Ashland Forest Resiliency Fisher Monitoring FY2012/2013 Interim Report

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USFS Rogue River-Siskiyou National Forest

Ashland Forest Resiliency Fisher Monitoring 2012 Interim Report

The Ashland Forest Resiliency Fisher Project (AFRFP) was initiated in 2010 by the Rogue River-Siskiyou National Forest and the Pacific Southwest Research Station (PSW) for two reasons: 1) to fill gaps in fisher ecology and habitat requirements in SW Oregon and 2) to address the uncertainty surrounding the effects of timber harvest and fuels treatments on fisher and their habitats.

The specific question we want to address is,

- What is the response of fisher to changes in forest structure and composition from the implementation of the Ashland Forest Resiliency Project?

In addition we are attempting to investigate the demography, habitat use, and home range of fisher in the Ashland watershed.

Introduction

The Ashland Forest Resiliency (AFR) project is designed to reduce the potential for large-scale, high severity fire in the Upper Bear Analysis Area. The AFR project is a landscape-scale fuels reduction Stewardship Project involving the USFS, The Nature Conservancy (TNC), Lomakatsi Restoration, and the City of Ashland (COA) located in the Ashland Watershed, south of Ashland, Oregon. The proposed action will treat up to approximately 7,000 acres of vegetation in order to reduce the threat of large scale fire in the watershed and to provide areas where fire fighters can hold fire to specific area within the watershed (http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=1563).

AFR proposes treatment of National Forest System lands within the Upper Bear Analysis Area to develop a resilient ecosystem and reduce the potential for large-scale, high-severity wildland fire events while maintaining other resource values. These values include water supply and quality and late-successional species habitat in forests that are influenced by fire over the long term. The stated Purpose is "to protect Values At Risk, reduce hazardous fuels, reduce crown fire potential and obtain conditions that are more resilient to wildland fires". The stated Need is "for urgent reduction of the potential for large-scale, high-severity wildland fire in the Upper Bear Analysis Area".

AFR proposes to make substantial progress toward attainment of Purpose and Need by making reasoned, prudent and professionally credible alterations to and manipulations of existing vegetation and fuels in order to promote restoration of long-term ecosystem function while simultaneously reducing short-term, immediate threats to important Values At Risk. AFR utilizes the following strategies, where ecologically appropriate, to meet these goals:

- Treating primarily small-diameter hazardous fuels;
- Reducing the density of understory seedlings, saplings and poles to reduce ladder fuels;
- Variable density management (thinning from below) to create more open stand conditions;
- Proposing treatment prescriptions based on Plant Association Groups, plant associations, and site-specific conditions, such as aspect, slope, soils, geologic hazard, active nest sites for northern spotted owl, etc.; and
- Using prescribed fire where appropriate and feasible to reduce existing fuels.

The project is within the extreme northeastern portion of the native Pacific fisher's range. The AFR project is designed to; 1) reduce the risk of large scale fire within a municipal watershed, LSR, and spotted owl Critical Habitat Unit, and 2) maintain late-successional characteristics for spotted owl and fisher habitat based upon specific fisher mitigations under the proposed action.

Due to the uncertainty as to the efficacy of the proposed mitigations for fisher, and a lack of research or literature on the effects of fuel reduction on fisher in the west, the Forest entered into a fisher monitoring program with the Pacific Southwest Research Station (PSW) in Fresno, California. As a result of that collaboration, from 2010 to date, 22 fisher, all with home ranges within the proposed project area, have been captured and fitted with GPS/VHF collars. Critical baseline data on fisher demography, home range, and habitat use in this population has been collected. Non-commercial

(ground and ladder fuels) fuels reduction activities as well as commercial treatments began in FY 2010 and continue. Throughout these treatments, fisher will continue to be monitored for habitat use, home range size and location, and their responses to both commercial and non-commercial fuel reduction activities.

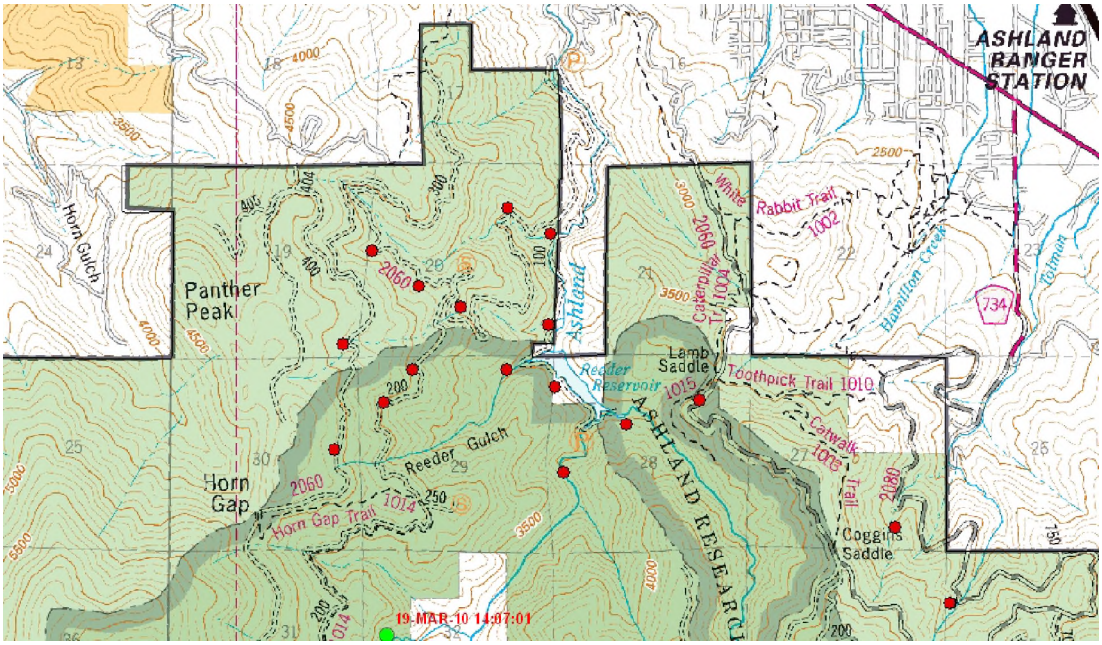
To date, PSW has provided $25,000 annually for personnel for trapping animals, radio collars and other telemetry gear. In addition, the Forest has provided approximately $96,000.00 in BLIs NFWF, NFIM, and WFHF for equipment and personnel to assist in trapping and to monitor animals on a bi-weekly to monthly basis. This information is a critical need for understanding the effects of fuels reduction and thinning on fisher movements and for designing effective mitigations during project planning across the range of the fisher in the West.

Materials and Methods

Animals were captured using model number 108.1 Tomahawk box traps equipped with an attached wooden cubby to protect the animal from weather and other predators (Figure 1). All traps were baited with a single chicken drumstick in a sock with Fisher Red bait attractant on the sock attached to the back of the Tomahawk trap. Gusto, a long distance attractant was applied to a nearby tree or branch at about 4 feet off the ground in order to spread the scent Traps were generally placed within the proposed project area and generally below 4,000 feet in elevation in order to avoid limiting access due to heavy snow and were located in small drainages or ravines that were thought to be potential travel corridors for fisher (Figure 2). Traps were covered with rigid chloroplast material, and woody debris to camouflage the trap and provide the animal additional security. Traps were checked for animals every morning and re-baited and re-lured if needed every morning. Captured fishers were transferred into a metal handling cone, and then anesthetized using a combination of Ketamine and Diazepam or Midazolam. Animals were weighed, sexed, and aged using a combination of tooth wear and sagittal crest development. Body measurements taken include body length, tail length, girth, zygomatic arch width, footpad dimensions, and tooth on the back measurements. Biological samples collected included blood for epidemiological and genetic analysis, tissue and hair for genetic identification, and any ecto-parasites observed were also collected for analysis (Appendix 1 and 2). Animals were permanently marked using passive integrated transponder (PIT) tags inserted under the skin at the nape of the neck and equipped with radio collars. Combination GPS/VHF radio collars manufactured by Telemetry Solutions Radio collars were equipped with breakaway light leather spacers designed to stretch or break under pressure. After processing, which typically can take between twenty and forty minutes, all animals were placed back in the trap cubby, then released when they were fully recovered; usually after one hour (Figure 1). In all, processing from the time an animal was anesthetized to release was approximately two hours. In 2010 and 2011, trapping sessions occurred for approximately fourteen to twenty-one days during the calendar year in February, July and October. In 2012, trapping occurred in February again in November of 2012. The number of deployed during a trapping session varied from 13 to 20 traps depending on availability from the PSW Lab.

Figure 1. Tomahawk Trap and Cubby

Figure 2. Initial location of traps with the Ashland watershed.



Results and Discussion

As of October 2012, we have captured 22 individual animals, (13 females and 9 males) within the study area (Table 1). Average weight for all females was 2.16 kg (range 1.9-2.5 kg), Average weight for all males was 4.4 kg (range 2.85 to 5.95).

Table 1. All Captures since 2010

Nickname	Age at Last Capture	Pit Tag#	Location at first capture (UTM 10)	Last Processed	Weight at last Capture
F01 Chloe	Adult	4A0C217824	526667, 4665514	2/14/2013	2.45
F02 Cindy lou	Adult	4A72096A03	523081, 4668191	2/19/2011	2.5 kg
F03 Cricket	Adult	4A0A795010	521928,4666732	11/02/2012	2.15
F04	Subadult	4B023A4222	525841,466492	10/23/2010	1.9 kg
F05	Adult	4A0B743D3E	527387,4665137	11/3/2010	2.25 kg
Daisy f06	Adult	4A0A785127	521928,4666732	6/25/2012	2.05 kg
Missy F07	Subadult	4A0B2D4411	527238,4664304	11/01/2012	2.0 kg
Morchella f08	Juvenile	4A0B2D0F39	526657,4665514	2/18/2013	1.95 kg
Lilly (aka Argyle) f09	Subadult/Adult	4B186C421F	524592,46667577	2/19/2013	1.95 kg
F10 - flo	Juvenile	4C31115F77	521928,46667577	11/03/2012	1.85
F11 BeBe	Juvenile	4C133B778	521928,46667577	11/04/2012	2.15
F12	Juvenile	4C132D3366	527238,4664304	11/02/2012	
F13	Juvenile	4C1334681F	527238,4664304	11/04/2012	2.05 KG
M01 "Little Guy"	Adult	4A73566E58	522003,4667722	2/23/2012	5.95 kg
M02 Lefty	Adult	4A0A6B0406	526667, 4665514	2/20/2010	4.5 kg
M03	Subadult	4A0B314426	526667, 4665514	11/2/2010	3.2 kg
M04 Butch	Adult	4A0A763458	528438, 4663716	2/19/2013	4.25 kg
M05 Squirt	Subadult	4A751F7D38	520623,4665356	7/2/2012	3.45 kg
M06 Peanut	Juvenile	4A0C1F0D5E	5226840,4664880	9/27/2011	2.85 kg
M07 Mama's Boy	Juvenile	4A0A7E4B40	526033,4665205	10/3/2011	3.15 kg
M08 Hercules	Adult	4B03214503	520252,4664238	10/4/2011	5.0 kg
M09 WALLY	juvenile	4C13355F7B	521928,4666732	11/04/2012	3.15

Captured in 2013

Several animals, in particular several of the females have been repeatedly recaptured over the two years of the study and we have collected home range data on many of those animals. Female 01(f01 = Chloe) has been captured at least 25 times over the course of the study and she has been collared 6 times. Males have been more problematic due to their assumed larger home ranges and issues with radio collars which will be discussed later.

Home Range

The size of fisher home ranges varies both regionally and by habitat condition, although male home ranges are generally larger than those of females. Home range size for fishers is likely related to the availability of resources, including abundance and diversity of prey and suitable habitats for den and rest sites. Male home range sizes may also be influenced by the availability of females. Mean home range sizes of males in the southern Cascades of Oregon was 147 km^2 during the breeding season and 62 km^2 during the non-breeding season compared to female home ranges of 25 km^2

(Aubry and Raley 2006). Male home ranges near the north coast of California averaged 58 km^2 compared to 15 km^2 for females (Zielinski et al. 2004). We only have home range data for the breeding season for two males, f02 and f04. Both had large home ranges, 65km and 76km respectively. This is not unusual for males during the breeding season.

Home ranges for our females ranged from 1km to 22 km with an overall average of approximately 8 km sq. using the MCP method (Table 2).

Table 2. Fisher Home Ranges in Km Square by season and individual

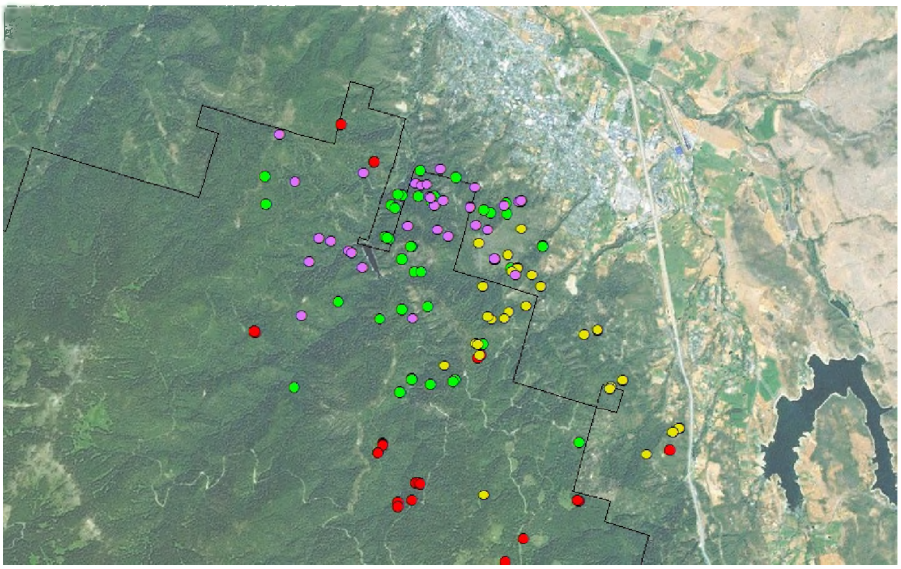
	2010			2011			2012			
fisher #	spring (feb to July)	summer (July to October)	Winter (October to Feb	spring (feb to July)	summer (July to October)	Winter (October to Feb	spring (feb to July)	summer (July to October)	Winter (October to Feb	overall average in KM
f01	12	5			2	5		3	2 (Nov. only)	5
F02		7	11							9
F03						4	8	3		5
F04				21						21
FO5	****									
FO6				10	3			2		5
FO7	****									
F08	****							2	1	1.5
F09							7	7		7
F10*										
F11*										
F12*										
F13*										
M01	****									
M02	65									65
M03	****									
M04							76			76
MO5	****									
MO6*										
MO7*										
M08	****									
M09*										

*Juvenile not collared
****Collar or animal lost

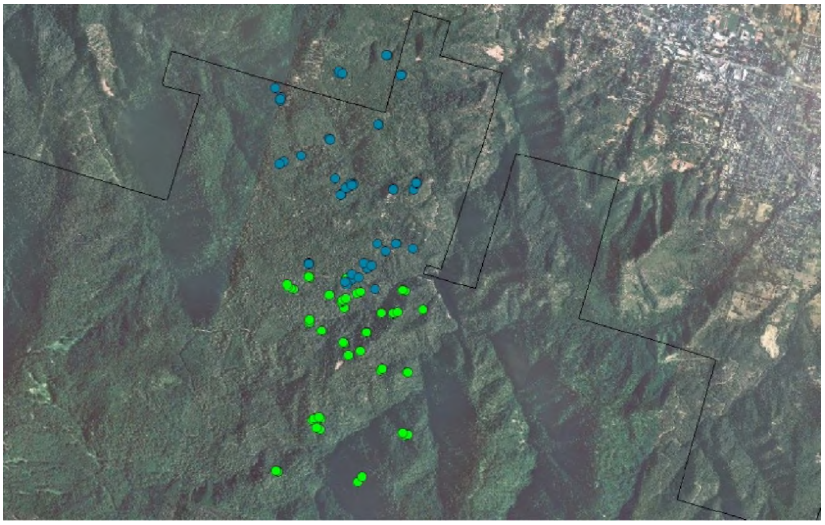
Home ranges (HR) by females typically overlapped at least somewhat and some HRs had high levels of overlap with one another. According to the literature, this is somewhat unusual as adults exhibit intrasexual territoriality and do not have non-overlapping territories within the same sex (Lofroth et al 2010). However this may indicative of a familial relationship where offspring of a female will set up an HR very close to her natal HR and very near her mother or the abundance of prey is to the point that these animals are somewhat

tolerant of one another (Figure 2). As seen below, in the winter of 2010, three female fisher were located within the same area on non-federal land during December and January of 2010. We have continued to observe this phenomenon throughout the study.

Figure 2. Overlap in the HRs of m02, f01, f03, and f04 winter 2010



However in another case, the HRs two adjacent females, f06 and f03 do not apparently overlap and may exhibit at least some territoriality towards each other (figure 3).



Habitat Use

All fisher in the study area use a wide variety of habitats from what is considered to be late-successional conifer habitat to younger previously thinned stands on private lands and even manzanita (Arctostaphylos spp.) and wedge leaf ceanothus (ceanothus cuneatus) thickets. However, all stands

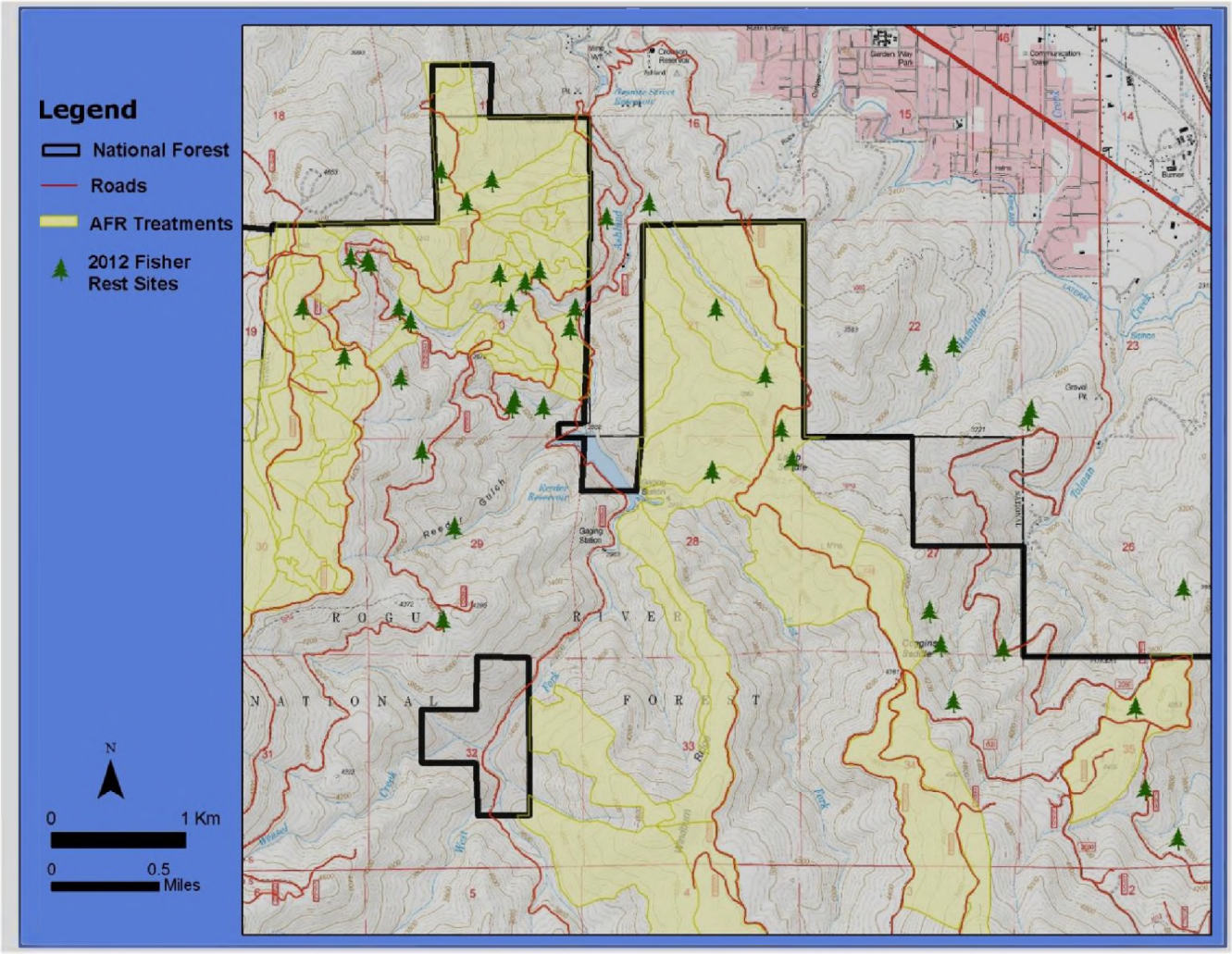
used had relatively high levels of canopy closure regardless of stand age or composition. The Forest currently has 750 permanent Common Stand Exam (CSE) plots within 186 stands scattered throughout the project area and they have been sampled for per-treatment conditions. Many of these stands have fisher locations and rest sites within those stands and the data will be used to quantify habitat use and rest site vegetative conditions. However, at this time, this data has not been summarized; work is currently ongoing to do this in order to be able to statistically quantify pre-treatment habitat use by fisher. In addition, when treatments are completed these permanent plots will be resampled so the forest can compare pre and post vegetation characteristics as well as post treatment habitat use by fisher in the study area.

Rest Sites

To date, we have identified 42 fisher rest sites used by collared fisher in the study area. Rest sites are found by following the animal to the site and usually visually locating the animal in that rest structure. All structures are flagged and tagged with a numbered tree tag if appropriate, and GPS'd. Structure and surrounding habitat data is recorded for the site (Appendix 4). Rest sites include two sites in a manzanita thicket, one in a live large cedar tree, one on a large log and two brush piles. However fully 80 percent of all rest sites located were in Douglas fir mistletoe brooms in Douglas fir tree ranging from 27 to 137 cm in diameter (Figures 4, 5, and 6). In addition, ten of these sites were in non-commercially treated stands; generally within leave areas of the stand. However, in one case, a rest area used by f03 was in a stand that had been treated and was surrounded by hand-piles. Other rest trees were within 100 meters of a road; however this road is not open motorized use by the public, only for administrative use by the FS or its contractors. In another case, a rest tree used by f03 on December 13 1012 was within 37 meters of a road that was being used by up to 20 log trucks on that day – all had gone up the road and several loaded trucks had come down past the animal. We had located the animal in the tree and a truck came down using its "jake" brake; when it past the animal left the tree. However it is unknown if it left due to disturbance by the truck or if it left due to us being beneath the tree.

Douglas fir mistletoe is not rare in the watershed and it is also used as nest sites for spotted owl, goshawk as well as many other mammalian species. Use of mistletoe as rest sites by fisher has been observed in other study areas (Lofroth et al 2010). In this study area it is typically associated with areas lower on the slope in forest with relatively high canopy cover; however some sites have been on the edges of openings. Again, some of these sites are located within CSE plots however we have not yet quantified those habitat conditions. Other rest sites not included in our permanent will have CSE plots placed and data collected to compare to other random points on the landscape.

Figure 4. Ashland Fisher Rest Sites



Figures 5 and 6. Fisher Rest Sites in Douglas-fir Mistletoe structure.

2011 Den Site

To date only one potential den site has been located. F01 slipped her collar inside a 16.5 inch black oak snag on non-federal land in the spring of 2011. The area had been treated non-commercially for fuel reduction and was near the top of the ridge with a south west facing aspect; a typical area for black oaks to occur in this landscape (Figure 7). A camera was placed at the site to determine if this in fact a den site; however the animal never returned that spring to the site and when subsequently captured in July of 2011 was found to be post-lactating. She apparently had re-located to another den. In 2012 this same animal was beginning to den again in the area, however her collared failed and we did not locate the den site. Again, when she was captured in July of 2012, she was post-lactating indicating she had reproduced and in fact we captured five kits that October, at least some of which were likely her kits. Another reproductive female (f02) captured in 2010 began to exhibit denning behavior while collared; her collared also failed before we could locate the den tree. When she was recaptured in July of 2010 she showed evidence of reproduction but had also slipped her collar. This animal was beginning to den in the spring of 2011 when she was predated by a cougar (Appendix 5). This year we have several females that are likely to den and we hope to finally locate some den sites.

Figure 7. F01 Potential Den Tree

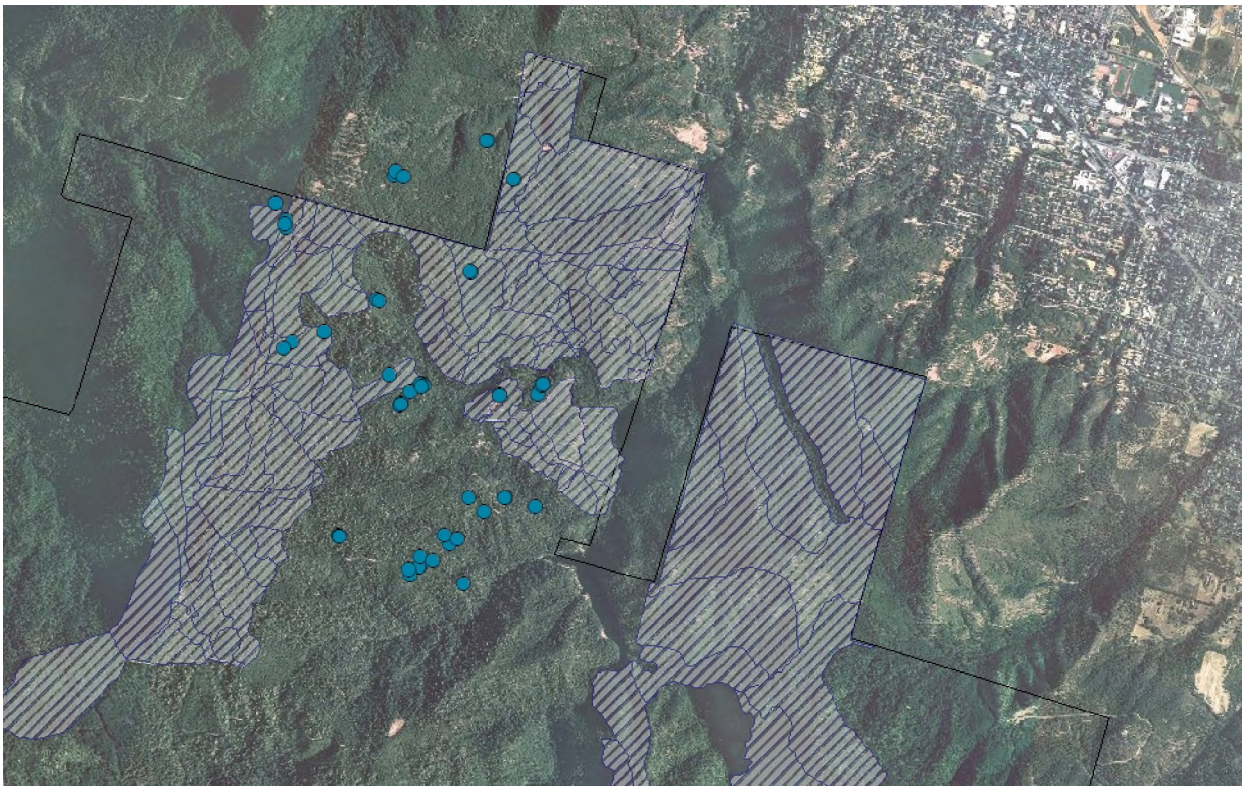
FY2013

Fisher Response to Treatments

We are currently attempting to discern how these animals respond to both the non-commercial and commercial thinning treatments. Non-commercial treatments generally attempt to treat encroaching conifers that would not normally be on the landscape if fire was naturally occurring across that landscape. As such, most conifers including Douglas fir and white firs under 10 inches DBH are cut, depending on plant association groups, slope position, and aspect; most hardwoods are encouraged to be left on-site (http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=1563).

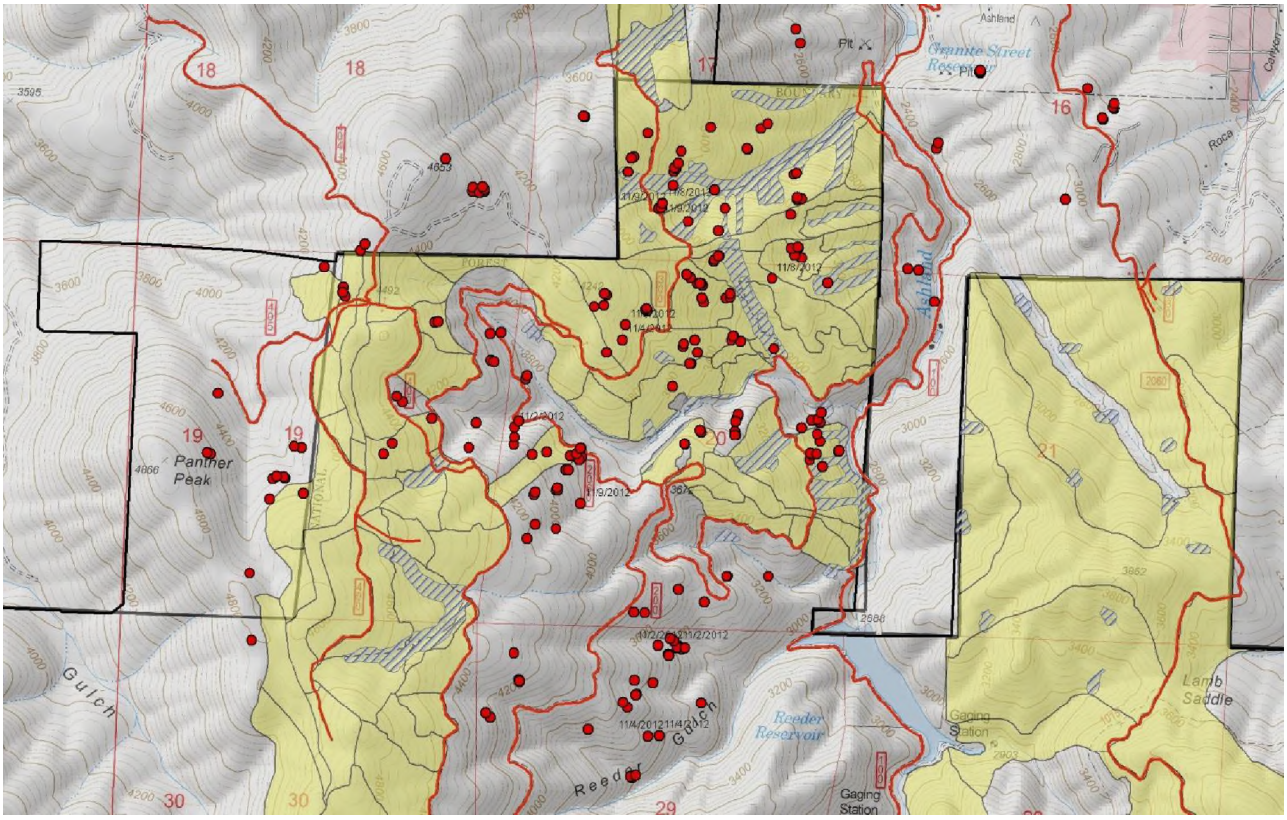
Non-commercial treatments in the on the west side of the project area occurred from June 2010 to July 2011and included cutting and piling of all cut trees and brush; 17 of the 26 units were burned in February of 2012. This area is entirely within the home range of two adult female fisher (F02 and F03) (figure 8). The photo below shows F03 in the summer of 2011 during the last months of non-commercial treatments of cutting and piling and there is evidence of some potential avoidance behavior due to disturbance by the animal to the ongoing activities occurring in the treatment block. F02 also tended to avoid the areas during treatments.

Figure 8. F03 locations summer 2011



However, after non-commercial treatments were completed, f03 continued to use the non-commercially treated area extensively from July 2011 to December 2012.

Figure 9. F03 composite of GPS Collar locations from July 2011 through December 2012



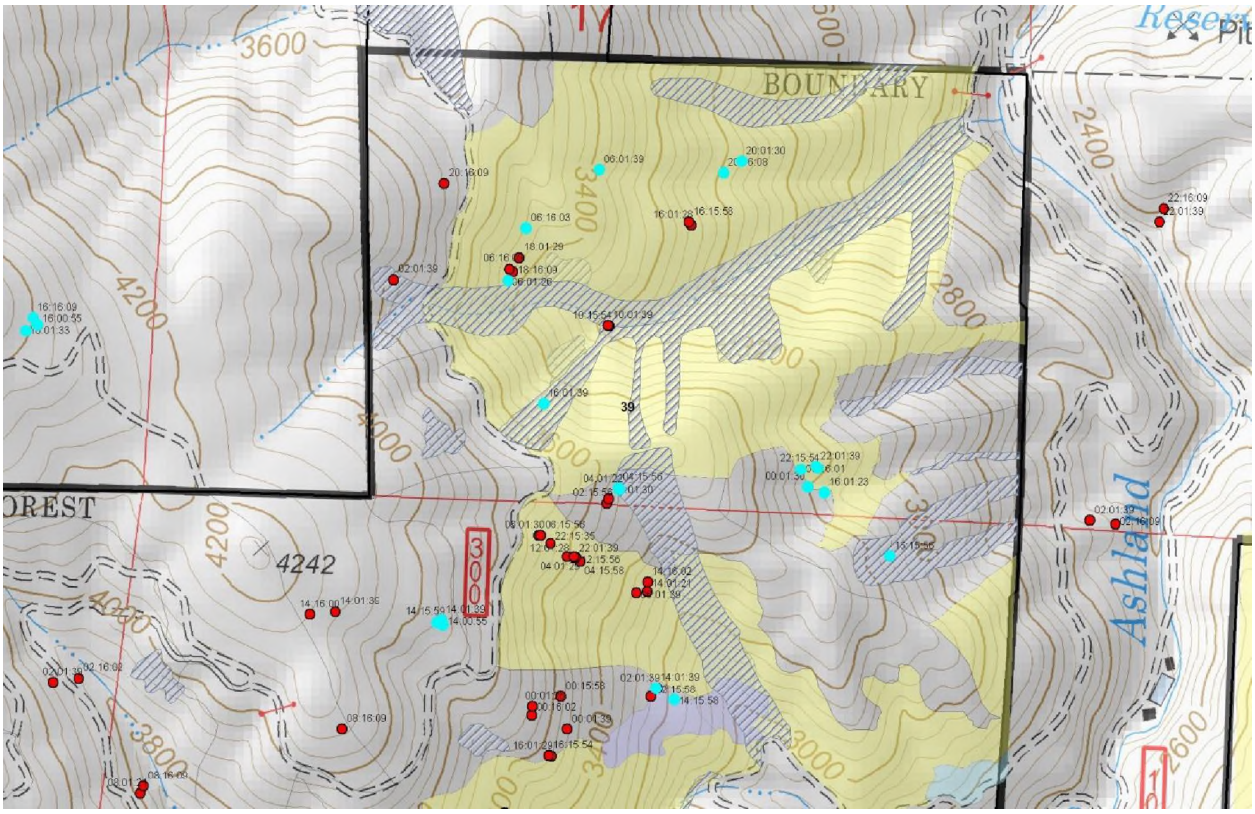
Of approximately 150 GPS locations during this time, f03 used the treated portions of the units 36 percent of the time and used either leave areas within units or areas outside of units 66 percent of the time.

Use of these non-commercially treated areas and use of non-federal lands that have been treated to various degrees seems to suggest that these fisher may be somewhat tolerant of these types of treatments. However the treatments are highly variable and at this time we have not yet quantified habitat conditions post treatment with resampling of the CSE plots. In addition, as this animal is surrounded by other fisher HRs she may not be able to move to another more suitable area.

Commercial Treatments

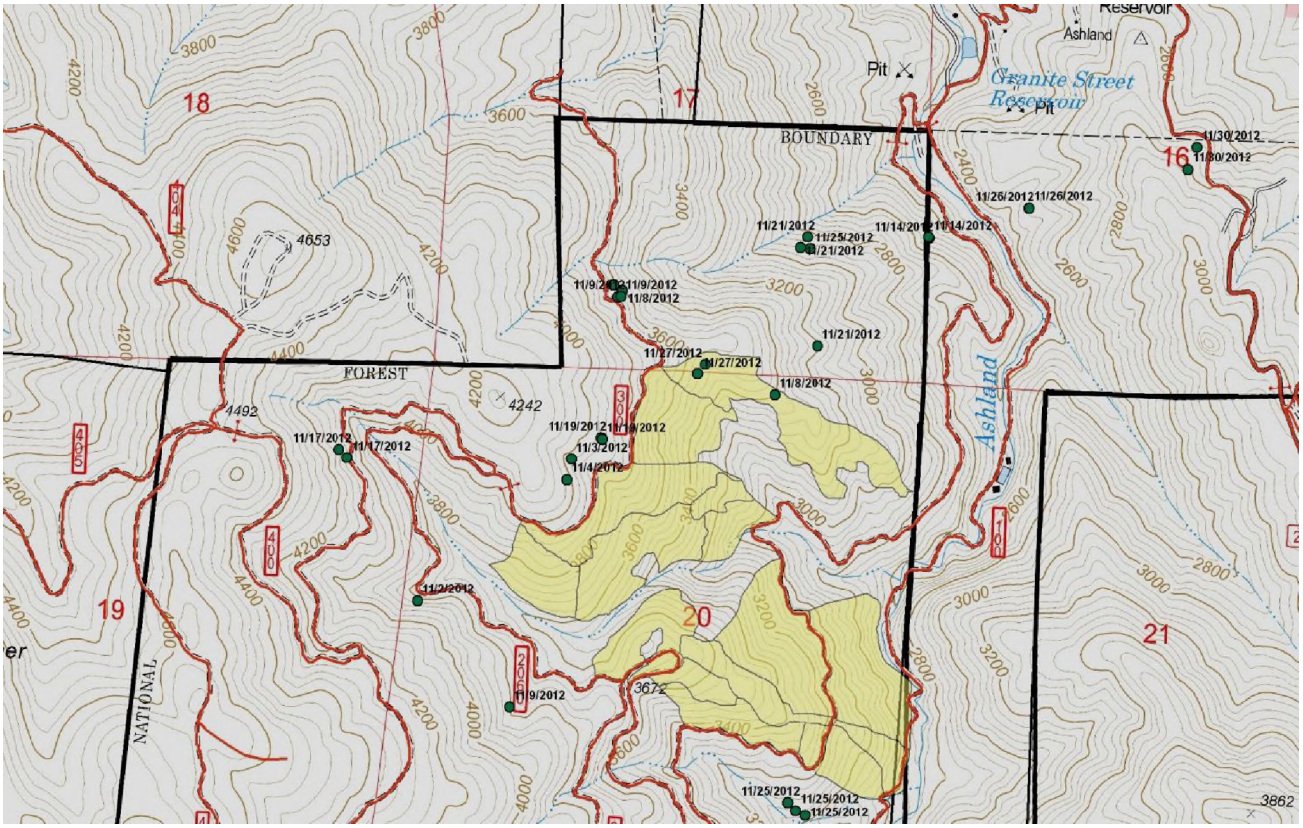
Beginning in October 2012, felling of commercial size trees was initiated in Block 1 located within the HR of f03. Felling took approximately 2 weeks in October to complete and during that time f03 seemed to be reacting to the felling operations as she was only in or near the units at night or before or after actual felling was occurring (Figure 9). One location is near a unit at 0900.

Figure 9. F03 October Locations Highlighted with Times of Location



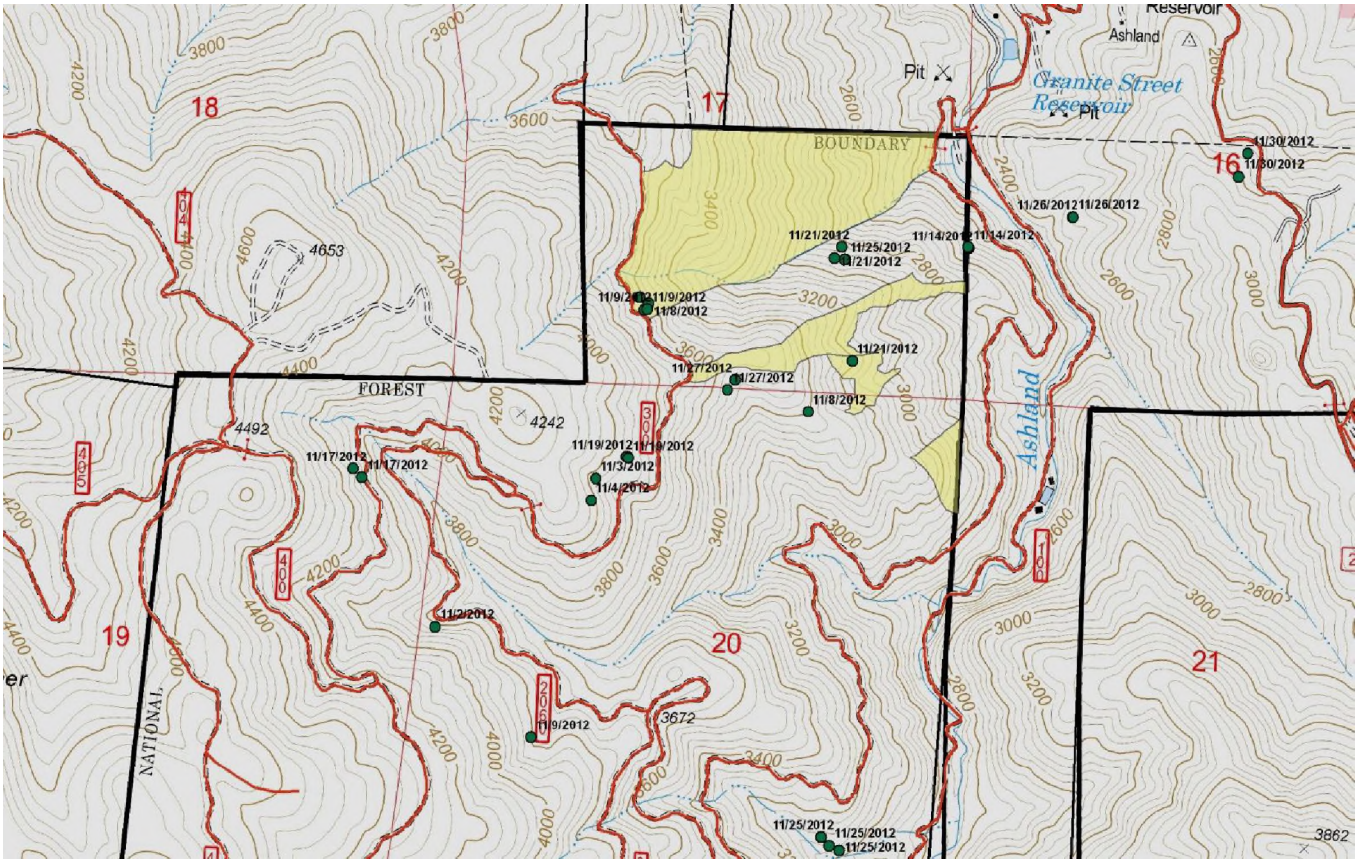
After cutting was completed f03 only used cut units in November four times that had been felled in October. In November when helicopter yarding began she showed a marked response to the helicopter disturbance. The helicopter used was a dual rotor Vertol heavy lift ship that is quite loud. During yarding operations in the southern portion of the block from November 19 to 23 she did use the northern portion of the block to some extent (figure 10).

Figure 10. F03 locations during yarding Nov. 19-23, 2012



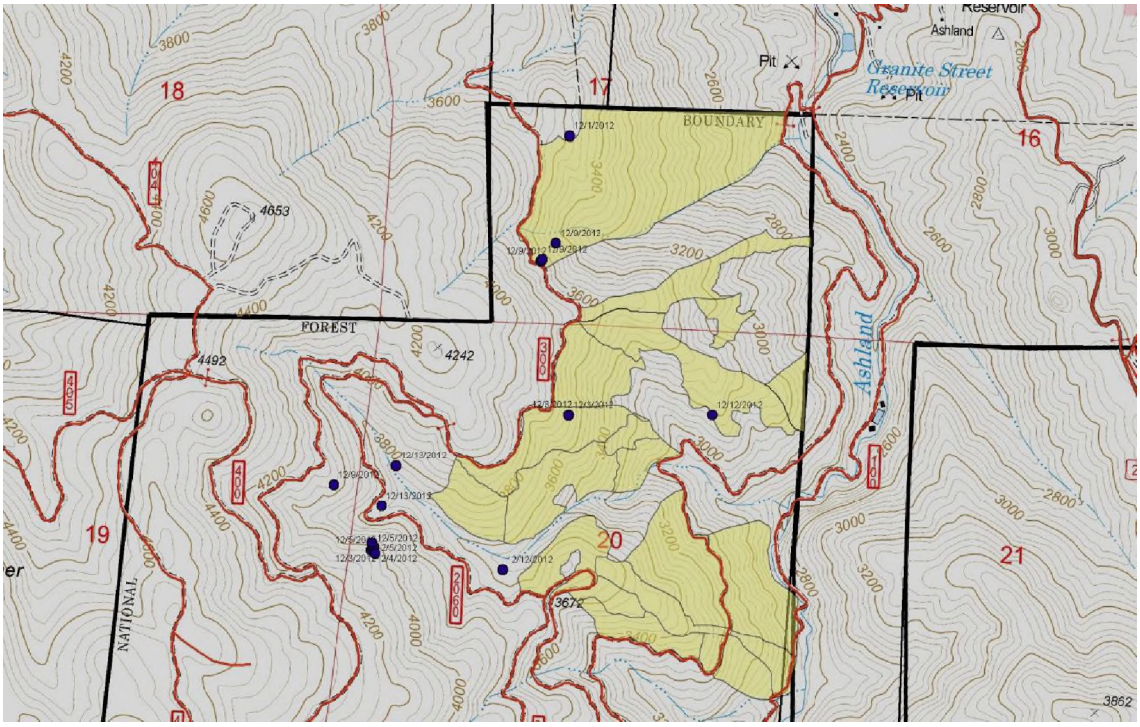
During yarding operations in the northern portion of the block she left the area and moved across Ashland creek (figure 11). Only one location on 11/27/2012 showed her near the active yarding operations and it was at night.

Figure 11. F03 Locations during Nov 26-29 Yarding Operations



After yarding operations concluded she did make at least 4 forays into the commercially treated stands in December (figure 12).

Figure 12. F03 December 2012 Locations



Discussion

Fuels Treatment Initial Response by Ashland Fisher

Our location data from at one animal (F03) and information on use by other animals on previously treated non-federal lands and Federal lands may suggest that these animals can be somewhat tolerant of non-commercial fuels treatments, at least of the type that was completed in the Ashland project. However this suggestion must be viewed with some skepticism as these treatments are still occurring and there may be a limit or "break point" at which these animals may move or vacate their HRs due to ongoing activities. Prey can be affected and reduced abundances can result which could affect reproduction and fitness, increased risk of predation is also a risk (Lofroth 2010). It is important to note that we do while we do have some reproduction in this population and capture kits annually we do not see the reproductive rates that are seen in other study areas which in western North America averages 64 percent annually (Lofroth 2010).

The location data seems to show some response to disturbance from non- commercial and commercial treatments, more so with commercial treatments, although anecdotal observations also suggest some tolerance of these animals to disturbance at least when in rest sites. F03s initial forays in December of 2012 into commercially treated stands is interesting however it says little at this time as to whether or not it is still suitable habitat for fisher or if she will continue to use this portion of her HR in the future. It is extremely important to note that this animal is surrounded by other fisher HRs so she may not have other suitable habitat to utilize. Also, a lag time in response to changes in habitat have been seen in other taxa, notably spotted owls and lynx, where an individual will continue to occupy their HR until they die or learn there is no longer suitable habitat and move on (Clark 2007 and von Kienast pers. comm.) She was

also a three year old adult female that has not yet to our knowledge reproduced successfully and there are multiple males known from her HR during breeding season so she is very likely breeding; this lack of reproduction may be a response to the habitat changes and/or disturbance within her HR. Our only currently confirmed reproducing female in the study area has an HR that generally avoids areas of active treatments and recreation disturbance.

It is critical to now continue to follow these animals over at least the next two to three years in order to determine if they are in fact tolerant to these treatments over the long term. If f03 continues to utilize this HR and she successfully reproduces in the next year or two then is may be possible to begin to state some conclusions about the response of these fisher to natural fuel reduction activities.

FY 2013 Results; Denning and response to treatments

In the spring of 2013 (February); we captured and collared four of our known adult females; F01, F03, F08, and F09. In early March we detected F01 on a piece of non-Federal land near town but we could not download her data from the collar; her collar failed shortly after that attempt. In early March we also detected F03 back in the home range she had been using previous to the commercial treatments, however she seemed to be in an area of that landscape that had little commercial treatment (Riparian reserves, landslide hazard zones, etc.). We could not locate her well enough to download data on here collar and her collar failed in mid-March. We suspect that she denned in that area.

On March 23rd, both F08 and F09 denned in the project area. F08 denned in a 12.5 inch black oak snag natal den approximately 100 meters from Tolman Creek road which at the time was being used as a haul route for the commercial treatments occurring in the watershed. The snag was located near the top of a small ridge on a southeast facing aspect and was on non-federal land that had been treated for fuels reduction non-commercially approximately a decade before.

Figure 13. F08 den site in a black oak.

Seventeen days later on April 9, she moved with her kit to a maternal den 400 meters to a large 40 inch class black oak on an east facing slope 120 meters above the road that was still being used for haul. One week later she moved uphill 300 meters into a 40 inch class madrone tree still with an east facing aspect. Shortly after that her collar failed.

Figure 14. F08 with kit leaving her natal den.

F09 moved into a woodpecker hole in a 24 inch class live ponderosa pine near the top of a ridge with an east facing slope in an Ashland Forest Resiliency unit that had been felled four days prior to her denning the tree. The den was on the edge of the unit with several Douglas fir trees on the ground near the tree and it was within 200 meter of a large helicopter landing that was to be used to yard the logs from that unit and other units nearby (Figures 15 and 16). Given that we had seen a strong avoidance behavior to helicopter yarding that fall by F03, the Forest restricted all activities within that unit and any unit within 600 meters of her natal den until she moved her kit. Three days after she moved into this natal den we observed a large uncollared male fisher in the tree adjacent to the natal den, apparently waiting for her to exit the tree and mate; this animal was observed that tree for most of that day (Figure 17). On April 12, F09 moved form that natal den with one kit (Figure 18). The day after that her collar failed. The Forest believes that restricting all activities from around this known den allowed that animal to be successful at least until she left for a maternal den. The fate of these two kits are unknown To date we have not trapped again in 2013; however we intend to trap in February of 2014 in order to relocate our animals and to study post-treatment habitat use and to conduct further work on denning sites.

Figure 15. F09 Natal Den.

Figure 16. F09 natal den in small group of Pines on edge of unit

Figure 17. Male fisher waiting outside F09 natal den

Figure 18. F09 with kit leaving Natal den.

Collar Issues

Throughout the study we have been using Telemetry Solutions Quantum 4000 mini collar combination GPS/VHF collars. http://www.telemetrysolutions.com/pdf/Quantum_4000_Enhanced_GPS_Collars.pdf

This is the only company that makes GPS collar s light enough for use on fisher, especially female fisher. It also enables the user to remotely download all GPS location data from the collar without having to recapture the animal. However, early on in the study we had problems with the battery life of the VHF portion of the collar; the batteries would die within a week of deployment and we could not find the animals to download the GPS data and if the animal slips the collar, we have lost that collar completely. . This has continued somewhat throughout the project however some of the collars are now lasting from trapping session to trapping session. In addition the GPS batteries only typically last for at most two months which without a full time field crew we lose valuable information on locations during down time between trapping sessions. We continue to work closely with the company and the collars are improving. In addition, we are going to try some different presetting in an attempt to increase the life of the GPS anf VHF portions of the collars.

Further Work

It is imperative to have the multi-party monitoring team complete their habitat data analysis both pre and post treatment in all treated areas so we can conduct analysis on fisher habitat use pre and post treatment. More analysis and data collection need to be conducted at rest sites not within already sampled stands. Most importantly, it is critical to continue to collar and follow these animals as treatments proceed and after they are complete. There is no other work like this being conducted in the Pacific Northwest on the species and given its imminent potential listing under the ESA this information could be critical in any decision to list the species.

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