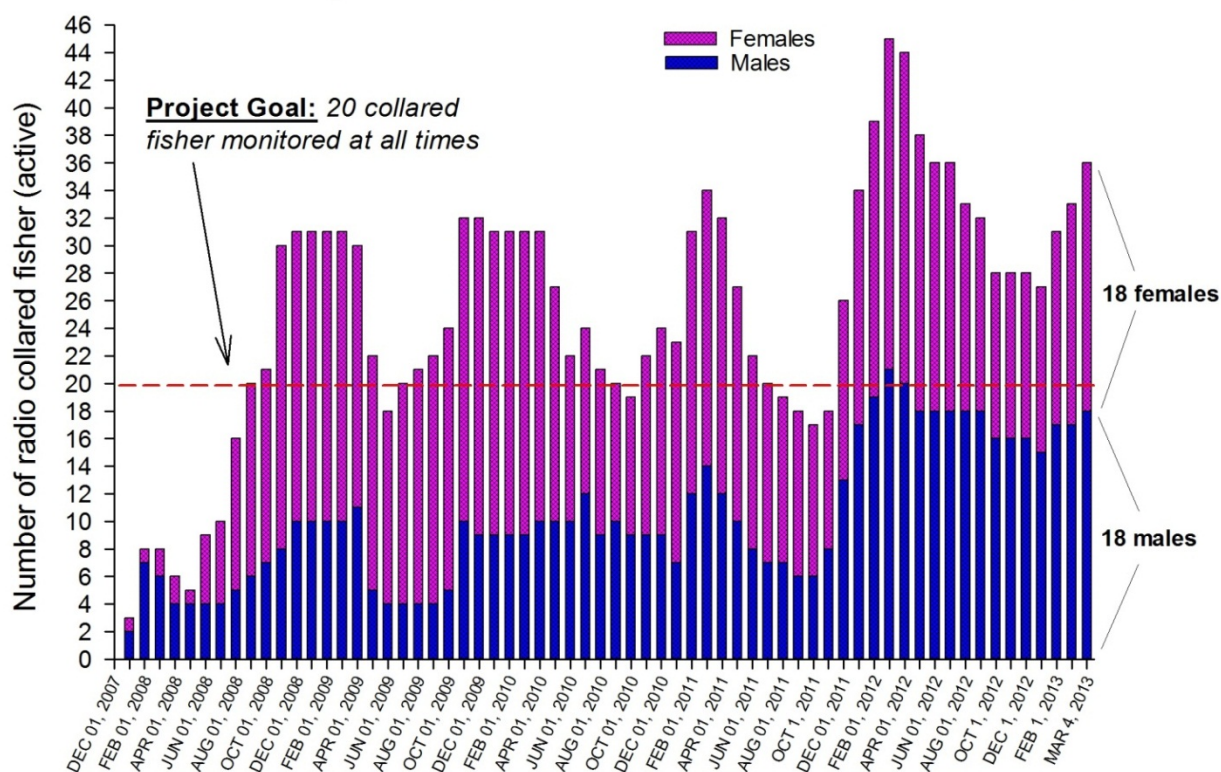


### March 2013 update on the SNAMP fisher team

**Field Activities:** Four SNAMP fisher crew members are continuing camera surveys within the Key Watersheds core study area to identify the presence or absence of fisher. Aerial telemetry flights continue five times a week out of the Mariposa airport to track all of the radiocollared study animals. Pacific Southwest Research station staff has been trapping fisher in the area since January, capturing 19 total fishers. Eleven of these were recaptures (five females and six males) with older or missing radiocollars that were replaced. In addition, eight fishers new to the study were captured: five females and two males. This brings the total number of fisher being actively monitored for survival and movements to 36 (figure below). There was a single mortality of a radiocollared fisher during the last two months. The intact carcass of a young adult male fisher was recovered from a small cavity beneath a large down tree on Feb 16. Trapping ended on March 6, and the field crew is now preparing equipment and protocols for the upcoming spring 2013 denning season.

**Number Actively Monitored Fisher Jan 01, 2008 to Mar 6, 2013**



**Analysis:** Dr. Sweitzer has been working on a combined analysis of survival and summary population biology of fishers for the SNAMP Fisher and Kings River Fisher Projects over the last two months. These analyses will be included in a manuscript tentatively titled *“Survival, causes of mortality, and an evaluation of the current status of the fisher population in the Sierra National Forest, California”*. Dr. Sweitzer will be the lead author for this manuscript, which will include Craig Thompson, Kathryn Purcell, Reginald Barrett, Mourad Gabriel, and Greta Wengert as contributing co-authors.

Rick assembled a comprehensive dataset including all records for individual fishers that have been captured for radiotelemetry monitoring for the Kings River and SNAMP Fisher Projects. These types of data were then used to develop “encounter histories” for all animals known present/alive, newly captured/recaptured, known to have died, or known to have a dropped/failed radiocollar during each month since June 2007 for the Kings River Fisher Project, or since December 2007 for the SNAMP Fisher Project.

Below is a table (Table 1) and simple figure summarizing some of the basic information on radio collared fishers from the SNAMP Fisher Project (does not include data for the Kings River Fisher Project) that is being used in the survival analyses.

Pop Year	Calendar period	Start year <i>N</i> <sup>a</sup>	End year <i>N</i>	Individual fishers <i>N</i> <sup>b</sup>	Fisher mortalities	Radio days <sup>c</sup>	Cumulative females	Cumulative males	Cumulative radio days
1	Apr 1 '07 to Mar 31 '08		7	11	3	692	3	8	692
2	Apr 1 '08 to Mar 31, '09	6	30	41	8	7578	27	17	8270
3	Apr 1 '09 to Mar 31, '10	30	32	51	10	9556	38	26	17826
4	Apr 1 '10 to Mar 31, '11	32	32	55	13	9716	48	34	27542
5	Apr 1 '11 to Mar 31 '12	32	44	59	9	9877	59	44	37419
6	Apr 1 '12 to Mar 5 '13	44	34	50	8	11107	62	47	48526

<sup>a</sup> Number of radio collar fisher being monitored by the study at the start and end of each population year.

<sup>b</sup> Number of different individual fishers that were monitored/tracked for at least 1 day during the population year

<sup>c</sup> Radio days represents the sum of the number of days that each individual fisher was actively being monitored

Data on individual fisher encounter histories have been used to produce estimates of annual survival and “combined year” overall survival for juvenile, subadult and adult-aged male and female fishers for both the Kings River and SNAMP Fisher study areas for each of six different “population years” (defined to begin April 1 and ending on March 31). Analyses were completed using a Kaplan-Meier staggered entry approach. The results have been summarized in multiple tables, which will be incorporated into the draft manuscript. Details of these results will be subject to peer review before being made public, but several interesting results can be highlighted:

- Nearly half ( $n = 51$ ) or 47% of the total 109 individual fishers captured and radiocollared on the SNAMP Fisher project are known to have perished, compared to 42 (approx.. 42%) of around 101 fishers captured on the Kings River Fisher Project. Accordingly, survival trends lower for all age and sex classes of fishers in the SNAMP Fisher study area compared to in the Kings River Project area.
- Survival trends lower for male compared to female fishers among all age classes within the SNAMP Fisher study area, which is also the case for juvenile and adult fishers in the Kings River study area.
- On the SNAMP Fisher project adult female fishers experienced very low survival (0.57 or 57%) during population year 3 (2010-11; Apr 1, 2010 to Mar 31, 2011). In all other years, however, adult female survival exceeded 0.8 or 80%, and was over 0.9 or 90% in both 2009-10 and 2011-12 (Population years two and four, respectively). The end of Population Year 6 is fast approaching on the calendar, and adult female survival in the SNAMP Fisher study area is 0.82 or 82% for 2012-13.
- Although low male survival is much less of a concern for the biology of any population of wild animals, adult male survival on the SNAMP Fisher Project dropped to only 0.42 (43%) during 2011-12

(population year three). Adult male survival has rebounded to 0.87 (87%) this year (2012-13; population year six), which is good news for the boys!

- Data on the encounter histories of all fishers in the SNAMP and Kings River Project study areas have also been analyzed using “Known-fate, staggered entry” models in analytical program MARK. Known fate modeling procedures in MARK allow biologists to evaluate how multiple different “factors” might influence and contribute to explaining patterns observed in survival, such as study area (Site), Age, Sex, Season, etc.. Preliminary results from Known-fate modeling in MARK reveal that Site and Sex are much less important than Age and especially Season (two six month seasons; Mar to Aug, Sep to Feb) for understanding fisher survival across both study areas. Importantly, and contrary to our original expectations when both studies were initiated in Summer and Fall 2007, survival is actually LOWER during Spring-Summer compared to Fall-Winter!?!)
- One explanation for this very atypical pattern, *survival among most wild populations of non-hibernating mammals is usually lower during winter compared to other seasons*, is our previous discovery that the use of anticoagulant rodenticides and other toxic chemicals used around marijuana grow sites in the Sierra National Forest (and elsewhere in California) is poisoning fishers and their rodent prey (squirrels and mice).

In association with the analyses and data to be included in the above-mentioned manuscript on fisher survival, I am coordinating an upcoming meeting with all of the co-authors to review a database I developed that provides an overall compilation of all field and laboratory/necropsy-based information on causes of mortality for dead radio collared animals from the SNAMP and Kings River Fisher Projects. Our goal for the meeting is to review each fisher mortality on a case by case basis to verify and finalize the determinations of the “proximate” causes of mortality prior to submitting the manuscript for peer review. We envision that data on causes of mortality from the SNAMP and Kings River Fisher studies will be key for upcoming reviews of the listing status for fishers in California and in the western United States; we need to be certain the published information is accurate.