THE UNIVERSITY OF

ARIZONA

MT. GRAHAM RED SQUIRREL MONITORING PROGRAM

2005 Annual Report

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Prepared by:
John L. Koprowski, Principal Investigator
Vicki L. Greer, Biologist - Senior
Melissa Merrick, Biologist

EXECUTIVE SUMMARY

In 2005, the University of Arizona Mt. Graham Red Squirrel Monitoring Program continued efforts to document aspects of red squirrel population biology and food resources in the established study areas around the Mt. Graham International Observatory in the Pinaleño Mountains, Graham County, Arizona. A complete census of the study areas was made in March, June, September, and December 2005.

Mushroom production on the monitored areas in 2005 was a two-fold increase from 2004, however the 2005 mushroom crop was still relatively low, the fifth lowest year since data collection began in 1994. Seed production for 2004 (1 year delay in reporting due to methodology), was 20 times lower than the seed crop in 2003. Overall, the 2004 seed crop was the third lowest seen since data collection began in 1993.

Overwinter survival, calculated as animals surviving from December 2004 to June 2005, was high in TR habitat (80%) and lower in SF habitat (33%). Of the 16 adult females that were known to live on or within 100m of the study areas in 2005, as many as 10 produced litters, although only 8 litters were confirmed. From these 8 litters, 28 juveniles were known to emerge from nests and 7 were live-trapped and marked with small metal ear tags for future identification. Squirrel populations decreased 22% on the monitored areas from December 2004 (18 squirrels) to December 2005 (14 squirrels). If the squirrels near the monitored areas (within 100m) are included, a overall decrease (19%) was still seen from December 2004 (27 squirrels) to December 2005 (22 squirrels).

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INTRODUCTION

The Mt. Graham red squirrel (*Tamiasciurus hudsonicus grahamensis*) is the southernmost subspecies of the wide-ranging red squirrel and is endemic to the Pinaleño (Graham) Mountains of southeastern Arizona (Hoffmeister 1986). Believed restricted to ≤ 12200 ha of mixed-conifer and spruce-fir forest at elevations > 2360 m (Hatten 2000), Mt. Graham red squirrels were federally protected as endangered in 1987 with critical habitat defined in 1990 and a recovery plan published in 1993 (United States Fish and Wildlife Service 1993). The University of Arizona's Mt. Graham Red Squirrel Monitoring Program (RSMP) was established in 1989 to meet the requirements of the Mount Graham International Observatory (MGIO) Management Plan (USDA Forest Service 1989) by monitoring the population of this endangered species in the highest peaks of the Pinaleño Mountains near the MGIO (32° 42' N, 109° 53' W). In 2005, the MGIO site consisted of two operating facilities, the Vatican Advanced Technology Telescope (VATT) and the Sub-Millimeter Telescope (SMT), a maintenance and generator building, and a 3.2 km access road (FR 4556). Construction activities at the Large Binocular Telescope (LBT) in 2005 were mainly interior building work. Herein, we report on the monitoring efforts from 1 January to 31 December 2005.

All use of terms *red squirrel* or *squirrel* refers to the Mt. Graham red squirrel unless otherwise noted.

Study Area

Four areas were defined in the vicinity of the MGIO to monitor red squirrel populations (Figure 1) and include two forest habitat types: transitional (TR) or mixed conifer forest and spruce-fir (SF) forest. The TR habitat, between 2680 and 3050 m elevation, is composed of Engelmann spruce (*Picea engelmannii*), corkbark fir (*Abies lasiocarpa* var. *arizonica*), Douglas-fir (*Pseudotsuga menziesii*), ponderosa pine (*Pinus ponderosa*), southwestern white pine (*P. strobiformis*) and aspen (*Populus tremuloides*). The SF habitat, ≥ 3050 m elevation, is composed of Engelmann spruce and corkbark fir. In each habitat type, an area within 300 m of the telescope sites and access road was defined as the *construction* area (TRC, SFC). For comparison, a *non-construction* area beyond 300 m from the MGIO or the access road was defined in each habitat (TRN, SFN). The size of monitored areas has changed several times due to construction and fire events (Table 1).

METHODS

Red squirrels cache conifer cones in locations known as middens. Middens are easily recognized by presence of cached cones and piles of discarded cone scales. The RSMP defines a midden site as a circular area with 10 m radius surrounding the center of the primary cache site. Because red squirrels are territorial and generally solitary, counts of occupied middens provide a reasonably accurate estimate of population size (Smith 1968; Vahle 1978).

All known midden sites are marked with numbered metal tags, and black and orange striped flagging. During censuses or other monitoring duties, new activity areas that have the potential to become new middens are often located. Feeding sign, caching and squirrels are seen at these areas. These areas are assigned a temporary number and are assessed for improved sign and the presence of a squirrel during the next quarterly census. If conditions warrant, an activity area will be upgraded to a midden and added to the regular quarterly censuses. If no improvement occurs in the two quarterly censuses following initial location, the activity area is removed.

Prior to 2003, at the end of each calender year, a list of middens to be removed from regular censusing is compiled. If a midden has been censused for at least three years (12 censuses), including at least one good cone year, and has not been occupied during that time, the midden is removed from the list for regular censusing and are revisited only in December. If any of removed middens become re-occupied, the sites are returned to the list for regular census. However, in 2003, because a large number of middens were removed in some areas as a result of insect damage, we began visiting all removed middens during each census. This change was made so as not to leave large parts of the monitored areas unvisited for an entire year. Removed middens, if still unoccupied, are simply checked off a tally sheet, while complete notes are taken on middens considered to be in the regular census.

Red Squirrel Food Resources

Conifer Seed Production

The RSMP began collecting quantitative data in 1993 to determine the abundance of major red squirrel food resources: conifer seeds and mushrooms. In July 2004, 14 of the original seed plots in SFC (7) and SFN (7) were in areas destroyed by the Nuttall Fire. We added 3 new plots in late summer 2004 (SFC - 2, SFN - 1) in remaining unburned areas. Therefore, seed production for 2004 was estimated from 20 seedfall plots distributed among the monitored areas (Figure 1). Three 0.25 m^2 seed traps were randomly placed within a 10 m x 10 m plot at each location. Seeds from the 2004 crop were collected from the seed traps in June 2005. Conifer seeds contained in each trap were separated by species and individually tested to determine the proportion of seeds that were likely to be viable. A viable seed leaves an oily spot on clean paper when squashed. This method is likely to underestimate total number of viable seeds because some seeds may have been preyed upon within the seed trap. Estimates of seedfall for each tree species were calculated as the average number of viable seeds from all three traps on each plot. Seeds of white pine and ponderosa pine are not readily dispersed by wind due to their large size. As a result, seed crops of these species are

under represented in seed trap samples. Both species may be important local food supplies for red squirrels, but at present no reliable method exists to estimate size of seed crops.

Mushroom Production

As in previous years, mushrooms were collected from plots 1m by 100m (0.01 ha) at two week intervals during periods of mushroom production. Fourteen of 28 food resource plots were destroyed in the Nuttall Fire in July 2004, however, three new plots were established in remaining unburned areas on the SFC and SFN. Mushrooms (epigeous or above-ground fungi) were collected at these 20 sites (Figure 1) from mid-July through early October 2005. In 2005, mushrooms were again collected from north-south oriented plots, instead of east-west as in 2001 and years prior . In 2001, we collected mushrooms from both east-west and north-south plots. We detected no significant differences in weight, number, or diversity of mushrooms between the two orientations; we decided to use north-south plots for 5 years and "rest" the east-west plots. Collections were restricted to genera of mushrooms used by red squirrels on Mt. Graham or in other regions (Table 2). Collected mushrooms were separated by plot and genus, and weighed wet. For most genera, dry weight was calculated by multiplying wet weight by a wet weight/dry weight ratio determined from previous samples on Mt. Graham. Dry weights were measured directly for genera with small numbers of specimens previously collected (<50).

Because seeds for a given year are not collected and analyzed until the following spring, seed data are delayed by one year. For comparison, the previous year's seed and mushroom data are reported **in addition** to the current year's mushroom data.

Population Biology

Midden Occupancy

Census data were used to determine number and distribution of occupied middens on each monitored area. In March, June, September, and December 2005, all middens were visited at least once to determine occupancy. If a midden appeared to be occupied based upon feeding sign (cone scales, dried mushrooms, and conifer clippings) or caching, every attempt was made on subsequent midden visits to observe the resident and to determine its sex, age, and reproductive condition. In 2005, most animals on or near monitored areas were ear-tagged and many were fitted with radio collars, further assisting census efforts.

All middens on the monitored areas were classified as either occupied, unoccupied, or possibly occupied, with each occupied midden representing one squirrel (except for females with dependant juveniles). A midden was considered unoccupied when no squirrel or squirrel sign was present. A midden was considered possibly occupied when red squirrel sign was found but sign was insufficient to clearly indicate occupancy. Possibly occupied middens were considered to be unoccupied when determining population size. Population size estimates are conservative and represent the minimum number known alive (Krebs 1966). Differences in midden occupancy among study areas were compared using data from June and December.

Overwinter Survival

Overwinter survival was estimated for squirrels in the monitored areas. During a complete census in December 2004, the number of occupied middens and the identity of resident squirrels were determined. December 2004 occupancy was compared to occupancy for June 2005. For unmarked animals, a squirrel was considered to have survived winter if it was a resident of a midden in December and that same midden was found to be occupied by a squirrel of the same sex in June. In addition, if the midden was listed as occupied based on sign or a squirrel of unknown sex was seen, this was also counted as a surviving individual. For marked squirrels, survival was generally known with a fair degree of certainty using available trapping and telemetry information.

Spatial Distribution

We used three methods to describe spatial distribution of middens and squirrels: crude density, local density, and nearest-neighbor distance. Crude density represents the total number of middens and squirrels per hectare. We made no allowance for differences in habitat quality among monitored areas, and statistical tests are not appropriate.

Local density (LD) is a method of describing local population densities for comparisons among populations in which habitat variables are uncontrolled. For this report, LD is defined as the number of *middens* or *squirrels* within 100 m of a focal *midden* or *squirrel*. Mean LD ($\bar{x}$ LD) of *middens* (all middens, occupied and unoccupied) and *squirrels* (all occupied middens) is compared between areas and habitats. The benefit of using LD is that measurements are not influenced by habitat variables, whereas crude density may include large areas not suitable as squirrel habitat, such as clearings and meadows. The LD method is adapted from distance models of neighborhood modeling used by plant ecologists to describe and compare plant populations (Czárán and Bartha 1992). A circle with a radius of 100 m encloses 3.14 hectares, which is approximately the average home range of Mt. Graham red squirrels (Froehlich 1990) and is also the approximate maximum distance that an observer can recognize and accurately locate a squirrel "chatter" call (P. Young, pers. obs.).

Nearest neighbor distance (NND) is used to describe and compare the spatial distribution of populations and communities of plants and animals (Clark and Evans 1954, Krebs 1989). In this report, NND is the shortest distance (m) from a focal *midden* or *squirrel* to the nearest *midden* or *squirrel*. Mean NND ($\bar{x}$ NND) of middens and squirrels was compared between areas and habitats.

Local density and NND were determined for each midden and squirrel using mapped coordinates and compared among areas and habitats using ANOVA. To determine the LD and NND of some middens and squirrels on the monitored areas, we included off-area middens within 100 m of a focal midden.

Reproductive Activity and Success

In 2005, we recorded breeding condition of adult male and female squirrels, and litter size when observed. By examining the squirrel's condition through trapping efforts or binoculars, we determined the reproductive status of a female as non-reproductive (small unpigmented teats), reproductive (vulva visibly swollen or appearance of pregnancy), lactating (swollen, elongated teats with surrounding alopecia), recently lactating (elongated black tipped teats), or lactating in past seasons (small black tipped teats). We determined reproductive status of male squirrels during trapping or visual assessment as testes non-scrotal (non-reproductive) or testes scrotal (reproductive).

Trapping and Marking

In accordance with Federal Fish and Wildlife Permit #TE041875-1, using accepted methods (Koprowski 2002), we trapped red squirrels using Tomahawk wire-mesh box-type live traps, baited with peanuts, peanut butter, apples, mushrooms, or cones. Once captured, we transferred squirrels to a cloth-handling cone for marks and measurements. We tagged squirrels with small numbered metal ear-tags threaded with colored plastic washers and affixed to ears for easy distance identification. We also fitted some adult animals with radio collars. Squirrels were normally released with in 2-3 minutes of transfer to the cloth-handling bag and observed for several minutes to ensure good condition.

Mapping

All middens and other physical features on the monitored areas have been previously mapped using GPS with an accuracy of ± 5m. Universal Transverse Mercator (UTM) coordinates from GPS files were used to compute local densities and nearest neighbor distances. New GPS data (nests, habitat plots, etc.) were collected using a GeoExplorer II system from Trimble Navigation, Inc. Readings were taken within 5 meters of the location center. Date, time, and location descriptions were noted in the field for later reference. Final GPS locations were based on an average from a minimum of 200 three-dimensional data points. Locations were differentially corrected using base station (Continuously Operating Reference Station, CORS-COT1, Tucson, Arizona). Maps were produced using Arc-View 3.2 (ESRI 1995).

Weather Data

Weather data were collected using two Davis Instruments weather stations. One station was located along the abandoned Forest Service road north of Emerald Peak on the SFC; the other was located at the Biology Camp on the TRC. Stations record air temperature (high, low, and average), wind speed, wind direction, rainfall, relative humidity and barometric pressure. Data were averaged at 60-min intervals. Snow depth (cm) was recorded from four snow pole pairs located in SF habitat, one pair at the 3050 m level on the access road, and three snow pole pairs in TR habitat. Each pair

consists of a pole in a clearing or canopy opening and a second pole nearby in the forest.

All statistical analyses were conducted using standard tests found in SAS, StatsDirect, or Minitab statistical software. Because sample sizes were sometimes small due to endangered status, significance for statistical tests was implied when $P \leq 0.05$ and potential biological significance was noted when $P < 0.10$.

RESULTS

Red Squirrel Food Resources

2004 Conifer Seed Production

The total 2004 seed crop was third lowest on the monitored areas since data collection began in 1993. Douglas-fir was the most abundant seed in 2004. When comparing the 2004 seed crop to all previous years of study for each species, corkbark fir (no seeds collected) was the lowest reported seed crop, Douglas-fir was fifth lowest reported seed crop, and Engelmann spruce was the third lowest reported seed crop. The 2004 overall seed crop was 20 times lower than the seed crop in 2003 (Table 3, Figures 2a-c, Appendix A).

2005 Mushroom Production

Overall annual mean mushroom production in 2005 was nearly two times greater than in 2004, but was the fifth lowest crop since data collection began in 1994. Production increased in both TR and SF habitats in 2005 as compared to 2004 (Figure 3). In 2005, mushroom production ($\bar{x}$ wet weight) did not differ between TRC and TRN areas, but was greater on SFC area than SFN. Overall production was greater in the TR habitat than in SF (Table 4). On TRC, three genera, *Cortinarius, Russula, and, Lycoperdon* accounted for 65% of production. On TRN, *Cortinarius, Pholiota,* and *Lycoperdon* accounted for 82% of total production. *Russula, Amanita,* and *Clitocybe* accounted for 82% of the production on SFC. On SFN, *Amanita, Cortinarius,* and *Russula* accounted for 75% of the total production (Table 5).

Population Biology

Midden Occupancy

Four quarterly censuses (Mar, Jun, Sep, and Dec) of all middens on or near monitored areas were made in 2005 (Appendix B). From December 2004 to December 2005, the number of red squirrels dropped from 18 to 14, a 22% decrease. On TRC, the highest number of squirrels (14 Ad) was in June 2005, and the lowest number was 9Ad in December. The highest numbers (4Ad + 1J) on TRN were in September and all other census months had 3Ad. The highest number of squirrels on SFC was in March (4 Ad) with the lowest (1 Ad) in September. On SFN, no squirrels were found to be living on the area during 2005 censuses (Figure 4, Appendix B, C, D). The squirrel populations in 2005 were some of the lowest observed on the monitored areas since data collection

began in 1989 (Figure 5).

Three newly established middens were added on the TRC area in June 2005 (Appendix B). In June 2005, the proportion of middens occupied was higher on TRC than TRN, but there was no difference within SF habitat. In December 2005, the proportion of middens occupied within TR or SF habitats did not differ (Table 6).

Overwinter Survival

The number of squirrels that survived the winter of 2004-2005 did not differ among all areas (Table 7); survival was 80% in TR habitat and 33% in SF habitat. For comparison, survival from the previous winter (2003-2004) was 71% in TR habitat and 53% in SF habitat.

Overwinter survival may be overestimated because a midden may be occupied in the spring by a different squirrel of the same sex. This mortality can not be detected among unmarked squirrels. However, this potential overestimate is much less likely as most squirrels on the monitored areas are ear-tagged and radio-collared for unique identification.

Crude Density

Between December 2004 and December 2005, crude density of *middens* on the areas remained relatively unchanged, except TRC, which increased slightly, as three newly established middens were found in June (Appendix E1-a). Crude density of *squirrels* on all areas decreased from December 2004 to December 2005 (Appendix E1-b).

Local Density

The December 2005 overall mean local density ($\bar{x}$ LD) of *middens* (3.4) was the same, as in December 2004 (3.4). Local density of middens differed among the four areas. The SFN had the lowest $\bar{x}$ LD (1.1), and TRC and TRN had the highest $\bar{x}$ LD (4.4). The mean $\bar{x}$ LD of *squirrels* (occupied middens) on all areas in December 2005 was 0.4, which is a decrease from 1.1 in December 2004. The $\bar{x}$ LD of *squirrels* did not differ among areas (Table 8, Appendix E-2).

Nearest Neighbor Distance

Overall $\bar{x}$ NND of *middens* increased slightly from December 2004 to December 2005 (59.1m to 59.8m). The $\bar{x}$ NND in SF habitat (82.9m) was longer than in TR habitat (46.9m) in December 2005 (Table 9, Appendix E-2). The $\bar{x}$ NND of *squirrels* (occupied middens) for all areas increased from 114.0m in December 2004 to 187.5m in December 2005. The $\bar{x}$ NND of *squirrels* differed among areas as SFC was longest $\bar{x}$ LD (654.2m) and TRN was shortest $\bar{x}$ NND (92.6m) (Table 9, Appendix E-2).

Reproductive Activity and Success

Three breeding chases were observed in 2005, in March and April on/near TRC, and in May on SFC (Appendix F-1). Based on information from census and trapping records, most resident adult males were scrotal from January through July. No scrotal males were noted in August through December (Appendix F-3b).

The first lactating female was observed 1 Jun on TRC and the latest was on 25 August, also on TRC. During the June census, of the 14 adult females identified as residents (including nearby off-area middens), 5 were reproductive and 4 were lactating. By September, of 9 resident females, none were lactating, and 7 were post-lactation (Appendix F-3a). Direct evidence of 8 litters (28 juveniles) was seen on or near the areas during censuses or other activities. All litters were confirmed in August, however, some likely emerged slightly earlier as those juveniles were a larger size and roaming further from the nest when first detected (Appendix F-2).

Trapping and Marking

By the end of 2005, nearly all residents on or near monitored areas were fitted with colored ear tags and radio-collared (Appendix B). In addition, 7 juveniles were caught while still at natal middens and fitted with small numbered metal ear tags to aid in the collection of dispersal information.

Mapping

No significant changes in maps of the monitored areas were made in 2005, as all major features (middens, roads, trails, construction areas, etc.) have been mapped in previous years. New nests or habitat plots were GPS located and added to databases and maps.

Weather Data

Weather data were collected for most of 2005 from two weather stations located at the biology camp (TR habitat) and near Emerald Peak (SF habitat). Data from Emerald Peak were missing between 6 June and 9 August 2005 due to lightning strike, and after 10 November 2005 due to equipment failure. Data from biology camp were missing after 12 December 2005 due to equipment failure. From available data, maximum temperature recorded was 26.5°C in July at the biology camp and the minimum temperature recorded was -13.7°C in January on Emerald Peak. The maximum average monthly temperature was 15.9°C in July at the biology camp and the minimum average monthly temperature was - 4.3°C in February on Emerald Peak (Appendix G-1). The maximum total monthly rainfall was recorded in August, at 88.8mm and June was the driest month at 0.4mm (Appendix G-1). Snow depth was recorded from the eight pairs of snow poles. The average accumulated snow depth from December 2004 through May 2005 ranged from 0.2cm to 155.3cm (Appendix G-2). For comparison, average accumulated snow depths for December - April

in 2003-2004 ranged from 10.0cm to 175.4cm, and in December - April 2002-2003, depths ranged from 0.0cm to 104.8cm. Data on wind chill temperatures, wind direction and speed, humidity, and barometric pressure were also collected (Appendix G-1).

Insect Outbreaks on Monitored Areas

Infestations of bark beetles (*Drycoetes confusus* and *Dendroctonus rufipennis*) continued on parts of the monitored areas in 2005, although to a lesser degree than in previous years. Spruce aphid (*Elatobium abietinum*) were seen, but in much reduced numbers. For a detailed report on forest health and continuing research on the insect infestations, please contact the USFS Southwestern Region Entomology and Pathology Office in Flagstaff, AZ.
http://www.fs.fed.us/r3/resources/health/

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Table 1. Changes in the areas monitored by the University of Arizona's Red Squirrel Monitoring Program as influenced by construction and fire events. TRC = transitional forest in the construction zone, TRN = transitional forest outside of the construction zone, SFC = spruce-fir forest in the construction zone, SFN = spruce-fir forest outside of the construction zone. All area measures are in hectares.

Event and Date	TRC	TRN	SFC	SFN	All Areas
September 1989	85.19	20.86	88.28	104.81	299.14
LBT Site Expansion 1993	85.19	20.86	100.42	104.81	311.28
After Clark Peak Fire April 1996	51.12	20.85	75.90	104.81	252.68
After Nuttall Fire July 2004	51.12	19.81	58.49	34.14	163.56

Table 2. Mushroom genera known to be food resources of red squirrels, and collected from food resource plots on RSMP study areas, Pinaleño Mountains, Arizona.

MUSHROOM GENUS	SOURCE(S)
Amanita	Buller 1920, M.C. Smith 1968
Auricularia	Monitoring Program personal observations
Boletus	Buller 1920, C.C. Smith 1968, M.C. Smith 1968
Clavaria	M.C. Smith 1968
Clitocybe	Monitoring Program personal observations
Cortinarius	C.C. Smith 1968, Froehlich 1990, Uphoff 1990
Gastroid sp.	Monitoring Program personal observations, States 1990
Hydnum	C.C. Smith 1968, M.C. Smith 1968
Lactarius	Buller 1920, C.C. Smith 1968
Leccinum	Monitoring Program personal observations
Lycoperdon	Monitoring Program personal observations
Pholiota	C.C. Smith 1968
Ramaria	Monitoring Program personal observations
Russula	M.C. Smith 1968, C.C. Smith 1968
Suillus	C.C. Smith 1968

Table 3. Mean filled conifer seed production, on RSMP study areas, Pinaleño Mountains, Arizona, 2004. The percent column represents the proportion of each seed species on an individual area.

		Corkbark fir		Douglas-fir		Engelmann spruce	
Area/Habitat	n	$\bar{x}$ 1000 seeds/ha	%	$\bar{x}$ 1000 seeds/ha	%	$\bar{x}$ 1000 seeds/ha	%
TRC	5	0.00	0.0	63.92	82.9	7.92	10.3
TRN	4	0.00	0.0	3.30	33.3	6.60	66.7
SFC	5	0.00	0.0	2.64	24.8	8.00	75.2
SFN	6	0.00	0.0	4.40	15.3	24.33	84.7
TR Habitat	9	0.00	0.0	36.98	78.2	7.33	15.5
SF Habitat	11	0.00	0.0	3.60	17.6	16.90	82.4

Table 4. Mean annual mushroom production on RSMP study areas, Pinaleño Mountains, Arizona, 2005.

Area/Habitat	n	$\bar{x}$ Wet weight ± se (Kg/ha)	$\bar{x}$ Dry weight ± se (Kg/ha)
TRC	5	22.3 ± 7.0	2.3 ±0.7
TRN	4	44.5 ±13.9	4.1 ±1.3
SFC	5	22.1 ±5.2	2.5 ±0.6
SFN	6	9.3 ±2.6	1.0 ±0.3
TR Habitat	9	32.1 ±7.8	3.1 ±0.7
SF Habitat	11	15.1 ±3.3	1.6 ±0.4

Wilcoxon Test within TR:

Wet Weight	*Z = 1.02*	P = 0.270
Dry Weight	*Z = 0.61*	P = 0.540

Wilcoxon Test within SF:

Wet Weight	*Z = 1.73*	***P = 0.083***
Dry Weight	*Z = 1.73*	***P = 0.083***

Wilcoxon Test between TR and SF:

Wet Weight	*Z = 1.90*	***P = 0.058***
Dry Weight	*Z = 1.60*	P = 0.111

Table 5. Mean annual mushroom production (wet weight Kg/ha) of selected mushroom genera known to be food resources for red squirrels, 2005. The proportions of the three most available genera on each area are in bold.

	TRC		TRN		SFC		SFN	
Genus	$\bar{x}$ Kg/ha	%	$\bar{x}$ Kg/ha	%	$\bar{x}$ Kg/ha	%	$\bar{x}$ Kg/ha	%
Amanita	2.36	10.5	0.00	0.0	2.99	**13.5**	3.25	**35.0**
Auricularia	0.89	4.0	1.82	4.1	1.72	7.8	0.53	5.7
Boletus	1.30	5.8	0.00	0.0	0.00	0.0	0.00	0.0
Clavaria	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
Clitocybe	0.64	2.9	0.09	0.2	2.75	**12.5**	0.54	5.8
Cortinarius	5.98	**26.8**	21.40	**48.2**	0.23	1.0	2.03	**21.9**
Gastroid sp.	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
Hydnum	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
Lactarius	1.76	7.9	0.12	0.3	0.76	3.4	0.16	1.7
Leccinum	0.00	0.0	2.30	5.2	0.00	0.0	0.00	0.0
Lycoperdon	2.55	**11.4**	2.53	**5.7**	1.28	5.8	1.06	11.5
Pholiota	0.00	0.0	12.45	**28.0**	0.00	0.0	0.00	0.0
Ramaria	0.88	4.0	2.25	5.1	0.00	0.0	0.00	0.0
Russula	5.95	**26.7**	1.46	3.3	12.36	**55.9**	1.71	**18.4**
Suillus	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
Total	22.30		44.45		22.09		9.28	

Table 6. Number and percent of available middens occupied by Mt. Graham red squirrels (*Tamiasciurus hudsonicus grahamensis*) on RSMP study areas, Pinaleño Mountains, Arizona, 2005.

	June			December		
Area/Habitat	# middens	# occupied	% occ	# middens	# occupied	% occ
TRC	36	14	39	36	9	25
TRN	27	3	11	27	3	11
SFC	21	2	10	21	2	10
SFN	14	0	0	14	0	0
TR Habitat	63	17	27	63	12	19
SF Habitat	35	2	6	35	2	6
TR + SF	98	19	19	98	14	14

Chi Square:

JUNE

within TR	$X^2 = 6.044$	df = 1	***P = 0.014***
within SF*			P = 0.506

DECEMBER

within TR	$X^2 = 1.930$	df = 1	P = 0.165
within SF*			P = 0.506

* Fisher's Exact Test was used for the SF area due to small sample sizes.

Table 7. Overwinter survival of Mt. Graham red squirrels (*Tamiasciurus hudsonicus grahamensis*) on RSMP study areas, Pinaleño Mountains, Arizona, 2004-2005.

	Number of Squirrels	Number of Squirrels Surviving	
Area/Habitat	Dec 2004[1]	Jun 2005	% survival
TRC	12	11	91.6
TRN	3	1	33.3
SFC	3	1	33.3
SFN	0	0	0.0
TR Habitat	15	12	80.0
SF Habitat	3	1	33.3

Fisher Exact Test*	
within TR	***P = 0.081***
within SF	not calculated
between habitats	P = 0.172

* Fisher Exact test was used due to the small sample size.

[1] Of the 18 animals resident on the area in Dec 04, 17 were ear-tagged and radio collared thus enabling unique identification and determination of their fate by Jun 05 even if they moved to a different midden or off the area. This large proportion of marked animals in the population increases the accuracy of survival calculations.

Table 8. Mean Local Density of middens and Mt. Graham red squirrels (*Tamiasciurus hudsonicus grahamensis)* on RSMP study areas, Pinaleño Mountains, Arizona, 2004 and 2005.

	December 2004				**December 2005**			
	Middens			Squirrels[1]	Middens			Squirrels[1]
Area/Habitat	n	$\bar{x}$ ± se	n	$\bar{x}$ ± se	n	$\bar{x}$ ± se	n	$\bar{x}$ ± se
TRC	33	4.7 ± 0.39[ab]	12	1.4 ± 0.29[a]	36	4.4 ± 0.40[a]	9	0.4 ± 0.24
TRN	27	4.3 ± 0.24[b]	3	0.7 ± 0.33[ab]	27	4.4 ± 0.27[a]	3	0.3 ± 0.33
SFC	21	1.7 ± 0.29[cd]	3	0.0 ± 0.00[b]	21	1.7 ± 0.29[b]	2	0.0 ± 0.00
SFN	14	1.1 ± 0.23[d]	0	--	14	1.1 ± 0.23[b]	0	--
TR Habitat	60	4.5 ± 0.24	15	1.3 ± 0.25	63	4.4 ± 0.25	12	0.4 ± 0.19
SF Habitat	35	1.5 ± 0.20	3	0.00 ± 0.00	35	1.5 ± 0.20	2	0.00 ± 0.00
TOTAL [1]	95	3.4 ± 0.23	18	1.1 ± 0.24	98	3.4 ± 0.23	14	0.4 ± 0.17

Kruskal-Wallis	**2004**			**2005**		
LD of Middens						
among all areas	H = 45.63	df = 3	***P* < 0.001**	H = 42.10	df = 3	***P* < 0.001**
LD of Squirrels						
among all areas	H = 6.25	df = 2	***P = 0.044***	H = 0.86	df = 2	P = 0.651

a,b,c,d Means within the same category, with the same letter(s), within the same year, are not significantly different.

1 Includes only middens on the monitored areas.

Table 9. Mean Nearest Neighbor Distance of middens and Mt. Graham red squirrels (*Tamiasciurus hudsonicus grahamensis)* on RSMP study areas, Pinaleño Mountains, Arizona, 2004 and 2005.

	December 2004				**December 2005**			
	Middens		Squirrels		Middens		Squirrels	
Area/Habitat	n	$\bar{x}$ ± se	n	$\bar{x}$ ± se	n	$\bar{x}$ ± se	n	$\bar{x}$ ± se
TRC	33	41.2 ± 2.49[a]	12	68.9 ± 11.96[a]	36	44.6 ± 4.04[a]	9	115.4 ± 29.62[a]
TRN	27	50.2 ± 3.07[b]	3	96.7 ± 5.42[ab]	27	50.1 ± 3.07[a]	3	92.6 ± 26.0[a]
SFC	21	79.0 ± 9.17[cd]	3	311.8 ± 69.49[b]	21	79.0 ± 9.17[b]	2	654.2 ± 0.00[b]
SFN	14	88.7 ± 18.65[d]	0	--	14	88.7 ± 18.65[b]	0	--
TR Habitat	60	45.2 ± 2.02	15	74.5 ± 9.98	63	46.9 ± 2.67	12	109.7 ± 8.50
SF Habitat	35	82.9 ± 9.14	3	311.8 ± 69.49	35	82.9 ± 9.14	2	654.2 ± 0.00
TOTAL [1]	95	59.1 ± 4.03	18	114.0 ± 24.96	98	59.8 ± 4.05	14	187.5 ± 53.30

	2004			**2005**		
Kruskal-Wallis:						
NND of Middens						
among all areas	H = 24.43	df=3	***P < 0.001***	22.26	df = 3	***P < 0.001***
NND of Squirrels						
among all areas	H = 8.60	df=2	***P = 0.014***	5.15	df = 2	***P = 0.076***

a,b,c,d Means within the same category, with the same letter(s), of the same year, are not significantly different.

1 Includes only middens on the monitored areas.

Figure 2a. Corkbark fir (*Abies lasiocarpa* var. *arizonica*) seed fall on RSMP study areas, Pinaleño Mountains, Arizona, 1993-2004. Note: scales are different for figures 2a-c.

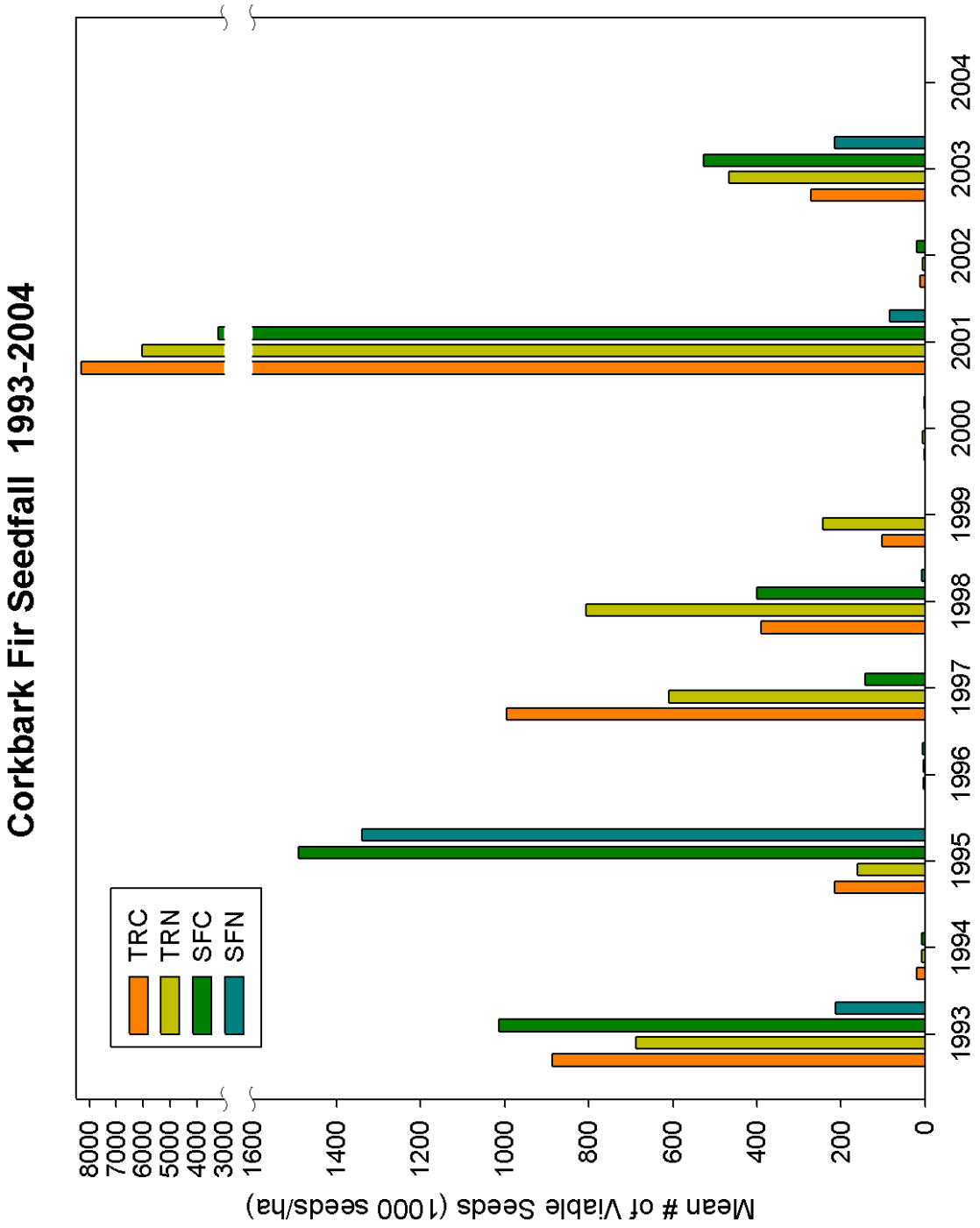


Figure 2b. Douglas-fir (*Pseudotsuga menziesii*) seed fall on RSMP study areas, Pinaleño Mountains, Arizona, 1993-2004. Note: scales are different for figures 2a-c.

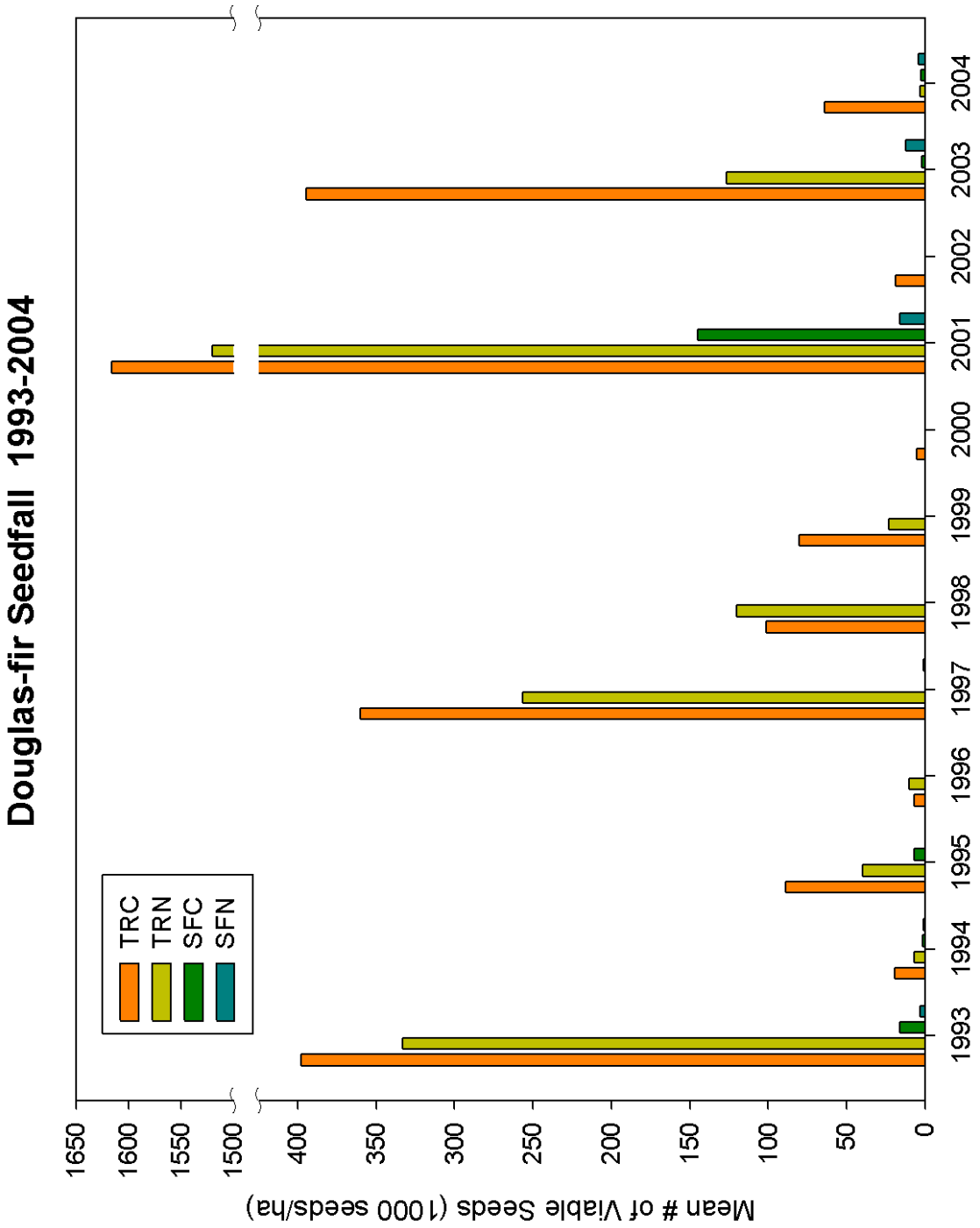


Figure 2c. Engelmann spruce (*Picea engelmannii*) seed fall on RSMP study areas, Pinaleño Mountains, Arizona, 1993-2004. Note: scales are different for figures 2a-c.

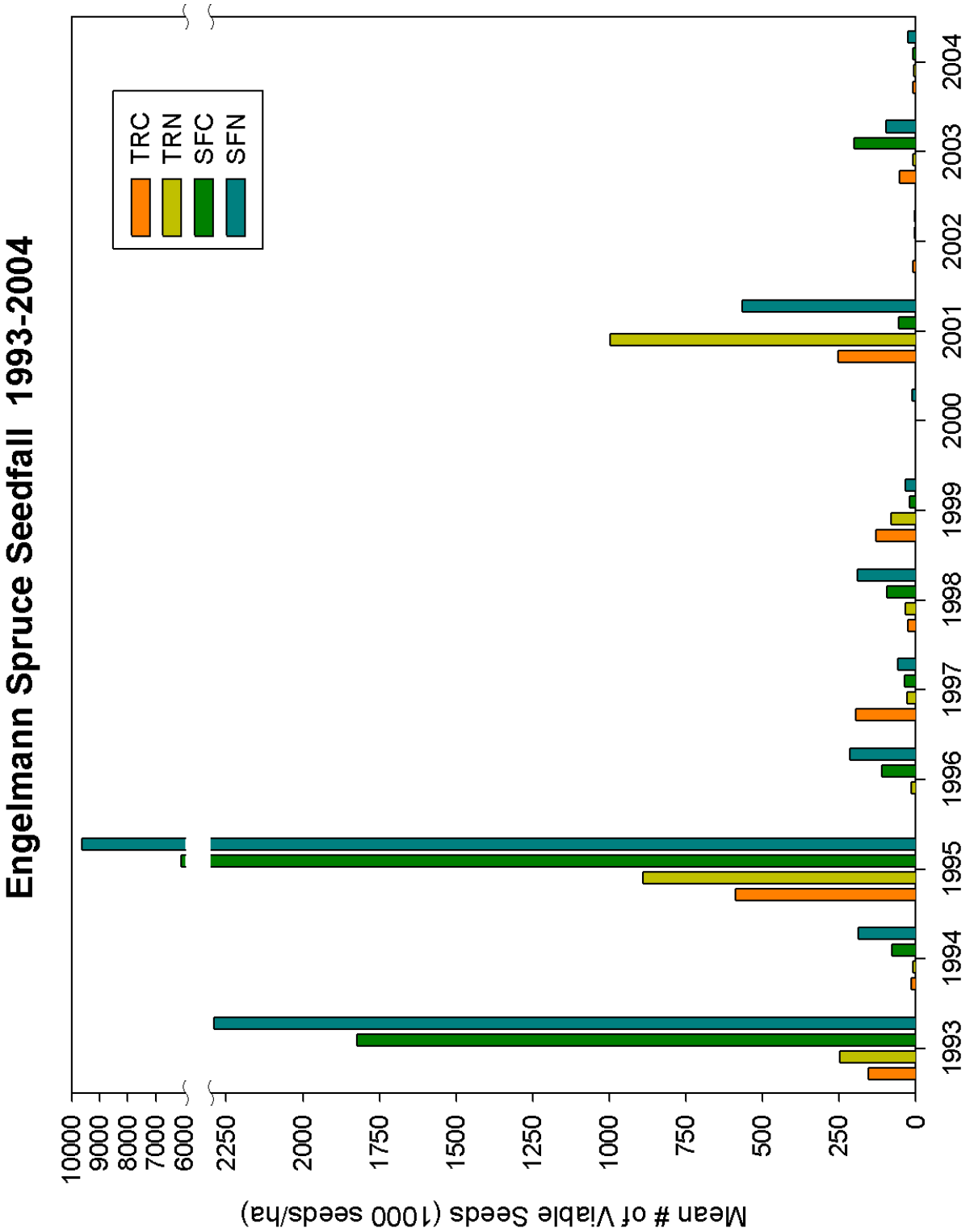


Figure 3. Mushroom crops collected on RSMP study areas, Pinaleño Mountains, Arizona, 1994-2005.

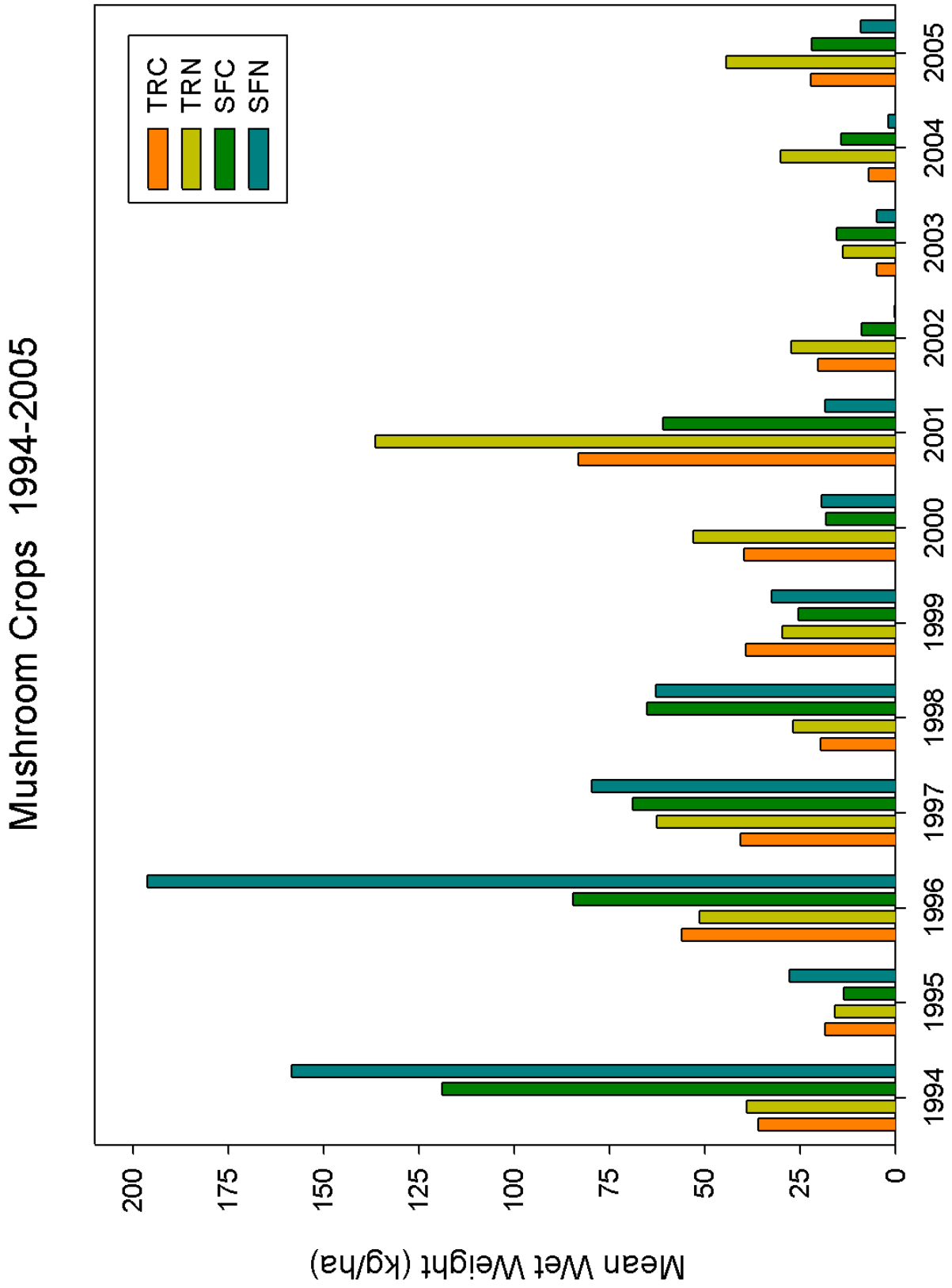


Figure 4. Quarterly Mt. Graham red squirrel (*Tamiasciurus hudsonicus grahamensis*) populations (including juveniles) on RSMP study areas, Pinaleño Mountains, Arizona, March 2001 - December 2005.

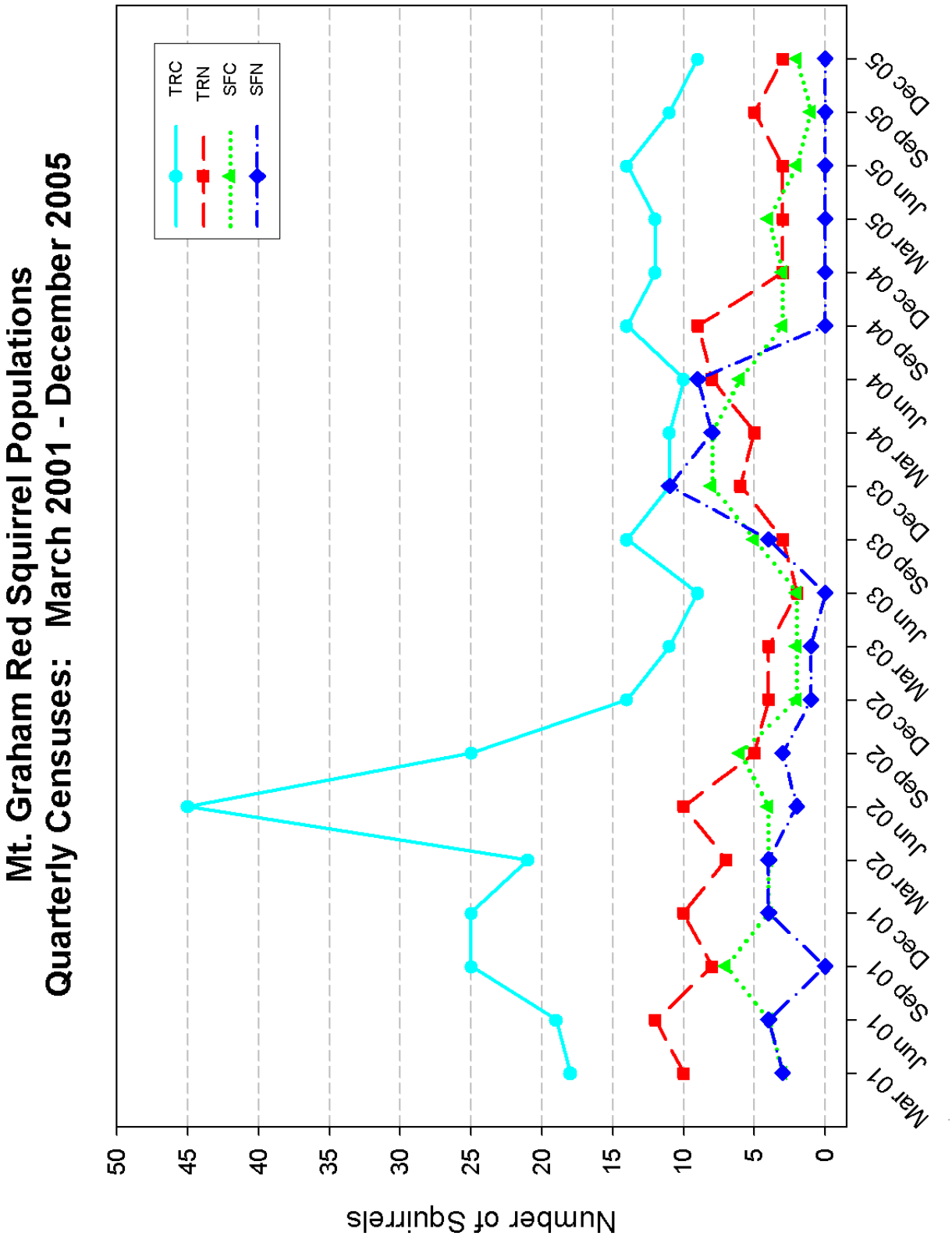
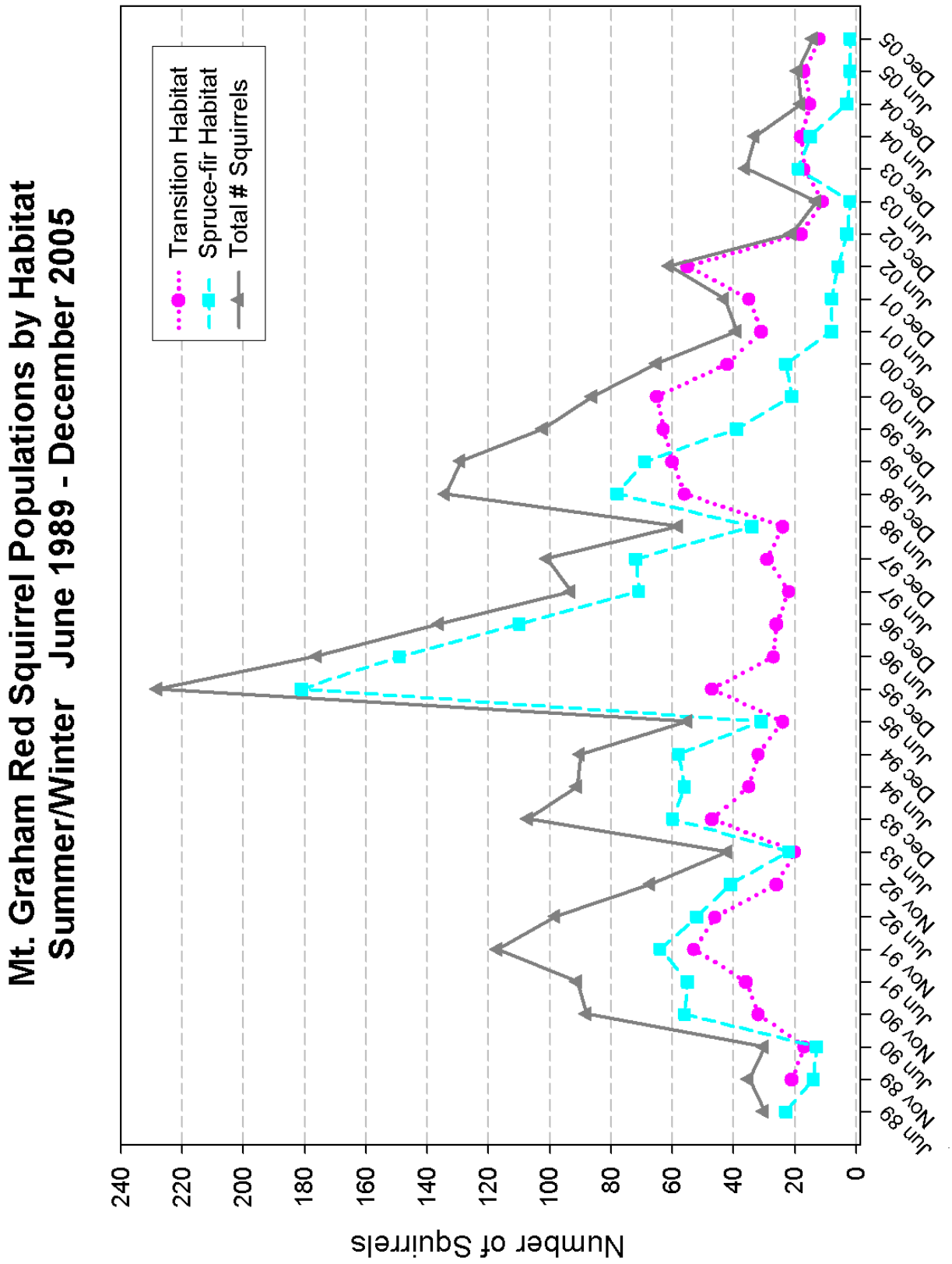


Figure 5. Summer and winter Mt. Graham red squirrel (*Tamiasciurus hudsonicus grahamensis*) populations (including juveniles) on RSMP study areas, by habitat, June 1989 through December 2005.



Appendix A. Annual conifer seed and mushroom production on RSMP study areas, Pinaleño Mountains, Arizona, 2004.

A-1: By transect

A-2: By area and habitat

Appendix A-1: Mean number of viable seeds and weights for 2004 seeds and 2004 mushrooms, by transect.

		Corkbark Fir	Douglas-fir	Englemann Spruce	Total Seeds	Total Mushrooms	
AREA	TRAN #	# 1000 seeds/ha	# 1000 seeds/ha	# 1000 seeds/ha	# 1000 seeds/ha	ww Kg/ha	dw Kg/ha
TRC	1	burned - Clark Peak Fire, 1996					
	2	burned - Clark Peak Fire, 1996					
	3	0.0	26.4	0.0	39.6	16.43	1.69
	4	burned - Clark Peak Fire, 1996					
	5	0.0	13.2	0.0	13.2	4.86	0.45
	6	burned - Clark Peak Fire, 1996					
	7	burned - Clark Peak Fire, 1996					
	8	burned - Clark Peak Fire, 1996					
	9	burned - Clark Peak Fire, 1996					
	10	0.0	0.0	13.2	13.2	9.41	0.85
	11	0.0	280.0	26.4	319.6	0.00	0.00
	12	0.0	0.0	0.0	0.0	4.35	0.42
TRN	1	0.0	0.0	13.2	13.2	54.33	5.01
	2	0.0	13.2	0.0	13.2	16.61	1.51
	3	0.0	0.0	13.2	13.2	24.53	2.19
	4	0.0	0.0	0.0	0.0	24.95	2.34

AREA	TRAN #	Corkbark Fir # 1000 seeds/ha	Douglas-fir # 1000 seeds/ha	Englemann Spruce # 1000 seeds/ha	Total Seeds # 1000 seeds/ha	Total Mushrooms ww Kg/ha	Total Mushrooms dw Kg/ha
SFC	1	burned - Nuttall fire, 2004					
	2	burned - Clark Peak Fire, 1996					
	3	burned - Nuttall fire, 2004					
	4	burned - Nuttall fire, 2004					
	5	0.0	0.0	0.0	0.0	22.13	2.97
	6	0.0	0.0	0.0	0.0	15.16	1.67
	7	burned - Clark Peak Fire, 1996, Nuttall fire, 2004					
	8	burned - Clark Peak Fire, 1996, Nuttall fire, 2004					
	9	burned - Clark Peak Fire, 1996, Nuttall fire ,2004					
	10	burned - Clark Peak Fire, 1996, Nuttall fire, 2004					
	11	0.0	0.0	0.0	0.0	16.05	1.94
	12	0.0	0.0	0.0	0.0	10.55	1.28
	13	0.0	13.2	40.0	53.2	7.70	0.92
SFN	1	burned - Nuttall fire, 2004					
	2	burned - Nuttall fire, 2004					
	3	burned - Nuttall fire, 2004					
	4	0.0	0.0	13.2	13.2	1.84	0.22
	5	0.0	0.0	0.0	0.0	4.43	0.47
	6	0.0	0.0	13.2	13.2	2.22	0.31
	7	burned - Nuttall fire, 2004					
	8	burned - Nuttall fire, 2004					
	9	burned - Nuttall fire, 2004					
	10	burned - Nuttall fire, 2004					
	11	0.0	0.0	106.4	106.4	0.00	0.00
	12	0.0	0.0	0.0	0.0	0.91	0.15
	13	0.0	26.4	13.2	39.6	2.57	0.36

Appendix A-2: Mean number of seeds and weights for 2004 seeds and 2004 mushrooms, by area and habitat.

		Corkbark Fir	Douglas-fir	Englemann Spruce	Total Seeds	Total Mushrooms	
AREA	N	# 1000 seeds/ha	# 1000 seeds/ha	# 1000 seeds/ha	# 1000 seeds/ha	ww Kg/ha	dw Kg/ha
TRC $\bar{x}$	5	0.0	63.9	7.9	77.1	7.00	0.68
TRN $\bar{x}$	4	0.0	3.3	6.6	9.9	30.10	2.76
SFC $\bar{x}$	5	0.0	2.6	8.0	10.6	14.32	1.75
SFN $\bar{x}$	6	0.0	4.4	24.3	28.7	1.99	0.25
TR $\bar{x}$	9	0.0	37.0	7.3	577.4	17.27	1.61
SF $\bar{x}$	11	0.0	3.6	16.9	280.8	7.59	0.93

Appendix B: Midden occupancy records for the monitored areas, 2005.

KEY

For Midden Numbers:

###[89*] Midden Number['Year Found' '*' following year indicates a newly established midden

For Monthly Occupancy cells:

N	Not Occupied
P	Possibly Occupied, Red Squirrel sign found but unsure of residency
Y	Occupied, Red Squirrel sign indicates resident
S	Occupied, Red Squirrel sighted
♀	Occupied, Adult female Red Squirrel
♂	Occupied, Adult male Red Squirrel
J	Occupied, Juvenile Red Squirrel sex unknown
SA	Occupied, Sub-adult Red Squirrel
A	Abert's Squirrel using area, no Red Squirrel present
XX	Remains of Red Squirrel found
* or (R/R)	Squirrel is tagged (letters indicate ear tag colors - left ear/right ear) [B - blue, G - green, M - metal, O - orange, P - pink, R - red, Y - yellow, W - white N - none, - - rip] [tag shape is round unless noted: sq - square, tr - triangle]
NAT	Squirrel is naturally marked - ear notch, short tail, etc.
-	Midden not checked, no data
♀L	Adult female Red Squirrel, lactating
♀+'#'	Adult female Red Squirrel with "#" juveniles
RC	Radio-collared Red Squirrel
	Shaded cell indicates a midden that has been renumbered or removed from censusing.

Transition Construction Area (TRC), 2005				
Midden	Mar	Jun	Sep	Dec
1101[89]	located off-area, new number - 5101			
1102[89]	N	N	N	P
1103[89]	N	♀ (O / rip RC) 9	N [9]	N
1104[89]	N [2]	N	N	N
1105[89]	burned in Clark Peak fire - April 1996			
1106[89]	N	N	N	N
1107[89]	burned in Clark Peak fire - April 1996			
1108[89]	removed from census - low occupancy [1]			
1109[89]	burned in Clark Peak fire - April 1996			
1110[89*]	burned in Clark Peak fire - April 1996			
1111[89]	N	N	N	N
1112[89*]	N	N	N	N
1113[89]	N	N	N	N
1114[89]	located off-area, new number - 5114			
1115[89]	N	N	N	N
1116[89]	♂ (rip / G RC)	P [5]	♀ [5]	♀ (W / P RC)
1117[89]	burned in Clark Peak fire - April 1996			
1118[89]	♂ (Wsq / metal RC)	♂ (Rsq / Ysq RC) 6	♂ (Rsq / Ysq RC)	♂ (metal / Ysq RC) 6
1119[88]	burned in Clark Peak fire - April 1996			
1120[89]	burned in Clark Peak fire - April 1996			
1121[89*]	N	N	♀ (Y / P RC) 11	N [11]
1122[89]	burned in Clark Peak fire - April 1996			
1123[95*]	burned in Clark Peak fire - April 1996			
1124[95*]	burned in Clark Peak fire - April 1996			
1125[95*]	burned in Clark Peak fire - April 1996			
1126[95*]	removed from census - low occupancy [1]			
1130[90]	burned in Clark Peak fire - April 1996			
1131[90*]	♂ (Gsq / Ysq RC)	♂ (Gsq / Ysq RC)	P [12]	N
1132[90*]	removed from census - low occupancy [1]			
1134[91*]	removed from census - low occupancy [1]			
1135[91*]	burned in Clark Peak fire - April 1996			
1136[91*]	burned in Clark Peak fire - April 1996			
1137[91*]	burned in Clark Peak fire - April 1996			
1138[91*]	removed from census - low occupancy [1]			

Transition Construction Area (TRC), 2005				
Midden	Mar	Jun	Sep	Dec
1139[91*]	burned in Clark Peak fire - April 1996			
1140[91*]	burned in Clark Peak fire - April 1996			
1142[91*]	burned in Clark Peak fire - April 1996			
1143[91*]	burned in Clark Peak fire - April 1996			
1144[91*]	♂ (Gsq / Wsq RC)	♂ (Gsq / Wsq RC) 7	N	N
1145[91*]	located off-area, new number - 5145			
1146[91*]	removed from census - low occupancy [1]			
1147[91*]	N	N	P	S
1148[91*]	burned in Clark Peak fire - April 1996			
1149[91*]	N	N	N	N
1150[91*]	located off-area, new number - 5150			
1151[91*]	N	N	P	N
1152[91*]	burned in Clark Peak fire - April 1996			
1153[92*]	P	P	♂	P [16]
1154[92*]	♀[3]	♀ (Gsq / Rsq RC)	♀ (Gsq / Rsq RC)	N [17]
1155[93*]	located off-area, new number - 5155			
1156[93*]	♀ (R / R RC)	♀(R / R RC)	♀(R / R RC) + 2J [15]	♀(R / R RC)
1157[93*]	located off-area, new number - 5157			
1159[93*]	burned in Clark Peak fire - April 1996			
1160[96*]	♂ (Ysq / Wsq RC)	♂ (Ysq / Wsq RC)	P [13]	♂ (Bsq / Rsq)
1161[96*]	removed from census - low occupancy [1]			
1162[96*]	♂ (metal / Gsq RC)	♂ (metal / Gsq RC)	♂ (metal / Gsq RC)	♂ (metal / Gsq RC)
1163[98*]	♀(metal / Gsq RC) 4	♀L (metal / Gsq RC)	N [14]	N
1164[98*]	removed from census - low occupancy [1]			
1165[98*]	removed from census - low occupancy [1]			
1166[98*]	removed from census - low occupancy [1]			
1167[98*]	N	N	N	N
1168[98*]	N	N	N	N
1169[98*]	removed from census - low occupancy [1]			
1170[98*]	♂ (W / metal RC)	♂ (W / metal RC)	♂ (W / metal RC)	♂ (W / metal RC)
1171[98*]	N	N	N	N
1172[90*]	removed from census - low occupancy [1]			
1173[99*]	N	N	N	N
1174[99*]	removed from census - low occupancy [1]			

Transition Construction Area (TRC), 2005				
Midden	Mar	Jun	Sep	Dec
1175[99*]	removed from census - low occupancy [1]			
1176[99*]	removed from census - low occupancy [1]			
1177[99*]	N	P	♀ (W / R RC)	♀ (W / R RC) 18
1178[99*]	removed from census - low occupancy [1]			
1179[99*]	N	N	N	N
1180[99*]	N	N	N	N
1181[99*]				
1182[02*]	N	N	N	N
1183[04*]	♀ (Osq / Psq)	♀ (Osq / Psq RC)	N [5]	N
1184[04*]	♂ (metal / O RC)	P [8]	N	N
1185[05*]	-	♀ (O / Y RC)	N	♀
1186[05*]	-	♂ (Rsq / Psq RC)	N	N
1187[05*]	-	♀L (P / P RC)	P	N
# Mid	33	36	36	36
# Occ	12	14	9	9
% Occ	36	39	25	25
# Sq	12	14 [10]	9 + 2J	9

Appendix B - TRC (cont.)

1 These middens have been removed from regular censusing due to low occupancy. These middens were unoccupied for at least 12 consecutive quarterly censuses (three years) prior to removal. After 2003, all of the removed-low occupancy middens are checked each census. Any middens that become re-occupied are added back to regular censusing.

2 Female O/- RC, former resident of midden 1104, moved to midden 5101 in January 2005. The signal for the former resident (♂ Bsq/Ysq RC) did not move from nest 15134 after the first week of January 2005. This female appeared to have moved into 5101within about a week's time, and was also using nest 15134.

3 The unmarked female resident of midden 1154, has most of her activity centered around nest 11041, located about 20m N-NE of 1154 tag tree.

4 The female (metal/Gsq RC) resident of midden 1163, has most of her activity centered around a midden shift/nest 11052, located about 25m SW of 1163 tag tree.

5 Male (rip/G RC), previous resident of midden 1116, was seen last on 24 May 05 during telemetry rounds. He was not seen at all in June, neither at the midden, nor anywhere on the area. Three other neighboring squirrels were seen in midden 1116 foraging, but none appeared to be a resident. By September, female (Osq/Psq RC), former resident of midden 1183, had moved to midden 1116. However, her collar only was found on 6 Sep 05 in a burned area east of the midden. An unmarked sub-adult female appeared to move into the midden quickly thereafter.

6 The previous male (Wsq/metal RC) resident of midden 1118 may have been displaced from his midden, as a new male (Rsq/Ysq RC) was trapped there and appeared to be resident afterwards. The male (Wsq/metal RC) was seen alive during the census however, in the vicinity of midden 5121, where he was chased away by the resident female. He was not known to have re-established residency on the area during June, and may have been a “floater” in the population. By December 05, male (Rsq/Ysq RC) had lost the colored tag in his left ear and is now (metal/Ysq).

7 The resident male (Gsq/Wsq RC) at midden 1144, was live trapped there on 2 June 05. However, he was not seen, nor was his radio signal detected on the area thereafter. He had previously made forays to the far North of the study area, so it is unknown whether he left the area, lost his radio collar, or met another fate. Because he was detected on the area during the census, he will be counted in the population for June 2005.

8 The male (metal/O RC), formerly resident at midden 1184, appeared to have shifted his midden of residence to 5101. There was still some slight sign at midden 1184, but it was unclear if there was a new resident or squirrels just foraging in the area. Therefore midden 1184 was listed as possibly occupied for the June census.

9 The female (O/rip RC), formerly resident at midden 5101, appeared to have shifted her midden of residence to the area around midden 1103 by June. Midden 5101 was quickly occupied by male (metal / O RC), see footnote 8. In September, female (O/rip RC) still may have been using areas around midden 1103, as one night nest was near there. However, there was good sign at midden 2242 and she spent more of her time there.

10 The number of squirrels on the monitored areas was likely higher than the number of occupied middens, as there appeared to be several "floaters" in the area. The previous resident of midden 1118, male (Wsq/metal RC), may have been displaced and was moving around the area. Two females (R/Y RC and W/R RC) were live trapped and radio collared on the southern end of the TRC area, but appeared to wander northward throughout the month. They had not yet definitively established residence middens.

11 Female (Y/P RC) may have been still using areas around her previous midden 5221, as there was a small amount of sign there, but she appeared to be spending more time west of midden 1121 in a cluster of nest trees. In December 05, this female was using areas and nests ever further W of 1121, so she is now considered resident of midden 5201shift.

12 In September, male (Gsq/Ysq RC) appeared to be spending the most time around a nest tree NE of midden 5125. There was more sign in that general area than his former residence midden 1131.

13 Male (Ysq/Wsq RC) was not seen nor his radio signal detected after Jun 05. Some sign was seen at midden 1160 during the September census, but no red squirrel was seen.

14 Female (Rsq/Gsq RC) shifted her residence from midden 1163 to the area around midden 5119 in July/August 2005.

15 Three older juveniles of female (R/R RC) were seen in a maternity nest near midden 1153 in mid-August, however only two juveniles were observed during the September 05 census.

16 In December 2005, at midden 1153, there was feeding sign and other activity. However, most sign appeared to result from neighboring squirrels using the area. A resident squirrel was not confirmed at midden 1153, so it was left as possibly occupied.

17 On 12 Dec 05, the tail and collar (along with a possible owl pellet) of female (Gsq/Rsq RC) was found about 80m W of midden 1154shift. There did not appear to be a new resident at that midden in December 2005.

18 In December 2005, female (W/R RC) still appeared to be living in and around midden 1177 based on sign observed, trapping, and telemetry data. However, she also spent time (feeding?) about 175m S near the Swift Trail forest road.

Transition Non-Construction Area (TRN), 2005				
Midden	Mar	Jun	Sep	Dec
2201[89]	removed from census - low occupancy [1]			
2202[89]	N	N	N	N
2203[89]	N	N	N	N
2204[89]	N	N	N	P
2205[89]	N	N	N	N
2206[89]	N	N	♂	N
2207[89*]	burned in Nuttall fire - July 2004			
2208[89*]	N	♀ (Osq / Ysq RC) 4	P [4]	N
2209[89]	removed from census - low occupancy [1]			
2210[90]	N	N	N	N
2211[90*]	♂ (R / metal RC) 2	P [2]	♂	♂
2212[90]	removed from census - low occupancy [1]			
2213[90]	removed from census - low occupancy [1]			
2214[90*]	located on TRC, new number - 1172			
2215[90*]	N	N	N	N
2216[90*]	♀(G / B RC) 3	♀(G / B RC) 3	N [3]	♂ (Bsq / Psq)
2217[90*]	N	N	N	N
2218[91*]	N	N	N	N
2219[91*]	removed from census - low occupancy [1]			
2220[91*]	removed from census - low occupancy [1]			
2221[91*]	located off-area, new number - 5221			
2222[91*]	removed from census - low occupancy [1]			
2223[91*]	N	N	N	N
2224[93*]	removed from census - low occupancy [1]			
2225[94]	removed from census - low occupancy [1]			
2226[95*]	removed from census - low occupancy [1]			
2227[95*]	N	N	N	N
2228[95*]	removed from census - low occupancy [1]			
2229[96*]	N	N	N	N
2230[96*]	N	N	N	N
2231[96*]	located off-area, new number - 5231			
2232[96*]	located off-area, new number - 5232			
2233[96*]	removed from census - low occupancy [1]			

Transition Non-Construction Area (TRN), 2005				
Midden	Mar	Jun	Sep	Dec
2234[97*]	N	N	♀ (Osq / Ysq RC) + 1J(met/met) [4]	P [4]
2235[98*]	N	N	N	N
2236[98*]	♂	♀ (Psq / Ysq) [4]	N [6]	N
2237[98*]	N	N	N	N
2238[98]	removed from census - low occupancy [1]			
2239[98]	removed from census - low occupancy [1]			
2240[98]	removed from census - low occupancy [1]			
2241[98*]	N	N	N	N
2242[98*]	N	N	♀ (O / rip RC) [5]	N[5]
2243[98]	removed from census - low occupancy [1]			
2244[99*]	N	N	P	N
2245[99*]	removed from census - low occupancy [1]			
2246[99*]	N	N	N	N
2247[99*]	burned in Nuttall fire - July 2004			
2248[99*]	N	N	N	S
2249[99*]	N	N	N	N
2250[00*]	N	N	N	N
2251[00*]	removed from census - low occupancy [1]			
# Mid	27	27	27	27
# Occ	3	3	4	3
% Occ	11	11	15	11
# Sq	3	3	4 + 1J	3

Appendix B - TRN (cont.)

1 These middens have been removed from regular censusing due to low occupancy. These middens were unoccupied for at least 12 consecutive quarterly censuses (three years) prior to removal. After 2003, all of the removed-low occupancy middens are checked each census. Any middens that become reoccupied are added back to regular censusing.

2 The former resident of midden 2211, (♂ Bsq/Bsq RC) was found dead on the snow on 2 Mar 05 near nest 12025. Male (R/Metal RC), former resident of midden 2215, within days moved into midden 2211and appeared to take over residency. The radio collar and tail of male (R/Metal RC) was found on 12 May 05. During the June 05 census, there was some sign found at midden 2211, but it could not be definitively determined if there was a new resident or just neighboring squirrels foraging in the area.

3 The female (G/B RC) resident of 2216 seems to spend her time over a large area around 2216 shift, located about 20m SW of 2216 tag tree. Some of her night nests have been located even further SW, near midden 2249. But she does still seem to center her activities around midden 2216 shift as of the March 2005 census. Female (G/B RC) continued to range widely in June 05, and had night nests both NE and SW, but her activities were still generally centered around the midden 2216 shift. On 13 Sep 05, the collar, tail, and viscera of female (G/B RC) were found in an area W of midden 2216 shift.

4 Female (Osq/Ysq RC), formerly resident of midden 5155, by June, had shifted her activities to a nest S of midden 2208. A new resident appeared to have moved into midden 5155 (see footnotes for that midden). By September, female (Osq/Ysq RC) was spending more time east of 2208, near midden 2234. Little fresh sign was found at midden 2208, and the adult female and 1 large juvenile were observed at midden 2234 along with fresh caching. In December 05, a squirrel with no radio collar and metal/rip tags was seen entering a nest about 35m N of midden 2234. There was minimal sign at the midden and the squirrel was not seen directly in the midden, therefore the midden was listed as possibly occupied.

5 See footnote # 9 - TRC Area. In December 05, female (O/rip RC) was seen during the census and appeared to be resident at midden 2242. However, she was killed in an apparent predation attempt on 20 Dec 05. Her body was found wedged in between bark and log in a decayed log. It appears some predator (fox?, bobcat?) tried to reach her and repeatedly pushed on the bark, squeezing her.

6 Female (Psq/Ysq RC) very quickly (the same day?) appeared to assume residency at midden 5200 following the death of the previous resident, male (Bsq/Wsq RC), from an apparent raptor attack.

Spruce-Fir Construction Area (SFC), 2005				
Midden	Mar	Jun	Sep	Dec
3000[95*]	burned in Nuttall fire - July 2004			
3001[95*]	burned in Nuttall fire - July 2004			
3002[95*]	removed from census - low occupancy [1]			
3003[95*]	removed from census - low occupancy [1]			
3004[95*]	burned in Clark Peak fire - April 1996			
3005[95*]	removed from census - low occupancy [1]			
3006[95*]	destroyed by fire suppression in Nuttall fire - July 2004			
3007[95*]	removed from census - too far off area, new # 5307			
3008[95*]	burned in Nuttall fire - July 2004			
3009[95*]	removed from census - low occupancy [1]			
3010[95*]	removed from census - low occupancy [1]			
3011[95*]	located off-area, new number - 5311			
3012[95*]	burned in Clark Peak fire - April 1996			
3013[95*]	removed from census - low occupancy [1]			
3014[95*]	removed from census - low occupancy [1]			
3015[95*]	burned in Clark Peak fire - April 1996			
3016[95*]	burned in Clark Peak fire - April 1996			
3017[95*]	burned in Clark Peak fire - April 1996			
3018[95*]	burned in Clark Peak fire - April 1996			
3019[96*]	removed from census - low occupancy [1]			
3020[96*]	N	N	N	N
3021[96*]	burned in Clark Peak fire - April 1996			
3022[96*]	removed from census - low occupancy [1]			
3023[96*]	burned in Nuttall fire - July 2004			
3024[98*]	removed from census - low occupancy [1]			
3025[98*]	removed from census - low occupancy [1]			
3026[98*]	removed from census - low occupancy [1]			
3027[99*]	removed from census - low occupancy [1]			
3028[99*]	N	N	N	N
3029[99*]	removed from census - low occupancy [1]			
3030[99*]	removed from census - low occupancy [1]			
3031[99*]	removed from census - low occupancy [1]			
3032[99*]	removed from census - low occupancy [1]			
3300[86]	burned in Nuttall fire - July 2004			
3301[94*]	burned in Nuttall fire - July 2004			

Spruce-Fir Construction Area (SFC), 2005				
Midden	Mar	Jun	Sep	Dec
3302[94*]	located off-area, new number - 5302			
3303[94*]	♂ (O / O RC) [2]	P [2]	N [2]	N
3304[94*]	removed from census - low occupancy [1]			
3305[94*]	removed from census - low occupancy [1]			
3306[94*]	burned in Nuttall fire - July 2004			
3307[94*]	removed from census - low occupancy [1]			
3308[95*]	burned in Nuttall fire - July 2004			
3309[95*]	removed from census - low occupancy [1]			
3310[95*]	removed from census - low occupancy [1]			
3311[95*]	N	N	N	N
3312[95*]	N	N	N	N
3313[95*]	located off-area, new number - 5313			
3314[95*]	N	N	N	N
3315[95*]	removed from census - low occupancy [1]			
3316[95*]	burned in Nuttall fire - July 2004			
3317[95*]	removed from census - low occupancy [1]			
3318[95*]	removed from census - low occupancy [1]			
3319[95*]	removed from census - low occupancy [1]			
3320[95*]	removed from census - low occupancy [1]			
3321[95*]	burned in Nuttall fire - July 2004			
3322[95*]	removed from census - low occupancy [1]			
3323[95*]	N	N	N	N
3324[95*]	removed from census - low occupancy [1]			
3325[95*]	removed from census - low occupancy [1]			
3326[95*]	removed from census - low occupancy [1]			
3327[95*]	removed from census - low occupancy [1]			
3328[95*]	removed from census - low occupancy [1]			
3329[95*]	removed from census - low occupancy [1]			
3330[95*]	N	N	N	N
3331[95*]	burned in Nuttall fire - July 2004 [3]			
3332[95*]	removed from census - low occupancy [1]			
3333[95*]	removed from census - low occupancy [1]			
3334[95*]	burned in Nuttall fire - July 2004			
3335[95*]	removed from census - low occupancy [1]			
3336[95*]	removed from census - low occupancy [1]			

Spruce-Fir Construction Area (SFC), 2005				
Midden	Mar	Jun	Sep	Dec
3337[95*]	removed from census - low occupancy [1]			
3338[95*]	burned in Nuttall fire - July 2004			
3339[95*]	removed from census - low occupancy [1]			
3340[95*]	removed from census - low occupancy [1]			
3341[95*]	N	N	N	N
3342[95*]	removed from census - low occupancy [1]			
3343[95*]	removed from census - low occupancy [1]			
3344[95*]	removed from census - low occupancy [1]			
3345[95*]	removed from census - low occupancy [1]			
3346[95*]	removed from census - low occupancy [1]			
3347[95*]	removed from census - low occupancy [1]			
3348[95*]	P [2]	N	N	N
3349[95*]	burned in Nuttall fire - July 2004			
3350[87]	removed from census - low occupancy [1]			
3351[87]	burned in Nuttall fire - July 2004			
3352[86]	removed from census - low occupancy [1]			
3353[87]	removed from census - low occupancy [1]			
3354[86]	removed from census - low occupancy [1]			
3355[95*]	burned in Nuttall fire - July 2004			
3356[86]	burned in Nuttall fire - July 2004			
3357[86]	removed from census - low occupancy [1]			
3358[87]	burned in Clark Peak fire - April 1996			
3359[87]	burned in Clark Peak fire - April 1996			
3360[86]	♂ (Ysq / Ysq RC)	P [3]	N	♂ (O / O RC) [2]
3361[86]	removed from census - low occupancy [1]			
3362[86]	N	N	N	N
3363[86]	removed from census - low occupancy [1]			
3364[86]	removed from census - low occupancy[1]			
3365[86]	♀ (Wsq / Ysq RC)	♀ (Wsq / Ysq RC)	N [4]	N
3366[86]	N	N	N	N
3367[87]	removed from census - low occupancy [1]			
3368[86]	removed from census - low occupancy [1]			
3369[86]	removed from census - low occupancy [1]			
3370[86]	N	N	N	N
3371[87]	N	N	N	N

Spruce-Fir Construction Area (SFC), 2005				
Midden	Mar	Jun	Sep	Dec
3372[89]	N	N	N	N
3373[87]	removed from census - low occupancy [1]			
3374[89]	♀	♀ (Gsq / Bsq RC)	♀ (Gsq / Bsq RC)	♀ (Gsq / Bsq RC)
3375[86]	removed from census - low occupancy [1]			
3376[86]	located off-area, new number - 5376			
3377[87]	located off-area, new number - 5377			
3378[90*]	N	N	N	N
3379[90*]	removed from census - low occupancy [1]			
3380[90*]	removed from census - low occupancy [1]			
3381[90]	burned in Nuttall fire - July 2004			
3382[91*]	N	N	N	N
3383[91*]	removed from census - low occupancy [1]			
3384[91*]	burned in Clark Peak fire - April 1996			
3385[91*]	removed from census - low occupancy [1]			
3386[91*]	removed from census - low occupancy [1]			
3387[91*]	burned in Nuttall fire - July 2004			
3388[92*]	located off-area, new number - 5388			
3389[93*]	removed from census - low occupancy [1]			
3390[93*]	removed from census - low occupancy [1]			
3390[93*]	removed from census - low occupancy [1]			
3391[93*]	removed from census - low occupancy [1]			
3392[93*]	removed from census - low occupancy [1]			
3393[93*]	destroyed by fire suppression in Nuttall fire - July 2004			
3394[93*]	N	N	N	N
3395[94*]	removed from census - low occupancy [1]			
3396[94*]	removed from census - low occupancy [1]			
3397[86]	burned in Nuttall fire - July 2004			
3398[86]	burned in Nuttall fire - July 2004			
3399[94*]	burned in Nuttall fire - July 2004			
# Mid	21	21	21	21
# Occ	4	2	1	2
% Occ	19	10	5	10
# Sq	4	2	1	2

Appendix B - SFC (cont.)

1 These middens have been removed from regular censusing due to low occupancy. These middens were unoccupied for at least 12 consecutive quarterly censuses (three years) prior to removal. After 2003, all of the removed-low occupancy middens are checked each census. Any middens that become reoccupied are added back to regular censusing.

2 Male (O/O RC), former resident of 3348, appeared to spend his time spread out over the slope from midden 5350 uphill to midden 3303 and further (he has been seen in midden 3365 with the resident female). There was scattered feeding sign, mostly branch clippings, in middens 3303, 3348, and 5350. However, his night nests were nearest to midden 3303 for some months, and there was a slight concentration of sightings near this midden. So his residency changed from 3348 in December 2004 to 3303 in March 2005. In June 2005, there was still some sign at midden 3303 and male (O/O RC) was live trapped there. However, this male seemed to be spending more time further S, near midden 5350, so he was counted as resident there for June 2005. In September 2005, the fate of this male was undetermined, as his radio signal was not heard after mid-July and he was not observed during the census, nor was there any recent sign at any of his previous middens. Male (O/O RC) was live-trapped and re-collared in Oct 05. By December 05, he was resident at midden 3360.

3 Male (Ysq/Ysq RC), previous resident of midden 3360, was last seen in early April 2005. The radio signal was coming from a ground nest near the midden since that time. Other neighboring squirrels were seen foraging in the midden. Male (Ysq/Ysq RC) was not observed during the June census and his radio signal did not move, he was not counted as resident as his fate was undetermined.

4 The radio collar and foot of female (Wsq/Ysq RC), former resident of 3365, was found on 5 Sep 05. She was last seen alive on 24 Aug 05.

Spruce-Fir Non Construction Area (SFN), 2005				
Midden	Mar	Jun	Sep	Dec
4000[95*]	N	N	N	N
4001[95*]	burned in Nuttall fire - July 2004			
4002[95*]	removed from census - low occupancy [1]			
4003[95*]	burned in Nuttall fire - July 2004			
4004[95*]	burned in Nuttall fire - July 2004			
4005[95*]	burned in Nuttall fire - July 2004			
4006[95*]	burned in Nuttall fire - July 2004			
4007[95*]	burned in Nuttall fire - July 2004			
4008[95*]	burned in Nuttall fire - July 2004 [4]			
4009[95*]	burned in Nuttall fire - July 2004			
4010[95*]	N	N	N	N
4011[95*]	removed from census - low occupancy [1]			
4012[95*]	burned in Nuttall fire - July 2004			
4013[96*]	removed from census - low occupancy [1]			
4014[96*]	removed from census - low occupancy [1]			
4015[96*]	burned in Nuttall fire - July 2004			
4016[96*]	N	N	N	N
4017[96*]	burned in Nuttall fire - July 2004			
4018[96*]	burned in Nuttall fire - July 2004			
4019[96*]	burned in Nuttall fire - July 2004			
4020[96*]	removed from census - low occupancy [1]			
4021[96*]	burned in Nuttall fire - July 2004			
4022[98*]	removed from census - low occupancy [1]			
4023[98*]	removed from census - low occupancy [1]			
4024[98*]	removed from census - low occupancy [1]			
4025[99*]	removed from census - low occupancy [1]			
4400[89]	N	N	N	N
4401[94*]	burned in Nuttall fire - July 2004			
4402[94*]	burned in Nuttall fire - July 2004			
4403[94*]	removed from census - low occupancy [1]			
4404[95*]	burned in Nuttall fire - July 2004			
4405[95*]	burned in Nuttall fire - July 2004			
4406[95*]	burned in Nuttall fire - July 2004			
4407[95*]	burned in Nuttall fire - July 2004			
4408[95*]	removed from census - low occupancy [1]			

Spruce-Fir Non Construction Area (SFN), 2005				
Midden	Mar	Jun	Sep	Dec
4409[95*]	burned in Nuttall fire - July 2004			
4410[95*]	located off-area, new number - 5410			
4411[95*]	burned in Nuttall fire - July 2004			
4412[95*]	burned in Nuttall fire - July 2004			
4413[95*]	located off-area, new number - 5413			
4414[95*]	burned in Nuttall fire - July 2004			
4415[95*]	burned in Nuttall fire - July 2004			
4416[95*]	burned in Nuttall fire - July 2004			
4417[95*]	N	N	N	N
4418[95*]	burned in Nuttall fire - July 2004			
4419[95*]	burned in Nuttall fire - July 2004			
4420[90]	burned in Nuttall fire - July 2004			
4421[86]	burned in Nuttall fire - July 2004			
4422[86]	burned in Nuttall fire - July 2004			
4423[86]	burned in Nuttall fire - July 2004			
4424[86]	burned in Nuttall fire - July 2004			
4425[87]	burned in Nuttall fire - July 2004			
4426[86]	burned in Nuttall fire - July 2004			
4427[86]	burned in Nuttall fire - July 2004			
4428[86]	burned in Nuttall fire - July 2004			
4429[86]	burned in Nuttall fire - July 2004			
4430[86]	burned in Nuttall fire - July 2004			
4431[86]	burned in Nuttall fire - July 2004			
4432[86]	burned in Nuttall fire - July 2004			
4433[87]	burned in Nuttall fire - July 2004			
4434[86]	burned in Nuttall fire - July 2004			
4435[86]	burned in Nuttall fire - July 2004			
4436[86]	burned in Nuttall fire - July 2004			
4437[95*]	burned in Nuttall fire - July 2004			
4438[90*]	burned in Nuttall fire - July 2004			
4439[90*]	burned in Nuttall fire - July 2004			
4440[91]	burned in Nuttall fire - July 2004			
4441[86]	burned in Nuttall fire - July 2004			
4442[95*]	burned in Nuttall fire - July 2004			
4443[86]	burned in Nuttall fire - July 2004			
4444[86]	burned in Nuttall fire - July 2004			

Spruce-Fir Non Construction Area (SFN), 2005				
Midden	Mar	Jun	Sep	Dec
4445[86]	burned in Nuttall fire - July 2004			
4446[86]	burned in Nuttall fire - July 2004			
4447[86]	burned in Nuttall fire - July 2004			
4448[86]	burned in Nuttall fire - July 2004			
4449[86]	burned in Nuttall fire - July 2004			
4450[86]	burned in Nuttall fire - July 2004			
4451[88]	burned in Nuttall fire - July 2004			
4452[86]	burned in Nuttall fire - July 2004			
4453[86]	burned in Nuttall fire - July 2004			
4454[86]	removed from census - low occupancy [1]			
4455[86]	burned in Nuttall fire - July 2004			
4456[86]	burned in Nuttall fire - July 2004			
4457[86]	burned in Nuttall fire - July 2004			
4458[86]	removed from census - low occupancy [1]			
4459[86]	burned in Nuttall fire - July 2004			
4460[87]	burned in Nuttall fire - July 2004			
4461[91*]	burned in Nuttall fire - July 2004			
4462[90]	burned in Nuttall fire - July 2004			
4463[90]	burned in Nuttall fire - July 2004			
4464[90]	removed from census - low occupancy [1]			
4465[90*]	removed from census - low occupancy [1]			
4466[87]	removed from census - low occupancy [1]			
4467[87]	N	N	N	N
4468[87]	removed from census - low occupancy [1]			
4469[87]	N	N	N	N
4470[87]	N	N	N	N
4471[87]	removed from census - low occupancy [1]			
4472[87]	N	N	N	N
4473[87]	N	N	N	N
4474[86]	N	N	N	N
4475[87]	located off-area, new number - 5405			
4476[95*]	removed from census - low occupancy [1]			
4477[87]	N	N	N	N
4478[90*]	removed from census - low occupancy [1]			
4479[90*]	removed from census - low occupancy [1]			
4480[90*]	burned in Nuttall fire - July 2004			

Spruce-Fir Non Construction Area (SFN), 2005				
Midden	Mar	Jun	Sep	Dec
4481[86]	removed from census - low occupancy [1]			
4482[86]	removed from census - low occupancy [1]			
4483[86]	removed from census - low occupancy [1]			
4484[86]	N	N	N	P
4485[86]	removed from census - low occupancy [1]			
4486[86]	removed from census - low occupancy [1]			
4487[86]	located off-area, new number - 5487			
4488[91*]	removed from census - low occupancy [1]			
4489[91*]	removed from census - low occupancy [1]			
4490[91*]	burned in Nuttall fire - July 2004			
4491[91*]	N	N	N	N
4492[91*]	removed from census - low occupancy [1]			
4493[91*]	burned in Nuttall fire - July 2004			
4494[91*]	burned in Nuttall fire - July 2004			
4495[95*]	burned in Nuttall fire - July 2004			
4496[93*]	removed from census - low occupancy [1]			
4497[93*]	burned in Nuttall fire - July 2004			
4498[93*]	burned in Nuttall fire - July 2004			
4499[93*]	burned in Nuttall fire - July 2004			
# Mid	14	14	14	14
# Occ	0	0	0	0
% Occ	0	0	0	0
# Sq	0	0	0	0

1 These middens have been removed from regular censusing due to low occupancy. These middens were unoccupied for at least 12 consecutive quarterly censuses (three years) prior to removal After 2003, all of the removed-low occupancy middens are checked each census. Any middens that become reoccupied are added back to regular censusing.

Off-Area Midden Occupancy, 2005				
Midden	Mar	Jun	Sep	Dec
TRC Area				
5101[89]	♀ (O / rip RC) 2	♂ (metal / O RC) 2	♂ (metal / O RC)	♂ (metal / rip RC) 2
5102[98*]	N	N	N	N
5103[99*]	N	N	N	N
5104[99*]	N	N	N	N
5105[02*]	N	N	N	N
5106[02]	N	N	N	N
5107[02]	N	N	N	♂ (Gsq / Psq RC)
5114[89]	removed from census - low occupancy [1]			
5118[94*]	N [3]	N	P	N
5119[89*]	♂ (Wsq / Osq RC)	♂ (Wsq / Osq RC)	♀ (metal / Gsq RC) 9	♀ (metal / Gsq RC)
5120[89*]	removed from census - too far off area			
5121[89*]	♀ (B / W RC)	♀ (B / W RC)	♀ (B / W RC) + 1J (met/met) 10	P [10]
5122[89]	removed from census - low occupancy [1]			
5123[89]	removed from census - too far off area			**♀ (B / W RC) 10**
5124[90*]	removed from census - too far off area			
5125[89*]	N	N	♂ (Gsq / Ysq RC) 6	♂ (Gsq / Ysq RC)
5126[91]	N	N	N	P
5127[95*]	removed from census - low occupancy [1]			
5145[91*]	N	N	N	N
5150[91*]	♂ (Y / R RC) 3	♂ (Y / R RC)	♂ (Y / R RC)	♂ (Y / R RC)
5155[93*]	♀ (Osq / Ysq RC) 4	♂ (O / B RC) 4	P [4]	P
5157[93*]	removed from census - low occupancy [1]			
TRN Area				
5200[93*]	♂ (Bsq / Wsq RC)	♂ (Bsq / Wsq RC)	S [7]	S
5201[99*]	removed from census - low occupancy [1]			♀ (Y / P RC) 11
5202[99*]	burned in Nuttall fire - July 2004			
5203[00*]	N	N	N	N
5221[91*]	♀ (Y / P RC)	♀ (Y / P RC)	P [8]	N
5231[96*]	N	N	N	N
5232[96*]	N [4]	N	Y	♂ (Bsq / Osq RC)

Off-Area Midden Occupancy, 2005				
Midden	Mar	Jun	Sep	Dec
SFC Area				
5302[94*]	burned in Nuttall fire - July 2004			
5307[95*]	removed from census - too far off area			
5311[95*]	N	N	N	N
5313[95*]	N	N	N	N
5350[86]	P [5]	♂ (O / O RC) [5]	N [5]	N
5351[94*]	burned in Nuttall fire - July 2004			
5352[94*]	burned in Nuttall fire - July 2004			
5353[94*]	removed from census - too far off area			
5354[94*]	burned in Nuttall fire - July 2004			
5355[94*]	burned in Nuttall fire - July 2004			
5356[94*]	burned in Nuttall fire - July 2004			
5357[95*]	removed from census - low occupancy [1]			
5358[95*]	burned in Nuttall fire - July 2004			
5359[95*]	burned in Nuttall fire - July 2004			
5360[96*]	burned in Nuttall fire - July 2004			
5361[96*]	N	N	N	N
5362[96*]	removed from census - low occupancy [1]			
5376[86]	removed from census - low occupancy [1]			
5377[87]	removed from census - low occupancy [1]			
5388[92*]	removed from census - low occupancy [1]			
SFN Area				
5405[87]	N	N	N	N
5410[95*]	removed from census - low occupancy [1]			
5413[95*]	N	N	N	N
5475[86]	located on area - new number 4021			
5487[86]	removed from census - low occupancy [1]			

Appendix B - Off Area (cont.)

1 These middens have been removed from regular censusing due to low occupancy. These middens were unoccupied for at least 12 consecutive quarterly censuses (three years) prior to removal. After 2003, all of the removed-low occupancy middens are checked each census. Any middens that become reoccupied are added back to regular censusing.

2 Female O/- RC, former resident of midden 1104, moved to midden 5101 in January 2005. The radio signal for the former 5101 resident (♂ Bsq/Ysq RC) did not move from nest 15134 after the first week of January 2005. This female appeared to have moved into 5101with about a week's time and she was also using nest 15134. By the June 2005 census, this female had shifted her activities back near midden 1103. Male (metal/O RC), formerly resident at midden 1184, quickly moved his residence to midden 5101. By Dec 05, male (metal/O RC) had lost his right ear tag and is now (metal/rip RC).

3 Male (Y/R RC), centers most of his activity around nest 15109, and has for some months during the past winter. There is not much sign at either 5118 (former residence) or 5150 tag tree, but nest 15109 is quite close to midden 5150 tag tree. So since December 2004, this male has been associated with midden 5150. Telemetry data supports this change in residence.

4 Female (Osq/Ysq RC), former resident of midden 5232, lost her radio collar sometime in December 2004 and apparently shifted her residence to midden 5155shift by January 2005, when she was sighted several times. Her radio collar was replaced. In March 2005, she spent some time in the areas south of midden 5155shift and night nested at 11113, located about 120m S of midden 5155. She did still spend considerable time, and had good feeding sign near midden 5155shift, but the potential for a move to a new area should be checked during the next census. Female (Osq/Ysq RC) by the June census, began to shift her activities to the N, centered around a nest near midden 2208. A new male (O/B RC) appeared to be resident at midden 5155. Male (O/B RC) was not seen, nor radio signal heard after July 05. In September, some sign was seen at midden 5155, but a resident squirrel could not be confirmed.

5 See footnote #2 - SFC area.

6 See footnote #12 - TRC area.

7 The collar and remains of female (Psq/Ysq RC), resident at midden 5200, were found on 31 Aug 05. During the September census (approximately 1 week later), a large juvenile was seen in the midden. This animal was presumed to be resident (4 juveniles were seen on 24 Aug 06 at midden 5200). See also footnote #6 - TRN area.

8 See footnote #11 - TRC area.

9 See footnote #14 - TRC area.

10 Female (B/W RC) had 4 juveniles in August 2005 and three were tagged with metal ear tags. During the September census, a juvenile with metal ear tags was seen in midden 5121 and the adult female began to spend more time W of the midden, perhaps in a bequethal event? In December 05, female (B/W RC) concentrated her time around a nest located about 20m W of midden 5123. This area is now considered a shift of midden 5123. Midden 5123 is greater than 100m from an “on area” midden, so it will not be included in population totals nor other calculations directly related to the study area. However, here residence here is noted for reference as she has been known on or near the study areas since May 2002.

11 Female (Y/P RC) may have been still using areas around her previous midden 5221, as there was a small amount of sign there, but she appeared to be spending more time west of midden 1121 in a cluster of nest trees. In December 05, this female was using areas and nests ever further W of 1121, so she is now considered resident of midden 5201shift.

Appendix C. Red squirrel populations (including juveniles still living at maternal middens) on the areas being monitored by the Red Squirrel Monitoring Program, from March 2001 through December 2005.

Date	TRC	TRN	SFC	SFN	TOTAL
Mar 2001	18	10	3	3	34
June 2001	19	12	4	4	39
Sep 2001	18 + 7J	8	3 + 4J	0	29 + 11J
Dec 2001	23 + 2SA	10	4	4	41 + 2SA
Mar 2002	21	7	4	4	36
Jun 2002	22 + 23J	6 + 4J	4	2	34 + 27J
Sep 2002	22 + 3J/SA	5	4 + 2J/SA	3	34 + 5J/SA
Dec 2002	14	4	2	1	21
Mar 2003	11	4	2	1	18
June 2003	9	2	2	0	13
Sep 2003	7 + 7J	3	1 + 4J	4	26
Dec 2003	11	6	8	11	36
Mar 2004	11	5	8	8	32
Jun 2004	8 + 2J	5 + 3J	6	9	28 + 5J
Sep 2004	12 + 2J	4 + 5J	3	0	19 + 7J
Dec 2004	12	3	3	0	18
Mar 2005	12	3	4	0	19
Jun 2005	14	3	2	0	19
Sep 2005	9 + 2J	4 + 1J	1	0	14 + 3J
Dec 2005	9	3	2	0	14

Appendix D: Quarterly occupancy maps for Mt. Graham red squirrels (*Tamiasciurus hudsonicus grahamensis*) on RSMP study areas, Pinaleño Mountains, Arizona, March 2005 - December 2005.

Appendix E: Measures of spatial distribution on the monitored areas, 2005

E-1. Crude Density

a) middens

b) squirrels

E-2. Local density and nearest neighbor distances of middens and squirrels.

Appendix E-1a: Crude Density (middens/ha) of *middens*, in quarterly censuses, for each of the monitored areas for December 2004 through December 2005.

DATE	TRC	TRN	SFC	SFN
Area [1] (after Jul 04)	51.1 ha	19.8 ha	58.5	34.1
Dec 2004	0.65	1.36	0.36	0.41
Mar 2005	0.65	1.36	0.36	0.41
Jun 2005	0.70	1.36	0.36	0.41
Sep 2005	0.70	1.36	0.36	0.41
Dec 2005	0.70	1.36	0.36	0.41

Appendix E-1b: Crude Density (squirrels/ha) of *red squirrels* (including juveniles at natal middens) in each of the monitored areas for December 2004 through December 2005.

DATE	TRC	TRN	SFC	SFN
Area [1] (after Jul 04)	51.1 ha	19.8 ha	58.5	34.1
Dec 2004	0.23	0.15	0.05	0.00
Mar 2005	0.23	0.15	0.07	0.00
Jun 2005	0.27	0.15	0.03	0.00
Sep 2005	0.22	0.25	0.02	0.00
Dec 2005	0.18	0.15	0.03	0.00

1 The reduction in the size of the monitored areas after July 2004 was due to the Nuttall Fire. The areas removed were severely burned and are no longer suitable habitat.

Appendix E-2. Local Density (number within 100m radius) and Nearest Neighbor Distances of *middens* and *squirrels* (number of occupied middens), December 2004 through December 2005.

TRC Area

	Middens					Squirrels				
Month	# Mid	Mean Local Dens.	Std. Error of the Mean	Mean Nearest Neighbor Dist (m)	Std. Error of the Mean	# RS	Mean Local Dens.	Std. Error of the Mean	Mean Nearest Neighbor Dist (m)	Std. Error of the Mean
Dec 04	33	4.7	0.39	41.2	2.49	12	1.4	0.29	68.9	11.96
Mar 05	33	4.7	0.38	41.0	2.45	12	1.3	0.25	72.3	9.66
Jun 05	36	4.4	0.40	44.6	4.04	14	0.9	0.10	66.4	11.49
Sep 05	36	4.4	0.40	44.6	4.04	9	0.7	0.24	89.0	9.23
Dec 05	36	4.4	0.40	44.6	4.04	9	0.4	0.24	115.4	9.87

TRN Area

	Middens					Squirrels				
Month	# Mid	Mean local Dens.	Std. Error of the Mean	Mean Nearest Neighbor Dist (m)	Std. Error of the Mean	# RS	Mean Local Dens.	Std. Error of the Mean	Mean Nearest Neighbor Dist (m)	Std. Error of the Mean
Dec 04	27	4.3	0.24	50.2	3.07	3	0.7	0.33	96.7	5.42
Mar 05	27	4.3	0.24	50.2	3.07	3	0.7	0.33	74.2	16.7
Jun 05	27	4.3	0.24	50.2	3.07	3	0.0	0.00	168.4	5.16
Sep 05	27	4.3	0.24	50.2	3.07	4	0.5	0.29	124.1	32.15
Dec 05	27	4.3	0.24	50.2	3.07	3	0.3	0.33	92.6	15.00

Appendix E-2 (con't.)

SFC Area

	Middens					Squirrels				
Month	# Mid	Mean Local Dens.	Std. Error of the Mean	Mean Nearest Neighbor Dist (m)	Std. Error of the Mean	# RS	Mean Local Dens.	Std. Error of the Mean	Mean Nearest Neighbor Dist (m)	Std. Error of the Mean
Dec 04	21	1.7	0.29	79.0	9.17	3	0.0	0.00	311.8	69.49
Mar 05	21	1.7	0.29	79.0	9.17	4	0.0	0.00	239.5	80.79
Jun 05	21	1.7	0.29	79.0	9.17	2	0.0	0.00	426.3	0.00
Sep 05	21	1.7	0.29	79.0	9.17	1	0.0	0.00	1260.5	--
Dec 05	21	1.7	0.29	79.0	9.17	2	0.0	0.00	654.2	0.00

SFN Area

	Middens					Squirrels				
Month	# Mid	Mean Local Dens.	Std. Error of the Mean	Mean Nearest Neighbor Dist (m)	Std. Error of the Mean	# RS	Mean Local Dens.	Std. Error of the Mean	Mean Nearest Neighbor Dist (m)	Std. Error of the Mean
Dec 04	14	1.1	0.23	88.7	18.65	0	--	--	--	--
Mar 05	14	1.1	0.23	88.7	18.65	0	--	--	--	--
Jun 05	14	1.1	0.23	88.7	18.65	0	--	--	--	--
Sep 05	14	1.1	0.23	88.7	18.65	0	--	--	--	--
Dec 05	14	1.1	0.23	88.7	18.65	0	--	--	--	--

All Areas Combined

(including **only** middens on the monitored areas)

	Middens					Squirrels				
Month	# Mid	Mean Local Dens.	Std. Error of the Mean	Mean Nearest Neighbor Dist (M)	Std. Error of the Mean	# RS	Mean Local Dens.	Std. Error of the Mean	Mean Nearest Neighbor Dist (M)	Std. Error of the Mean
Dec 04	95	3.4	0.22	59.1	4.03	18	1.1	0.24	114.0	24.96
Mar 05	95	3.4	0.22	59.1	4.03	19	0.9	0.20	107.8	22.95
Jun 05	98	3.3	0.22	59.8	4.05	19	0.6	0.11	120.4	27.52
Sep 05	98	3.3	0.22	59.8	4.05	14	0.6	0.17	182.7	83.63
Dec 05	98	3.3	0.22	59.8	4.05	14	0.4	0.17	187.5	53.34

Appendix F: Reproductive success on the monitored areas, 2005.

F-1: Breeding chases seen on or near the monitored areas.

F-2: Litters seen on or near the monitored areas.

F-3: Reproductive status and age statistics by census quarter.

Appendix F-1: Breeding Chases Observed, 2005.

Descriptions of breeding chases observed on or near the monitored areas in 2005.

Date	Midden	Notes
21 Mar 05	1154 shift	Breeding chase was observed near nest 11041 (1154 shift), involving at least 4, possibly 6 squirrels. An unmarked female was the resident at 1154 shift at the time (a female (ID 652) was trapped and tagged one week later). Two marked males were confirmed in the chase, residents of 1160 (ID 634) and 1131 (ID 633). The chases lasted until 18:55h, after sunset. Male #634 was tracked back to his nest at midden 1160.
26 Apr 05	5155	At the midden of resident female (ID 458), there were as many as 12 males involved in a breeding chase - Residents of: 1170 (ID 14), 5150 (ID309), 1118 (ID330), 8028 (ID 425), 1144 (ID 456), 1131 (ID 633), 1160 (ID 634), 5119sh (ID 635), 8003 (ID 636), plus at least 3 unmarked males. Chases were observed for over 3 hours, until sunset.
31 May 05	5311	Possible breeding chase between female resident of 8735 (ID 318) and male resident of 5350 (ID 159). The two squirrels were seen chasing back and forth in the trees, did not seem to be strictly territorial defense as each was chasing the other in turn.

Appendix F-2: Litters observed on or near the monitored areas.

Date	Midden	Notes
4 Aug 05	1156	**3 Juveniles** were confirmed for resident female (ID 202) at maternity nest 11050. By 15 August, the juveniles were roaming well away from the nest and appeared near dispersal.
10 Aug 05	5121	**4 Juveniles** were confirmed for resident female (ID 23) at maternity nest 15141. Three of these juveniles (all female) were live-trapped and marked with small numbered metal ear tags.
10 Aug 05	2216 shift	**4 Juveniles** were confirmed for resident female (ID 68) at maternity nest 12063.
17 Aug 05	2234	**3 Juveniles** were confirmed for resident female (ID 458) at maternity nest 12012. Two female juveniles were live-trapped and marked with small numbered metal ear tags.
17 Aug 05	3365	**4 Juveniles** were confirmed for resident female (ID 637) at maternity nest 13118.
18 Aug 05	1154shift	**3 Juveniles** were confirmed for resident female (ID 652) at maternity nest 11041. One male juvenile was live-trapped and marked with small numbered metal ear tags.
18 Aug 05	3374	**3 Juveniles** were confirmed for resident female (ID 653) at maternity nest 15318.
24 Aug 05	5200	**4 Juveniles** were confirmed for resident female (ID 657) at maternity nest 15201. On 31 Aug 05, the remains and radio collar of the mother were found in an open area near the midden. On 1 Sep 05, a large juvenile was observed in the midden and defended the area by vocalizing and chasing away an Abert's squirrel and birds.

Appendix F-2: (cont.)

Date	Midden	Notes
Females that did not have litters confirmed or did not reproduce.		
Jun 05	1103	Resident female (ID 16) was thought to be pregnant based on physical characteristics seen during live-trapping, but no litter was observed for this female.
Jun 05	1183	This female (ID 466) did not appear to reproduce in 2005, as she was not pregnant or lactating in early Jun 05. Her collar only was found E of midden 1116 shift in early Sep 05, so her fate was unknown.
Jun 05	1187	This female (ID 670) was lactating when she was first live trapped in Jun 05, but no litter was ever seen. She was not seen, nor radio signal heard on the study areas after Jul 05.
Jun 05	1185	This female (ID 672) was lactating when she was first live trapped in Jun 05, but no litter was ever seen. She was not seen, nor radio signal heard on the study areas after Jul 05.
Jun/Aug 05	1163 shift	This female (ID 153) likely produced a litter in 2005, as she was noted to be lactating during live-trapping efforts in June. No litter was ever confirmed, however **1 or 2 larger juveniles** were seen in the area of a known nest for the adult female, but never with the adult female, so they could not be confirmed as her offspring. In August, the adult female moved to a new midden (5119) to the N and across the forest road.
Jun/Sep 05	1177	This female (ID 668) did not appear to reproduce in 2005, based on physical characteristics seen during live-trapping efforts in Jun and Sep 05.
Aug 05	5221/1121	Resident female (ID 39) very likely had a litter, as she appeared to be lactating in August and was seen with or near **1 juvenile,** that appeared to be larger size, on 8 Aug and again on 30 Aug 05. However, we did not confirm a maternity nest or any other juveniles at the time of emergence.

Appendix F-3: Reproductive status and age information for squirrels on or near the monitored areas, for quarterly census months, 2005. Only information on the final resident each month is given. Middens that were determined to be active based on sign alone (Y) are not included. Information gathered on non-resident squirrels is also excluded. Therefore the total number of active middens for a given month may be higher than the totals of the numbers seen here. ***Information for off-area middens (5000s) is included in Appx F3a-c.*** Information on reproductive condition is taken from trapping records or visual assessment if no trapping data is available.

Appendix F-3a: Female reproductive information

Reproductive Status	March			June			September			December		
	Adult	J/SA[1]	Unkn.	Adult	J/SA[1]	Unkn.	Adult	J/SA[1]	Unkn.	Adult	J/SA[1]	Unkn.
reproductive[2]	2			5								
lactating[2]				4								
recent lactation[2]							7					
past lactation[2]												
non-reproductive[1]	7	0/1		3			1	0/1		6	0/1	
unknown	1			2			1			1		

1 J/SA - Juveniles are still living at the maternal midden. Subadult squirrels have dispersed and are living independently. Subadults may be identified by examination during trapping or visual cues: generally smaller size, whiter fur on underside, thinner tail, head may appear slightly large (out of proportion).

2 Reproductive may indicate estrus or pregnancy. Lactating indicates current lactation, milk expressed or other visual cues. Recent lactation includes females that have lactated in the current breeding season. Past lactation indicates lactation in a previous breeding season (at least 1 year prior).

Appendix F-3b: Male reproductive information.

Reproductive Status	March			June			September			December		
	Adult	J/SA[1]	Unkn.	Adult	J/SA[1]	Unkn.	Adult	J/SA[1]	Unkn.	Adult	J/SA[1]	Unkn.
scrotal	13			13								
partially scrotal												
non-reproductive[1]							8			9	0/0	
unknown	2						1			1		

Appendix F-3c: Age information for final monthly resident females, males, and squirrels of unknown sex combined

March			June			September			December		
Adult	J/SA[1]	Unkn.	Adult	J/SA[1]	Unkn.	Adult	J/SA[1]	Unkn.	Adult	J/SA[1]	Unkn.
25	0/1	0	26	0/1	0	18	4/2	1	18	0/3	1

1 J/SA - Juveniles are still living at the maternal midden. Subadult squirrels have dispersed and are living independently. Subadults may be identified by examination during trapping or visual cues: generally smaller size, whiter fur on underside, thinner tail, head may appear slightly large (out of proportion).

Appendix G. Weather information for RSMP study areas, Pinaleño Mountains, Arizona, January - December, 2005.

G-1: Monthly weather summaries

G-2: Accumulated snow depths

Appendix G. Monthly weather summaries - January through December, 2005.

Note: Averages are calculated based on the total number of records collected per month. Weatherr stations record data at 1 hour intervals: about 600 to700 records per month. Data from Emerald Peak are missing between 6 June and 9 August 2005 due to lightning strike, and after 10 November 2005 due to equipment failure. Data from Biology Camp are missing after 12 December 2005 due to equipment failure.

	Month	Biology Camp	Emerald Peak
Temperature (°C) average (max; min)	January	-1.7 (8.4; -12.2)	-3.1 (7.9; -13.7)
	February	-2.7 (5.7; -11.8)	-4.3 (4.2; -12.3)
	March	-1.4 (10.0; -10.4)	-3.2 (7.8; -12.2)
	April	3.6 (13.3; -7.1)	1.8 (10.8; -9.4)
	May	9.3 (24.1; -1.4)	7.6 (20.8; -2.9)
	June	12.9 (24.7; 2.5)	8.0 (15.6; 1.9)– [1]
	July	15.9 (26.5; 9.4)	– [1]
	August	12.2 (21.3; 6.0)	11.1 (18.7; 5.4) – [1]
	September	11.7 (20.2; 2.9)	10.6 (17.9; 4.3)
	October	6.5 (16.8; -1.9)	5.2 (15.0; -2.7)
	November	4.4 (13.9; -11.1)	6.2 (12.1; -1.3)– [1]
	December	0.0 (8.9; -8.3)– [1]	– [1]

	Month	Biology Camp	Emerald Peak
Wind Speed (m/sec), maximum(max. gust)	January	2.2 (11.6)	4.5 (12.1)
	February	2.7 (9.4)	5.4 (13.4)
	March	2.2 (11.6)	3.6 (12.1)
	April	3.1 (13.9)	5.4 (15.2)
	May	1.8 (10.7)	2.2 (10.7)
	June	1.3 (8.0)	1.8 (7.2)– [1]
	July	1.8 (8.5)	– [1]
	August	1.3 (7.2)	2.2 (8.0)– [1]
	September	1.3 (6.7)	4.0 (9.8)
	October	1.8 (9.4)	4.0 (13.4)
	November	3.1 (13.0)	3.1 (10.3)– [1]
	December	1.8 (9.8)– [1]	– [1]
Wind, Most Common Direction	January	W	SW
	February	W	N-NE
	March	E	W
	April	W	NE
	May	W	NE
	June	W	N– [1]
	July	E	– [1]
	August	E	S-SW– [1]
	September	W	N
	October	W	N
	November	E-NE	N-NW– [1]
	December	E – [1]	– [1]

	Month	Biology Camp	Emerald Peak
Maximum Snow Depth (cm) Forest/Clearing	January	48/85	110/131
	February	97/147	185/192
	March	86/136	180/186
	April	70/120	160/156
	May		93/29
	June		
	July		
	August		
	September		
	October		
	November		
	December		
Rain Fall (mm) Total	January	– [2]	– [2]
	February	– [2]	– [2]
	March	– [2]	– [2]
	April	– [2]	– [2]
	May	– [2]	– [2]
	June	0.4	– [1],– [2]
	July	45.8	– [1]
	August	88.8	39.0 – [1]
	September	43.8	55.2
	October	17.0	23.6
	November	– [3]	– [3]
	December	– [3]	– [3]

	Month	Biology Camp	Emerald Peak
Relative Humidity (%) average (max; min)	January	70.4 (100.0; 15.0)	62.2 (95.0; 6.0)
	February	87.5 (100.0; 17.0)	83.2 (96.0; 19.0)
	March	67.0 (100.0; 21.0)	62.7 (94.0; 9.0)
	April	48.0 (100.0; 11.0)	42.3 (95.0; 5.0)
	May	47.7 (100.0; 21.0)	40.9 (96.0; 14.0)
	June	45.1 (96.0; 17.0)	44.1 (84.0; 22.0)– [1]
	July	54.3 (100.0; 17.0)	– [1]
	August	83.7 (100.0; 31.0)	73.3 (98.0; 21.0)– [1]
	September	69.1 (100.0; 27.0)	60.2 (97.0; 20.0)
	October	68.4 (100.0; 21.0)	62.0 (97.0; 10.0)
	November	38.2 (98.0; 6.0)	35.5 (75.0; 11.0)– [1]
	December	33.2 (100.0; 10.0)– [1]	– [1]
Dew Point (°C) average (max; min)	January	-7.5 (1.7; -23.6)	-11.4 (-0.8; -34.4)
	February	-4.8 (-1.6; -20.5)	-7.2 (-0.7; -22.0)
	March	-6.9 (0.2; -24.7)	-10.3 (-2.9; -29.6)
	April	-7.7 (6.4; -24.6)	-11.5 (1.7; -33.8)
	May	-2.3 (9.5; -14.3)	-6.2 (6.9; -18.7)
	June	0.5 (10.4; -10.5)	-4.2 (1.6; -12.7)– [1]
	July	5.3 (14.9; -6.7)	– [1]
	August	9.1 (14.6; -1.3)	5.8 (11.6; -6.0)– [1]
	September	5.5 (14.4; -9.9)	2.1 (11.1; -13.8)
	October	0.7 (11.2; -15.6)	-2.3 (9.7; -21.3)
	November	-10.1 (2.6; -34.5)	-9.1 (-2.0; -23.7)– [1]
	December	-16.0 (0.6; -30.7)– [1]	– [1]

1 For Emerald Peak: No data are available from 6 June to 9 August 2005 due to electrical short caused by lightning. No data are available after 10 November 2005 due to equipment failure.
For Biology Camp: No data are available after 12 December 2005 due to equipment failure

2 The rain gauges were disconnected in Dec 04. All moisture during the winter and spring was in the form of snow. The rain gauges were reconnected on 6 June 05.

3 The rain gauges were disconnected in Dec 05 and will be reconnected in the spring after the snow melt. Any precipitation in November was snow, so not included here.

Appendix G-2. Monthly maxima, minima and averages for accumulated snow depth. Data are from snow poles in Spruce-Fir (SF) and Mixed Conifer (TR) habitats from locations in the forest (F) and in clearings (C).

Month	Hab	Loc	N[1]	Average snow depth (cm)	Maximum snow depth (cm)	Minimum snow depth (cm)
Dec 2004	TR	C	9	27.3	49	0
Dec 2004	TR	F	9	27.3	45	9
Dec 2004	SF	C	9	61.0	77	31
Dec 2004	SF	F	10	49.0	62	32
Jan 2005	TR	C	12	71.1	97	55
Jan 2005	TR	F	12	58.4	93	36
Jan 2005	SF	C	15	108.3	140	57
Jan 2005	SF	F	14	90.4	112	50
Feb 2005	TR	C	10	119.5	151	80
Feb 2005	TR	F	10	100.4	133	73
Feb 2005	SF	C	6	144.3	205	76
Feb 2005	SF	F	6	133.3	185	77
Mar 2005	TR	C	10	113.7	153	60
Mar 2005	TR	F	10	100.0	136	75
Mar 2005	SF	C	14	153.7	213	36
Mar 2005	SF	F	14	155.3	220	90
Apr 2005	TR	C	13	50.6	120	0
Apr 2005	TR	F	13	51.4	110	2
Apr 2005	SF	C	8	88.0	161	0
Apr 2005	SF	F	8	95.0	160	0
May 2005	TR	C	9	0.2	2	0
May 2005	TR	F	9	13.7	62	0
May 2005	SF	C	9	9.7	42	0
May 2005	SF	F	11	28.5	93	0

Appendix G-2 (cont.)

1 N represents the number of snow pole readings in each area per month. There are 8 sets of snow poles (a set = 1 forest and 1 clearing) on the monitored areas: 3 in the TR habitat and 5 in the SF habitat. Not all sets of poles may be read every month.