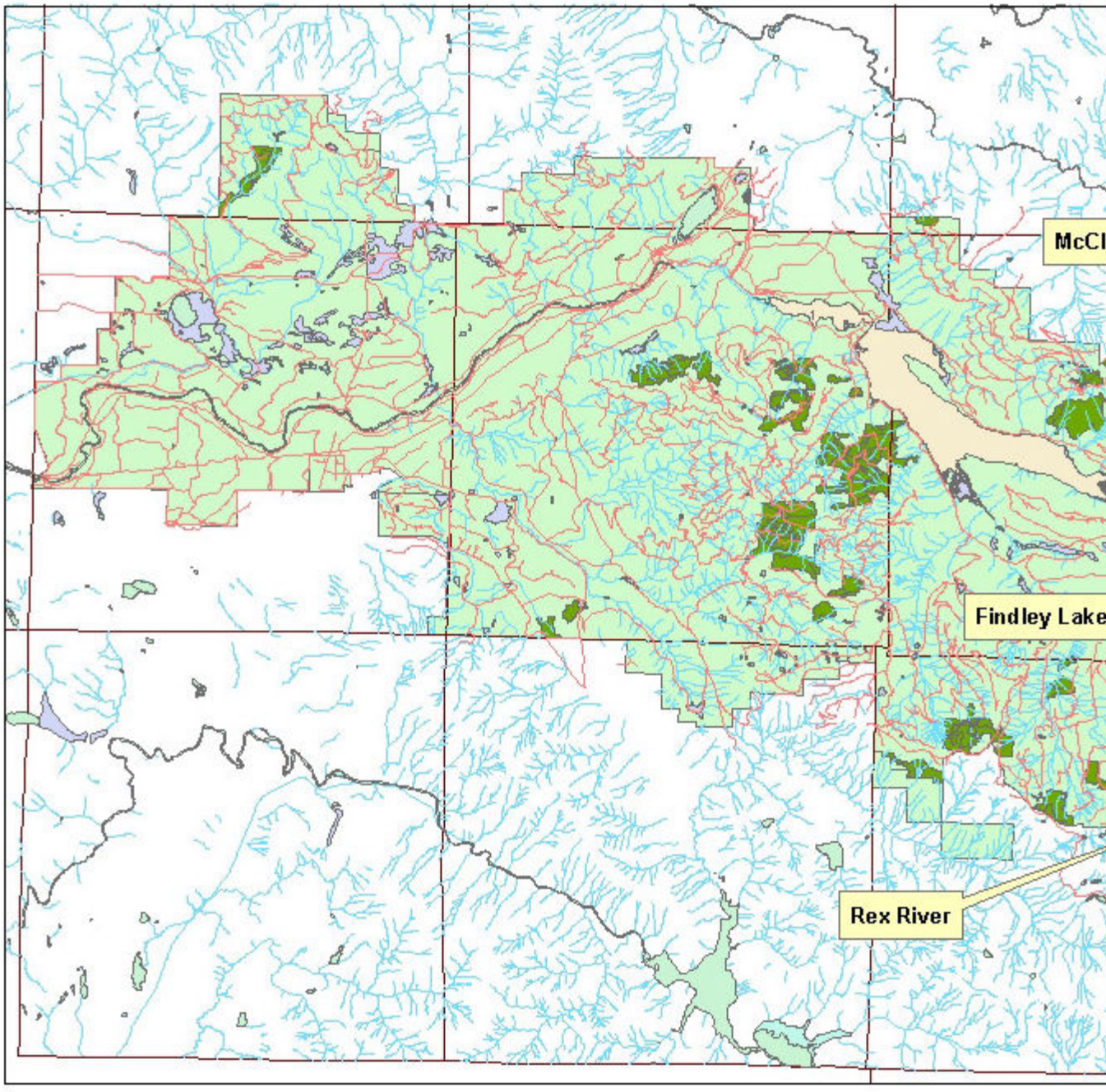

Figure 2.
SPOW Survey Locations, Patch #5: (Fidley Lake)

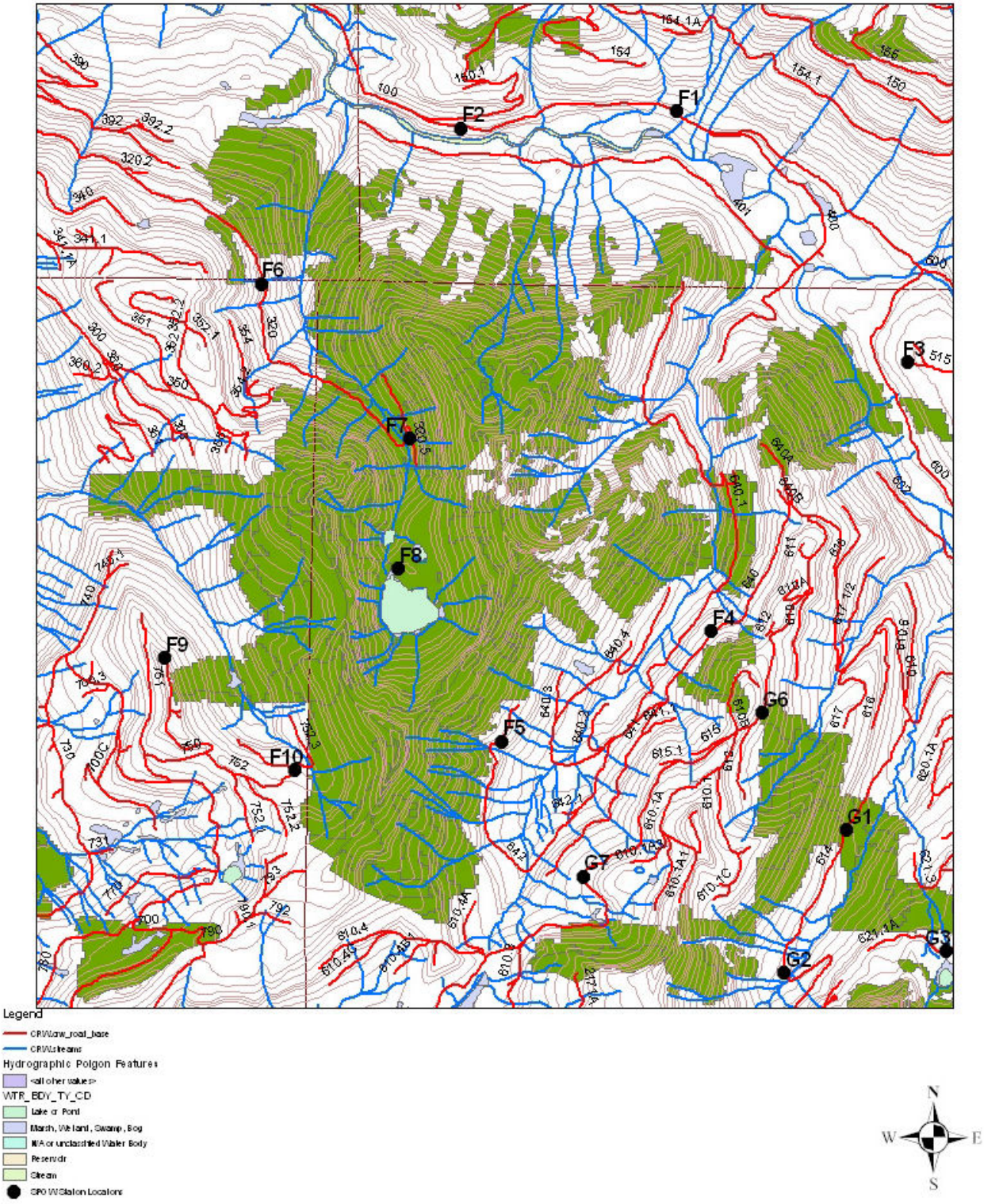

Figure 3.
SPOW Survey Locations, Patch #2: (Goat Mountain)

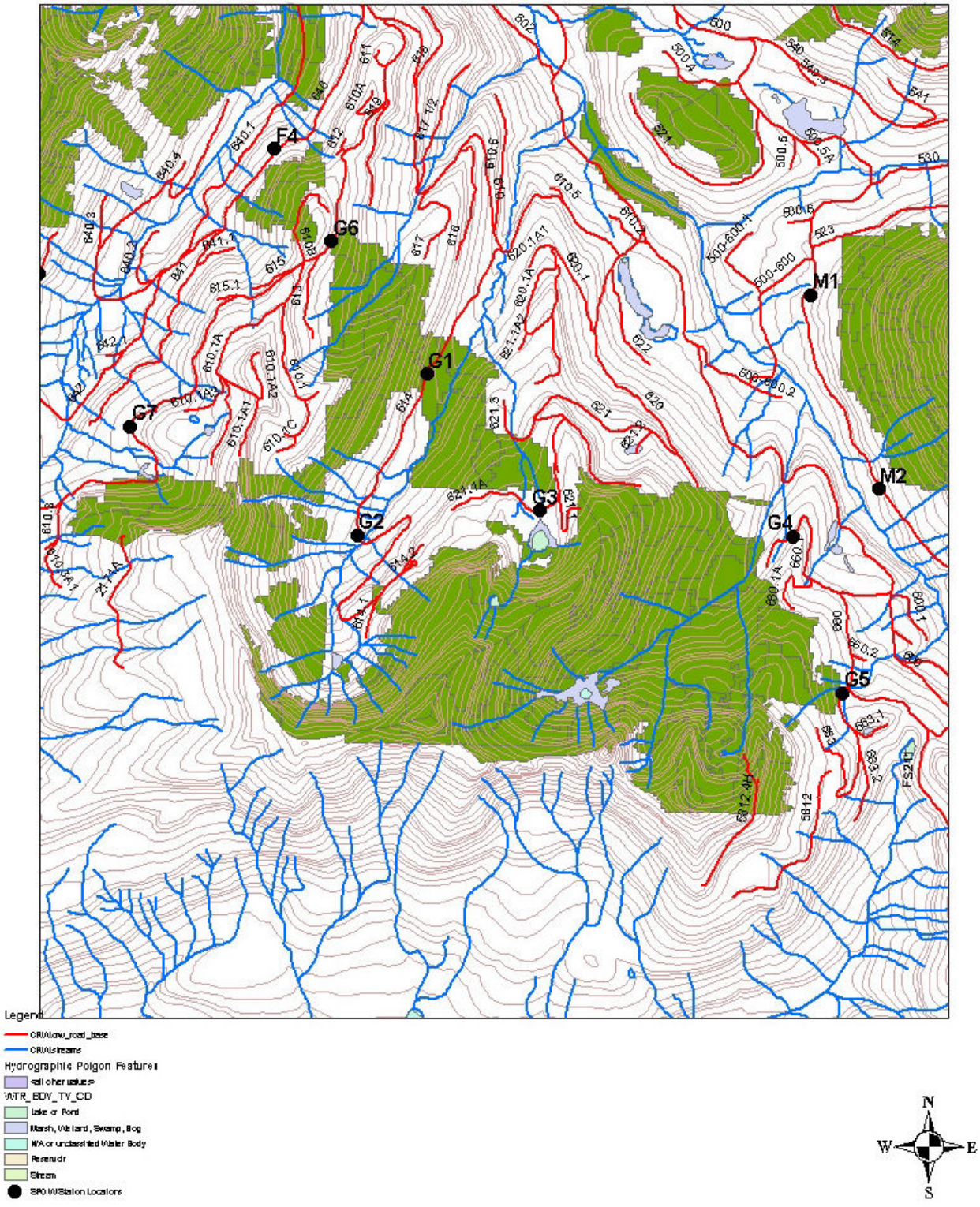

Figure 4.
SPOW Survey Locations, Patch #6: (McClellan)

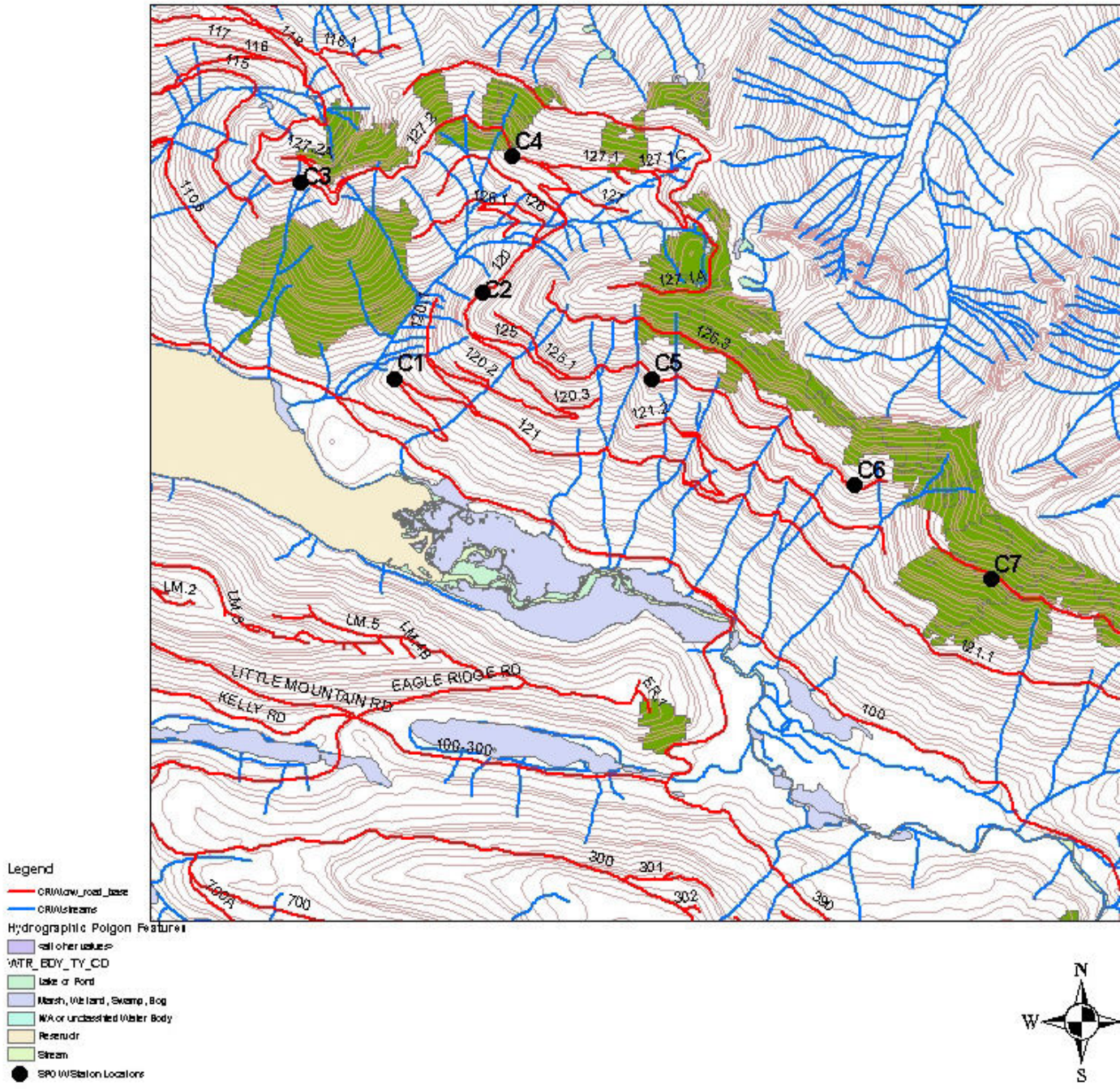

Figure 5.
SPOW Survey Locations, Patch #1: (Meadow Mountain)

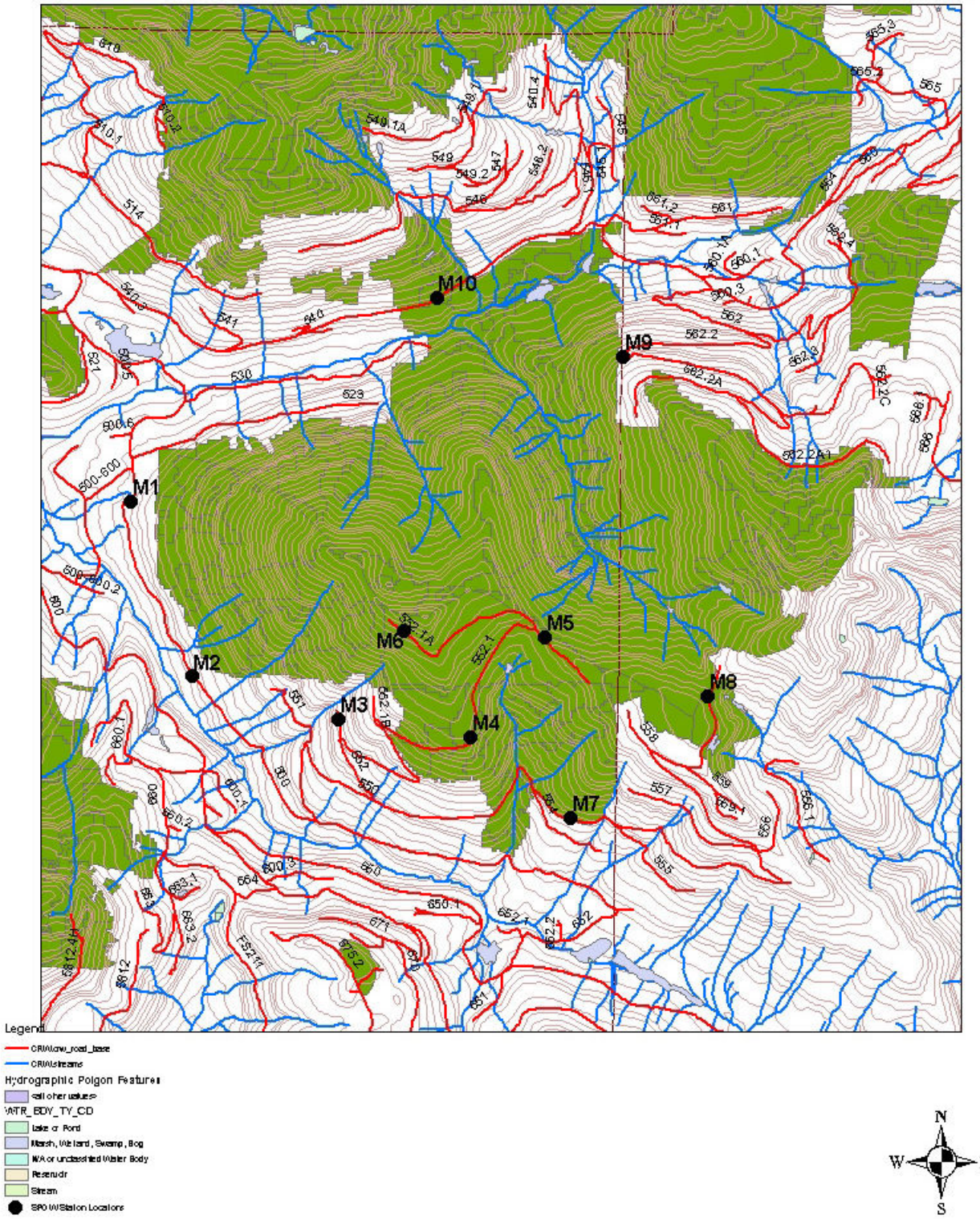

Figure 6.
SPOW Survey Locations, Patch #4: (Rex River)

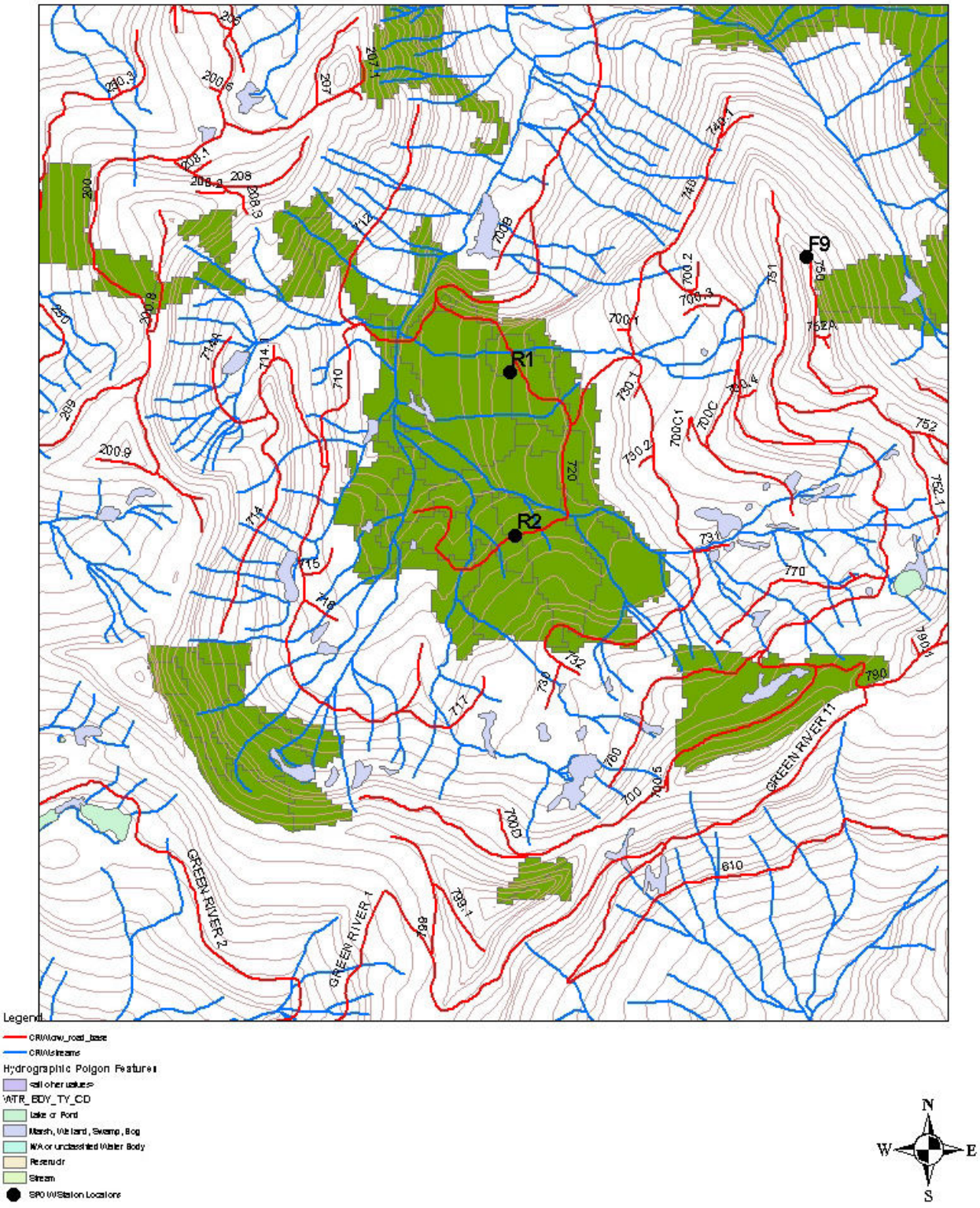

Figure 7.
SPOW Survey Locations, Patch #3: (Tinkham/Abiel/Baldy)

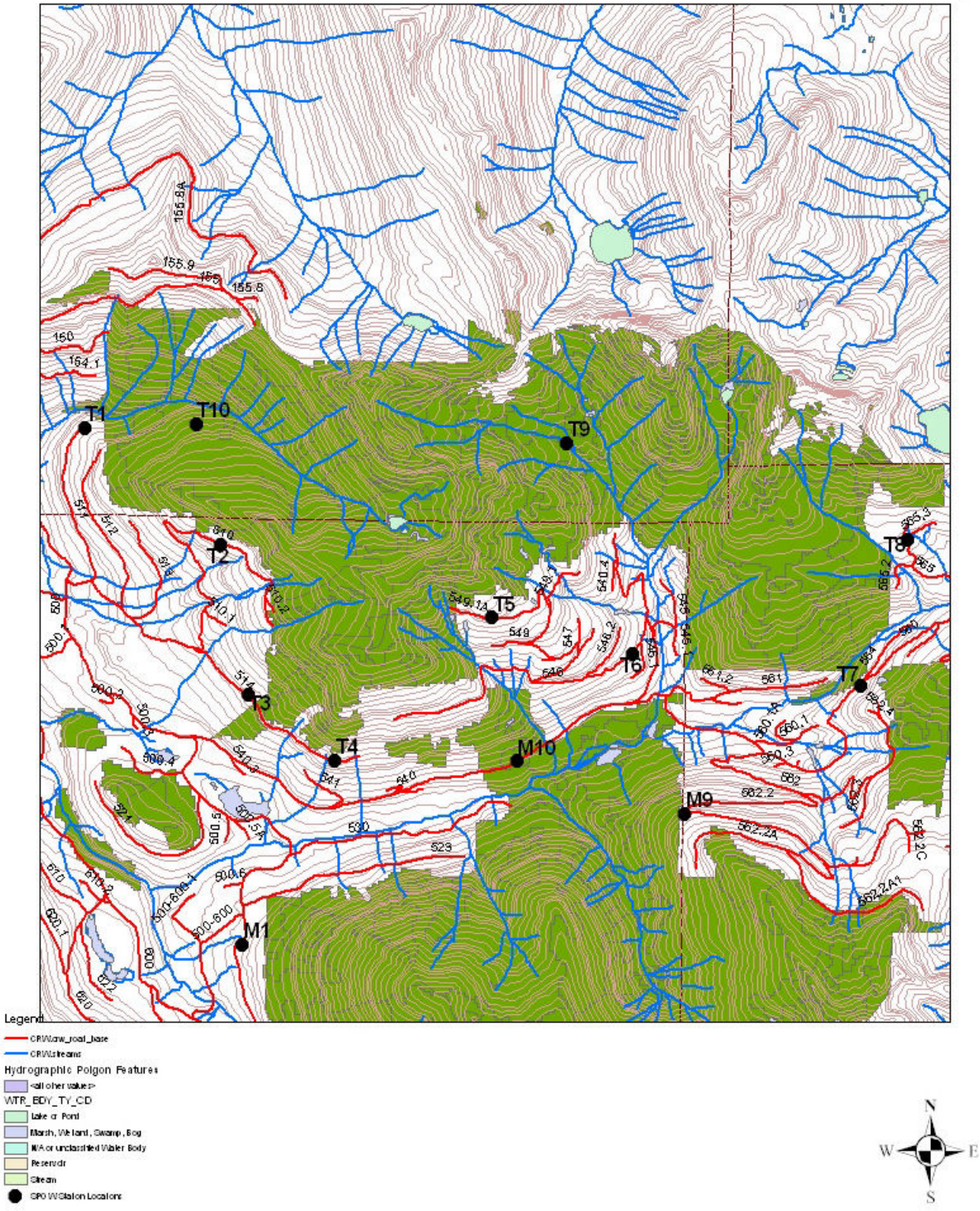

Figure 8.

Locations of Barred and Great Horned Owls: found during Spotted Owl Surveys, 2005.

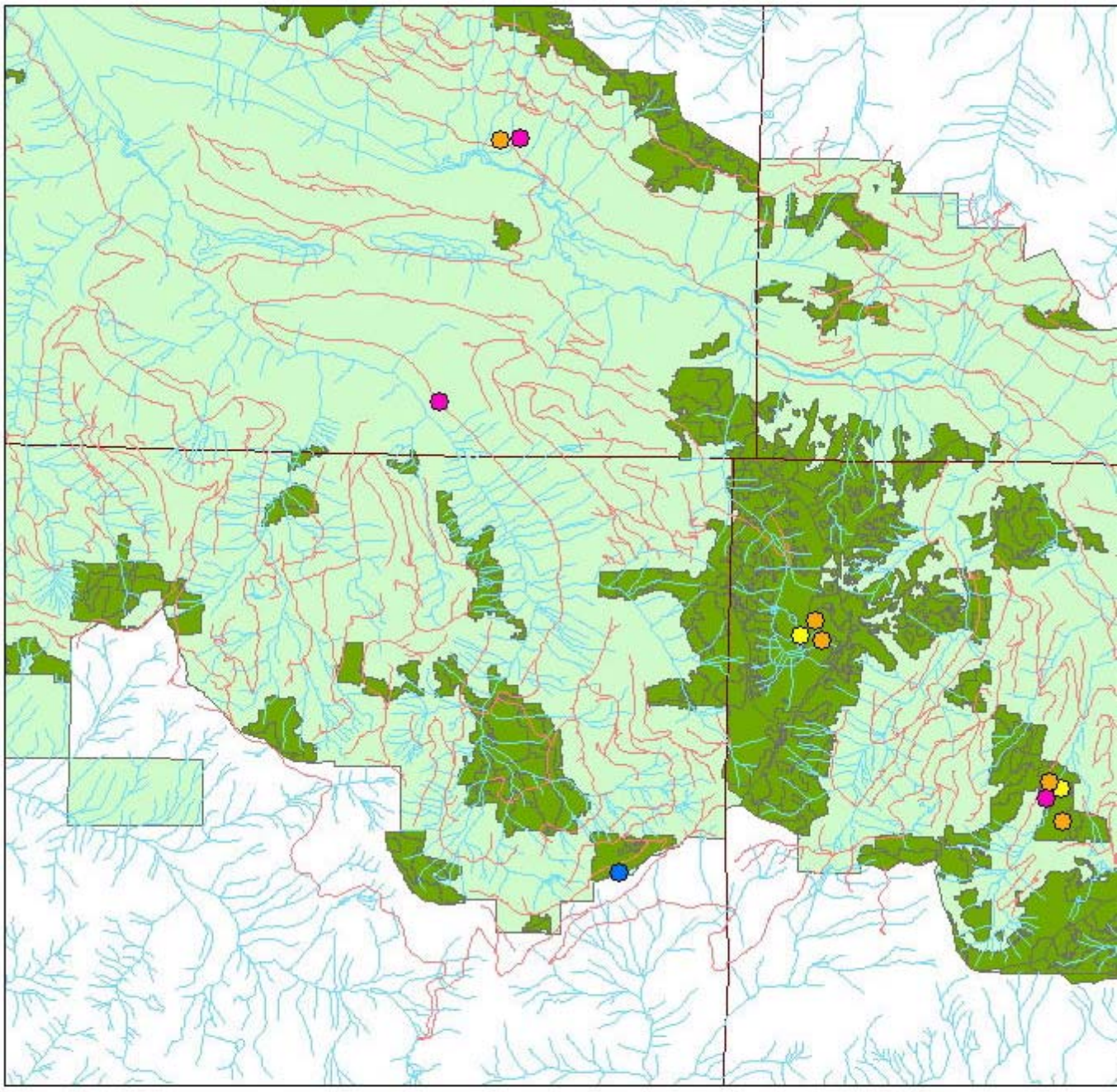

Figure 9.
Spotted Owl Demographic Study Areas Adjacent to the Cedar River Watershed.

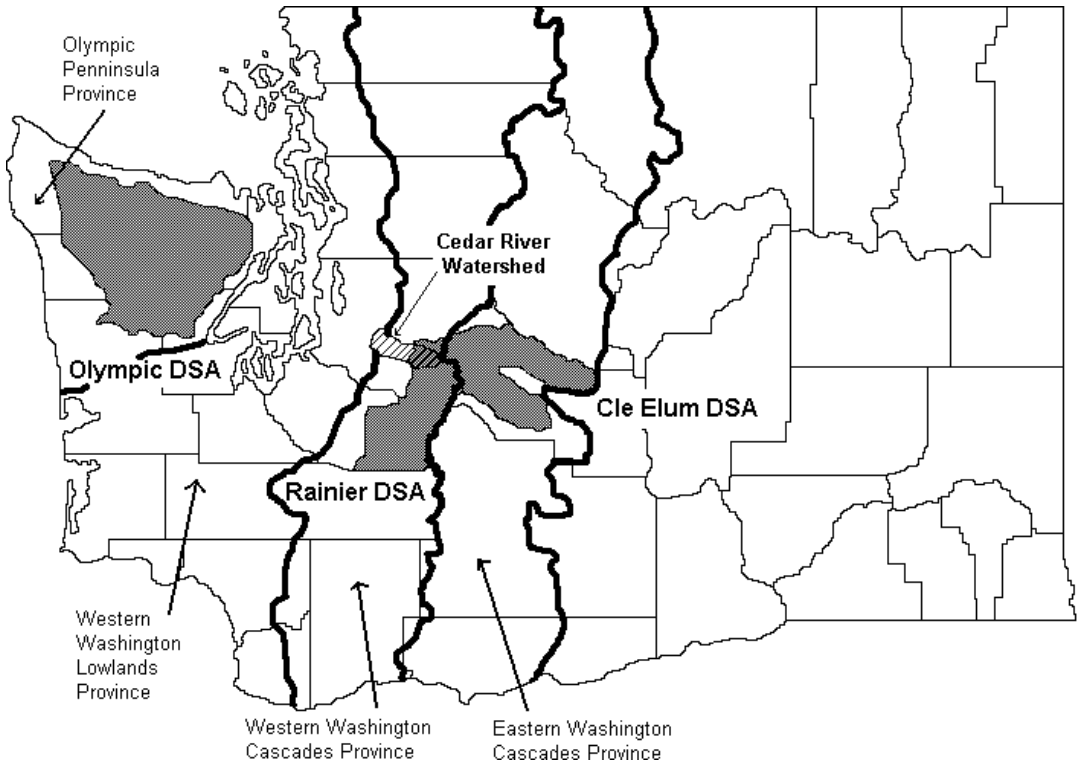

Figure 10.
Historical Responses from Spotted Owls: 1981-1997

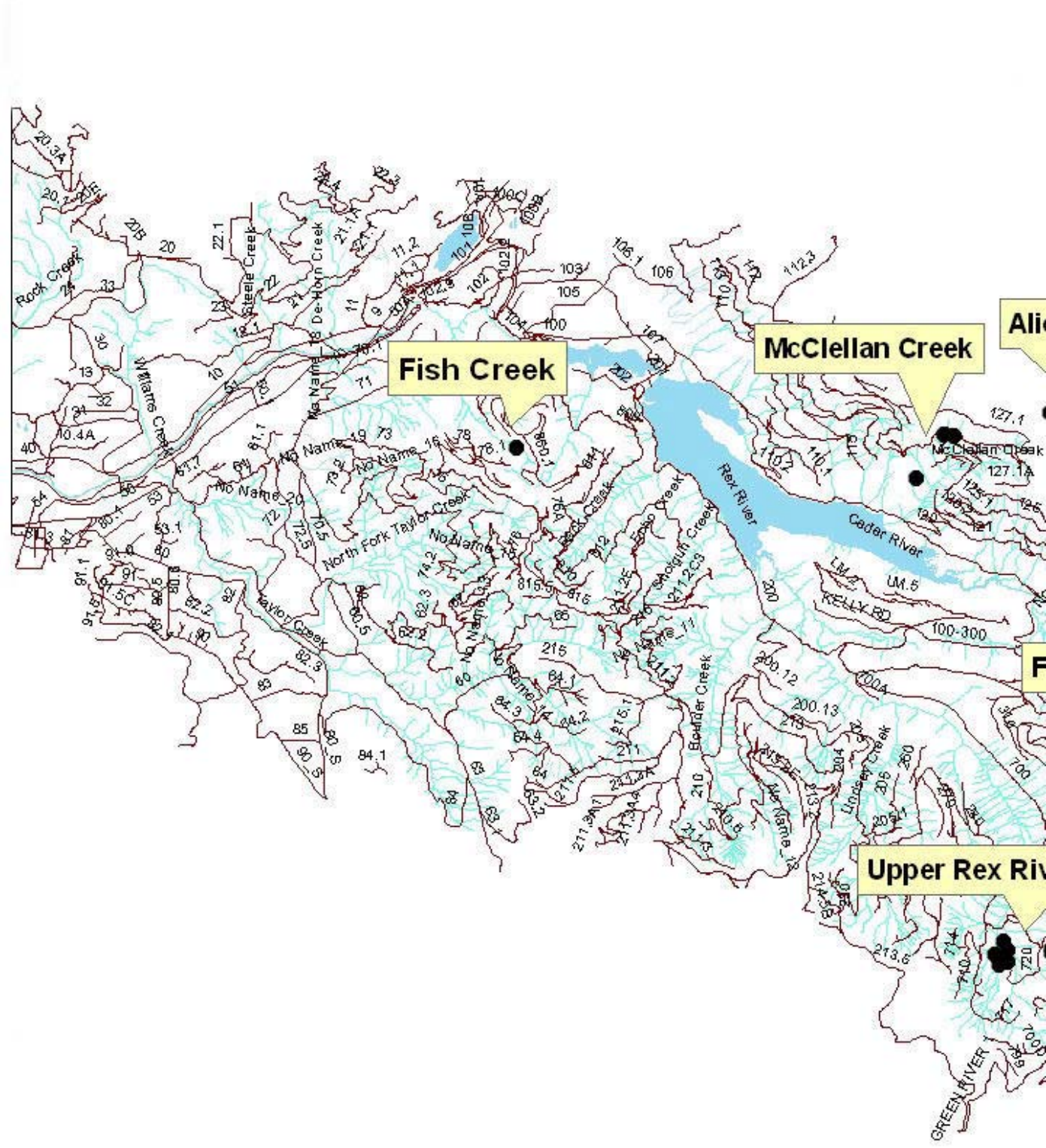

Table 1. Timing of visits to spotted owl survey areas in the Cedar River Watershed, 2005.

Visit #	*Start Date*	*End Date*	*Observers*
1	16 May	18 May	Herter, Holloway, Merriman
2	31 May	2 June	Holloway, Merriman
3	14 June	16 June	Holloway, Merriman
4	18 July	21 July	Herter, Merriman
5	15 August	17 August	Holloway, Merriman
6	29 August	30 August	Herter, Holloway, Merriman

Table 2. Summary of responses from all owl species detected in the Cedar River Watershed, 2005.

Response: No.	Species	Sex/Age	Date	Time	Survey Area
1	Barred Owl	pair	1 June	19:19	Findley Lake
2	Barred Owl	pair	15 August	21:57	Meadow Mountain
3	Barred Owl	male	15 August	22:25	Goat Mountain
4	Barred Owl	male	15 August	22:48	Meadow Mountain
5	Barred Owl	male	15 August	23:04	Meadow Mountain
6	Barred Owl	pair/juv.	16 August	21:59	Goat Mountain
7	Barred Owl	male/juv.	17 August	19:00	McClellan Butte
8	Barred Owl	male	17 August	20:07	Findley Lake
9	Barred Owl	male	29 August	22:23	Meadow Mountain
10	Barred Owl	female	29 August	23:06	Tinkham Creek
11	Barred Owl	male	29 August	22:18	Goat Mountain
12	Barred Owl	male	29 August	23:00	Meadow Mountain
13	Great Horned Owl	male	30 August	21:10	Findley Lake
14	Barred Owl	juvenile	30 August	22:10	(Rex River)

APPENDIX A

Data forms for all spotted owl survey visits to the Cedar River Watershed - 2005.

APPENDIX B

Historic spotted owl responses in the Cedar River Watershed, 1981-1997.

Historic responses spotted owl responses in the Cedar River Watershed, 1981-1997.

A brief discussion of the responses obtained at each site and a general overview of the survey effort known at the sites is discussed below. The Washington Department of Fish and Wildlife (WDFW) site number is given after the official WDFW name. Alternative names known for each site are also listed. Only sites in which the site center is located within or very close to the Cedar River Watershed are listed (Figure 10).

The 1.8-mile regulatory circle from 2 other sites, Cold Creek near Snoqualmie Pass and Snow Creek near Stampede Pass, overlap the watershed, but only within the outer ring. Activities on the Cedar River Watershed would be unlikely to affect the core area of either of these two sites.

Fish Creek (Site # 547) highest status: pair, reproduction unknown

1981
In June, the USFS reported that a pair of spotted owls was heard in the NW1/4 of Sec. 14, T22N, R8E.

1989
Surveys were done in Rack Creek and Taylor Creek, near this site but not exactly at the site center by the USFS. No spotted owls were detected.

Alice Creek (Site # 736) (a.k.a. McClellan Butte) highest status: reproductive pair

1990
At least one bird was located at this site in late August by Weyerhaeuser contract surveyors (Beak Inc.). Barking calls from either a male or female were heard on August 23 and 29 and a daytime follow-up on August 31 with D. Paige located a male spotted owl. Surveys at the site on July 27, August 25, and August 30 were all unsuccessful in locating a spotted owl.

1991
In June, a nesting pair was located and 2 young were fledged. The nest was located very near the trail up McClellan Butte. A barred owl was detected twice in this area as well.

1992
Nighttime surveys located a female spotted owl on June 9, but were unsuccessful on June 20. No other surveys are known for this year.

1995
A birder (Kevin Aanerud) reported seeing a spotted owl at the 4000 ft. level of the McClellan Butte trail on July 3. Other nighttime and day surveys by Plum Creek Timber Co. contractors (Raedeke Associates) near the former nest site were unsuccessful in detecting any owls.

McClellan Creek (Site # 213) (a.k.a. McClellan Butte) highest status: single, status unknown

1986
On September 22 and 23, a male was heard both west and then north of McClellan Creek, respectively, by L. Egtvedt.

1987
On March 20, a male was again heard north of the creek by L. Edtvedt. A great horned owl was detected here later, on May 5.

1988
On June 21, L. Edtvedt spent 1.5 hours in the area at night but did not detect a spotted owl.

Findley Creek (No WDFW #) highest status: single, status unknown

1987
On August 6, barking calls from a spotted owl (suspected to be a female) were heard near Findley Creek in the SW of the SE, Sec. 36, T22N, R9E by Phyllis Reid, USFS surveyor. This site was lumped with the Rex River-Upper site but we feel it is far enough from those detections to warrant listing as a separate site.

Rex River-Upper (Site # 207) highest status: reproductive pair

1981
A pair at a nest was located on July 11 by USFS personnel. The male and nest were seen again on July 16.

1985
Surveys by USFS personnel in mid-June and early July detected no spotted owls. A spotted owl was seen during the day in the area on July 17, however.

1987
A male spotted owl was heard at night on June 16 by Phyllis Reid, USFS surveyor. Other surveys by the USFS on June 10, 24, and 30, and August 6, 7, and 12 found no spotted owls. Great horned owls were heard on June10 and 30. Surveys by L. Egtvedt located a spotted owl on May 14 and 26 at night and a daytime location on June 16. A female was heard at night on October 3. Other surveys at the site on June 29 and August 25 found no owls.

1988
L. Egtvedt conducted surveys here from early May through early July but got no responses from any owls.

1989
The USFS surveyed twice at this site on June 28 and again on July 4 but found no owls.

1992
Raedeke Associates personnel conducted a daytime visit at the site of historic responses on June 9 but found no owls.

1994
Raedeke Associates personnel surveyed 8 night stations in the area but found no owls.

North Fork Cedar River (Site # 747) highest status: resident single

1986
L. Egtvedt detected a male spotted owl in the NE1/4 of Section 12, T21N, R10E on October 22. A previous survey on September 2 found only 2 different great horned owls in the area.

1987
A survey by L. Egtvedt on July 8 detected only a great horned owl in the area.

1990
Surveys by the USFS on June 29, July 18, and July 21 each detected a male spotted owl in the Sec. 6 and 7 area of T21N, R11E. The survey on July 21 was a daytime observation of the owl. Other surveys on June 28, July 1, July 6, July 20, July 27, and July 28 found no spotted owls.

1992
Raedeke Associates personnel conducted a daytime visit on June 9 in the area of historic responses but detected no owls.

1994
Raedeke Associates personnel surveyed 6 night stations in the area on August 15 but found no owls.

South Fork Cedar River (Site # 208) (a.k.a. Meadow Mountain) highest status: reproductive pair

1987
A male was consistently located by L. Egtvedt in Sec. 14, T21N, R10E from early May through early July when it was captured and radio-tagged. A female was also heard on June 11 and the pair was confirmed on July 17. Radio-tracking of the male continued through May 1988. Both barred and great horned owls were heard in the area in 1987.

1988
The male was radio-tracked through May but the site did not appear to be reproductive.

1990
On July 18 the female and one fledgling were located and banded with help from S. Sovern of the USFS-PNW lab. The male's transmitter and harness were removed and the male was banded on July 19 by S. Sovern. Other surveys by the USFS in mid-June and early July detected no owls until July 8 when the male was heard at night.

1991
On June 9, D. Paige from the City of Seattle surveyed the site at night but detected no spotted owls.

1992
On June 24, Raedeke Associates personnel surveyed the site during the day and found no owls but located an active northern goshawk nest.

1994
On May 18, Raedeke Associates personnel surveyed the site during the day but found no owls. On May 26 a night survey located a male in Sec. 22. A follow-up on June 1 found an un-banded male and it was banded by D. Herter. On July 11 a pair was suspected in Sec. 14 by Raedeke Associates and a follow-up on July 12 found the recently banded male only.

1995
Seven visits were conducted by Raedeke Associates from April through August.

The pair was located and the female from 1990 was seen with 2 fledglings. The nest was not located. Both fledglings were banded.

A barred owl was heard in Sec. 22 during one night visit.

1996
Six visits to the site were conducted by Raedeke Associates.

The female was heard on one night visit and the male was found on three other visits and his band was verified. The site appeared to be non-reproductive.

1997
Raedeke Associates conducted two daytime visits on June 16 and August 18 located the male on June 16 and his band was verified. A night visit on August 20 was unsuccessful in detecting any owls. The male ate and cached mice, and appeared to be non-reproductive.

1998
Night visits were conducted by Raedeke Associates on May 28, June 8, and August 18 with no responses. A daytime hike was done on July 21 with no responses.

1999
A day visit was conducted by Raedeke Associates on June 29 and night visits on August 23 and 30, no responses obtained.

2000
Night visits were conducted by Raedeke Associates on June 30, July 27, August 14 with no spotted owl responses. A male barred owl was heard in Sec. 22 on June 30 and August 14, and a barred owl was also heard in Sec. 14 on August 14.