REPORT ON THE SMALL MAMMALS IN THE VERMILION PASS BURN: 1972

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INTRODUCTION

The Vermilion Pass fire of July 9, 1968 left 6160 acres of burnt timber. Three years later, a preliminary study on the small mammal community structure (Shank, 1971) provided some data on the status of small mammals inhabiting this area. Some of the major findings were that the forested areas surrounding the burn were practically universally inhabited by Clethrionomys gapperi (red-backed vole) whereas in the burn, a much greater diversity of species were present, the major species being Peromyscus maniculatus (white-footed deer mouse) and Eutamias spp. (Chipmunks).

This year's study was undertaken as a sequel in a continuing study of the small mammal situation. Emphasis was placed on certain questions unanswered during the previous study such as overwintering habitats of the mammals, communities on the south-facing side of the road and the nature of the Eutamias species present.

DESIGN OF DATA COLLECTION

The method of data collection followed that of Chris Shank in 1971, i.e. the small mammals of the Vermilion Pass area studied by a simple trap, tag, release and recapture method.

Consultation with Shank led to modification in the emphasis of trapping. The plan was not to study as many varied trap grids as time allowed, but to focus on a smaller number of areas and to obtain frequent data from these sites over a long time period. To this end representative areas were chosen which would be trapped throughout the summer. It was intended that 3 trapping periods during June, July and August be employed. However in June very poor weather hampered trapping activities and also lead to high numbers of trap deaths. Trapping in one grid over a long time period (more than 4-5 days) resulted in death to animals which had become dependent on entering traps for the bait ("trap happiness").

Thereafter all trap periods were restricted to a four or five day regime which may or may not have biased results.

Another objective was to determine whether animals had been over-wintering in certain areas. This was the reason for starting in June and also one of the reasons for using the same grids as the previous year.

As in the 1971 study, live traps were placed in a grid system with 10 metres between each trap. Traps were baited with a Peanut-Butter - Rolled-Oats mixture and covered with available material to camouflage and protect from the sun-glare, etc. Bedding in the form of cotton batting was added to traps after July 1st to aid in reduction of deaths.

Since most emphasis was placed on the North-facing side of the highway in 1971, 3 areas (M1, M2, M3) were added on the South-facing side which are described later. Two new areas (L1, L2) were also added at the North end of

the lower Altrude Lake to represent a lakeside area in the burn. Another reason for these grids were sightings of predatory birds and mammals during 1972 by Barry Edwards and myself indicating a localized population of mammals in the lake areas.

Traps were checked twice daily at 6:30 - 9:30 am, and at 4:30 - 7:30 pm. Animals captured were marked by attachment of a numbered fingerling fish tag to the ear, were sexed, and were weighed on a spring balance. Condition of nipples and testes, and instances of pregnancy were also noted.

The daily temperature variations necessitated this pattern of work since checking the traps later than 10:00 am resulted in the death of some animals, presumably from cold. The metal traps themselves provided a factor in deaths for they sometimes had a layer of frost on the bottom and being metal, the traps conducted away much of the body heat generated by the animals; hence the use of the cotton batting. Another factor in death was the high Basal Metabolic Rates of the animals which may have resulted in both starvation and dehydration of trapped mammals.

DESCRIPTION OF NEW TRAP AREAS

The locations of the five new grids used are shown on Fig. 1.

L-1 a 4x4 grid in the burn at the North end of lower Altrude Lake (5420'). Many small growing bushes and several 6' high alpine firs (apparently unburnt) were present. The lakeshore varied from 1 to 5 yards from the edge of this grid.

L-2 a 4x4 grid (5420') beside L-1 which was largely unburnt. L-2 was also alongside the lakeshore.

M-1 a 4x4 grid at 5420' on the South facing side of the road. This area was between 2 streams of the Great Divide run-off in a burnt area which was densely covered with tall grasses.

M-2 a 4x4 grid at 5500' on the South-facing side of the road. This area was a steep hill at the edge of the burn facing the road and had little vegetation regeneration.

M-3 a 4x4 grid also at 5500' on the South-facing side of the road. This area faced the Great Divide stream and was chosen because of its uniqueness. It was a "Burnt Pocket" surrounded on all four sides by unburnt areas. It was a steep hill with very little regeneration.

The other locations (also on Fig. 1) are:-

1-1 a 6x6 grid in the wood at elevation 5250' on the SE side of the highway It is located near the weather station at the S end of the burn. The underbrush and blowdown timber is very dense in this area.

2-1 a 6x6 grid in the burn approximately 75 metres from the burn edge at elevation 5250'. Located near 1-1. This area was burned quite hard and there is little regeneration.

3-1 a 6x6 grid in the burn at elevation 5250' on the SE side of the highway near the weather station on the midburn cutline. This area was burned very heavily and there is little regeneration.

3-2 a 6x6 grid in the burn at 5750' elevation approximately 75 metres from the midburn cutline. Although fairly heavily burnt there is quite a bit of regeneration by annual plants in this area.

3-3 a 6x6 grid in the burn at 6250' elevation approximately 100 metres from the midburn cutline. Heavily burnt with little regeneration.

A-1 a 4x4 grid on the lightly burned-stream-side flats near the weather station at elevation 5250' on the midburn cutline. This area is covered with tall grasses.

A-2 a 4x4 grid directly across the stream from A-1. Similar in appearance.

B-1 a 4x4 grid at elevation 5250' on the NW side of the highway in the burn. It is located across from the Stanley Glacier trail. A good deal of regeneration has occurred in this area.

B-2 a 4x4 grid at elevation 5750' above B-1. Very little topsoil remains on this area and there has been little regeneration. There is quite a bit of cover from burned brushpiles.

C-1 a 4x4 grid at elevation 6250' near a patch of unburned timber located 100 metres S of the midburn cutline. Heavily burnt with little regeneration.

C-2 a 4x4 grid in the 50 metre wide patch of unburned mentioned above. Very similar to area 2-2 in appearance.

H-1, H-2, H-3, H-4: a complex of four 4x4 grids located in and immediately North of the deep gorge cut by Stanley Creek at the head of its hanging valley. This canyon is sufficiently deep to have caused the fire to leave the trees in it unharmed and to have created a shadow effect allowing a patch of timber N of it to escape destruction. H-1 was placed in the timber at the base of the canyon. H-2 is situated in the woods N of the canyon. H-3 is in the burn adjacent to H-2. H-4 was placed in the burned area at the base of the gorge where the incline of the walls was gradual enough to allow the fire access. Both H-1 and H-4 were placed as close as possible to the stream. The burn in this vicinity was very heavy and there is almost no regeneration. The forest is similar in appearance to 2-2.

RESULTS

Table 1 provides a resume of the overall quantitative data from the trapping. There were a total of 10,096 trap ½ days with a total of 210 individuals being captured 495 times, giving an average of 2.35 captures per individual. Citellus and Sorex individuals captured were not included in these results due to the bias of weight and size.

The percentage of trap success decreased from 5.41% in the first period (June 1 - July 11) to 5.00% in the 2nd (July 11 - Aug. 7) and increased to 7.08% in the 3rd (Aug. 7 to Aug. 23). These last two compare with values of 4.27% in July 1971 and 8.08% in August 1971. The overall trap success for 1972 was 5.53% as compared to 5.92% in 1971. Using an unpaired t-test one finds a t-value of 0.25 which shows no significant difference between overall trap success in the two years at both the 1% and 5% levels. These values compare favourably with the trap success of Munro and Cowan (1944) who found returns of less than 6% from 50-75 traps over 24 hours when they trapped in June, 1944 by Vermilion Crossing and in other regions of Kootenay Park.

Deaths per 100 captures were very high in the first period due to the weather which unfortunately must bias results in subsequent periods in areas where deaths were very high. Not only does one lose the animal but also its

potential offspring. However in July and August 1972, values were comparable with 1971. The 1971 results being 7.55% and 6.76%. The 1972 results being 6.98% and 6.43%.

SPECIES PRESENT

As in previous study, the following species were captured:-

1. Citellus lateralis - the golden mantled ground squirrel
2. Clethrionomys gapperi - the red-backed vole
3. Euramias amoenus - the rufous-tailed chipmunk
4. Microtus pennsylvanicus - the meadow vole
5. Peromyscus manifulatis - the white-footed deer mouse
6. Sorex cinereus - the cinereus shrew
7. Zapus princeps - the western jumping mouse

While the 1971 study, no Tamiasciurus spp. were captured, although many were seen. Citellus and Sorex, were not treated in the analysis due to size bias with respect to the traps.

Eutamias skulls and skins were prepared to determine whether E. amoenus and/or E. minimus were present in the burn area. These were found to be exclusively E. amoenus. Specimens were obtained from area F-1 at 6250' on the North-facing slope and B-2 at 5750' on the South-facing slope in the burn.

Unlike 1971, a larger number of Zapus were captured in areas A-1 and A-2. However, in 1971, these areas were trapped only in August which may explain the differences in the results. In July 1972, 4 individuals were captured in A-1 and seven in A-2, but only 1 in August in A-1 (one was captured in 1971 in A-2). In addition, one Zapus individual was captured in area M-1 in July 1972. This area was similar to A-1 and A-2 in that it

was a streamside area with tall grasses growing in the grid. Whether these mice migrated or were captured by predators during late July is a question yet to be answered. The Zapus captured in 1971 (#438) was recaptured in July of 1972 but not in August. A subsequent study year might indicate recaptures of Zapus in these areas.

Table 2 (arranged identically to Table 2 of Shank, 1971) shows some changes in relative numbers of individual species in the various forest areas. The pristine forest area 1-1 is very similar in its numbers of Clethrionomys. The forest pockets of 1971 were 100% monospecific with C. gapperi whereas in 1972, the captures were more varied, with an average of only 73.7% of C. gapperi. There were Peromyscus present in 2 pockets while both Peromyscus and microtus were trapped in another area. This indicates some movement of the euryotopic species from the nearby burnt areas. Another striking difference was in some edge of burn areas. For instance area 2-1 had 10 Clethrionomys individuals and 5 Eutamias in 1971. In 1972, no Clethrionomys and only 2 Eutamias (#126 and 131 which had been tagged in 1971) were captured, 2 each of Peromyscus and Microtus were found in this area indicating perhaps some takeover of the region by these species which eliminated a previously existing Clethrionomys colony.

Other edge of burn areas still had Clethrionomys (C-1, L-1, M-2 and M-3) but other species were also present. These habitats had a monospecific inhabitation index 57.8% with variations from 30.0% - 100.0%, indicating some instability in the areas as primary habitats for any given species. Since edge of burn areas probably represent some intermediate between normal pristine forest and heavily burnt areas, one would expect to find these types of results as they would be areas of flux.

Area M-3 represents an interesting case. It was a burnt pocket surrounded by four sides of pristine forest. Thus one might expect the large numbers of Clethrionomys captured these to be residents of the pristine forest who were on night food gathering trips. M-3 which yielded only 1 Microtus during 1972 and no animals during 1971 was an extremely dry area with virtually no regrowth, bordering an unburnt pocket.

Shank (1971) found that areas adjacent to pristine forest were primarily inhabited by Clethrionomys while those adjacent to pockets of unburned timber were inhabited by Peromyscus. In 1972, this trend could not be seen as more than one species were either residing in or moving through most of the areas.

In the middle of the burn areas were found a predominance of Peromyscus in most regions except A-1 and A-2 with Zapus (discussed earlier) and 3.2 which yielded more Microtus than Peromyscus. Most mid-burn areas showed evidence of greater numbers of Microtus and fewer Eutamias than in 1971. All areas in which Eutamias were captured in 1971 housed them in 1972 (3-1, B-1, B-2 and G-1). But in all cases except G-1, the numbers of captures decreased. Two other areas studied in both 1971 and 1972, 2-1 and C-1, also had chipmunks captured both years. In 2-1, numbers decreased but in C-1 they increased. If one totals Eutamias individuals captured in areas 3-1, B-1, B-2, G-1, 2-1 and C-1 for 1971, there were 31, as compared with only 12 in 1972.

Similar comparisons show that in the same areas 62 Peromyscus were captured in 1971 and 85 in 1972, 2 Microtus in 1971 as compared to 19 in 1972, and 63 Clethrionomys in 1971 and 54 in 1972.

These figures indicate that numbers of Peromyscus and Microtus are increasing while Clethrionomys and Eutamias are decreasing. This indication

could be verified by a further captive study on the same areas during another summer. However some bias may be entering the data due to deaths of animals.

One trend which seems universal in both 1971 and 1972 is a greater diversity of species in the burnt areas than the pristine forest.

DENSITY ANALYSIS

Density analysis utilized the method designated by Shank in 1971. In the method, five types of individuals were defined on the basis of probability of recapture (see Shank 1971). By using these types one can determine low and high estimates of the number of residents and transients in the grids. These figures are calculated in mice per hectare to standardize results.

Many of the mice which were dead when captured were impossible to categorize. This factor has in some cases made data in the table appear different than what it really represents. For example in the pristine forest, the density is 8-11 and 3-8 mice per hectare in June and July 1972 which does not represent the fact that only 19 individuals were captured, and there were 8 deaths in this period.

Table 4 shows the density of mice and chipmunks in the area. Specific trends from both 1971 and 1972 are that densities increase from July to August with the edge of burn areas having the lowest densities.

Table 5 containing data on juvenility shows similar trends to 1971. In both cases numbers of juveniles are high only during August (63.8% of captures in 1972, 64.41% in 1971) and 71.4% of transients in 1972 compared with 64.9% in 1971). In both tables the rates of juvenility are high in the middle of the burn but since data on the edge of burn areas is missing for August in all but one area (C-1) one cannot determine the trend in these areas for this period.

Several examples of migration and movements were recorded during the summer. Peromyscus #277 which weighed 17 grams was caught in area A-2 on July 26. This area was a low-lying stream-side grid (5250'). After two days (on July 28) she was in grid H-1 (an unburnt pocket) which was about 6000' and over 800 m down the burn. The minimum distance travelled is estimated to be between 1.1 and 1.3 kms. The Peromyscus was then caught twice again in H-1. Another Peromyscus was caught in area A-1 four times between July 4 and 6, and then in area 3-1. Five times between July 17 and 20. It appeared in A-1 three times on July 26 and 27 and again three times August 22 and 23. The distance between A-1 and 3-1 was a journey of 250 m; this mouse seemed to follow the food in the trap!

Many instances were seen where mice seemed to oscillate between 2 proximal grids. There were no definite patterns in short distance travels.

The juvenile mice according to Table 5, did not constitute a greater percentage of the transients than other total captures which parallels Shank's findings in 1971. If anything, the structure of transient population comprised of more adults than the structure of the overall population of mice.

Table 6 is a list of t-values determined from comparing densities of mice in different habitats and during different months of the summer. These values were taken from high and low estimates of mice per hectare (Table 4). The table shows that there are no significant differences between any two habitat types, but in the unburnt pockets, there was a significant difference in density between June and August and between July and August, since deaths were so high in area 1-1 (the representative pristine forest region), the validity of the numbers in this region are questionable. This

factor may account for the absence of a significant difference between this area and the middle of burn, and also of this area and the edge of burn as Shank did in 1971.

Fourteen animals (4 Eutamias), 3 Clethrionomys, 6 Peromyscus and 1 Zapus) were captured during 1972 that had been tagged in 1971. All of these individuals were captured in the same grid in 1972 as in 1971 implying that either they overwintered in these areas or migrated away for the winter and later returned. The former explanation is preferable migration would not usually be likely to follow fat storage during the fall.

OTHER MAMMALS IN THE BURN

Since no formal study on other mammals in the burn was undertaken, I tried to familiarize myself with the situation. This was difficult because we could not follow these mammals but had to rely on sightings of people in the burn. However, many of these mammals came up to the highway in early morning and early evening to feed on grass or search after other mammals on the roadside.

A moose and calf were seen several times in July by Altrude Lake and later in August on the outline by the 3 weather stations. A mule deer was sighted on the South-facing slope across from Stanley glacier in the middle of August. Two days later a mule deer (presumably the same one) was found dead on the roadside close to this place. Five elk does were seen many times along the road near Vista Lake in early morning. Many porcupines were squashed on the road near Vista Lake.

Barry Edwards sighted a mink in Vista Lake and several martens. Several marmots were seen by the highway in some rocks by Vista Lake parking lot. Another person reported a wolverine but was not certain of its identification. No bears were seen during the summer in the burn area

although a black bear visited my cabin at Eisenhower Junction. Several coyotes were seen by the highway just North of the burn area but none in the burn itself.

The larger mammals in the area seemed to be congregated around the lakes and on the highway. Since no one was following their movements closely, it is difficult to determine their numbers etc. However, between Barry Edwards, the surveyors and myself, most of the burn was covered each week so that a fairly representative number must have been seen.

MY RECOMMENDATIONS TO THE STUDY

I feel this study is worthwhile continuing for at least three more years. A five-year study will give data over a time range that may show definite trends. I think that studying the same grids had both advantages and disadvantages, the advantages being that one can show overwintering patterns and movements. Also comparisons may be made easily. Disadvantages are that deaths in the areas year after year will bias data to a point that it does not represent the situation on all areas of the burn. Also animals in those areas become accustomed to traps and adjust themselves to the presence of these. Trapping in June I feel may be more of a disadvantage than an advantage to the study. I lost many animals due to a snow storm on June 16. This means that temperatures are very low during this period and will have a disastrous impact on later data for not only are these animals lost but their potential or even suckling offspring will perish. Thus one must decide if high death rate (24% in June) is worth the extra data that one receives during the trapping year.

I felt that in some of my grids the losses in June had a tremendous affect on the later data, e.g. in area 1-1 -- 8 Clethrionomys died in June.

The addition of cotton batting had favourable results, I think, but its insulating characteristics could probably not help in below freezing temperatures and heavy rains that occurred many nights in June, July and late August. However, in future years this wet, cold pattern may not occur except in June.

Collection of data would be valuable for several more years to clarify trends that seemed to exist in 1971 and 1972 and changes not yet seen. Since the pattern seems to go towards a stable habitat with Clethrionomys it would be interesting to know at what stage of forest regrowth this occurs. At present Clethrionomys seems to be an unimportant species within the burn whereas Peromyscus and possibly Microtus seem to be important. However, capture rates and reality may be somewhat different.

SUMMARY

The purpose of this study was to act as sequel in a comprehensive study on the small mammal community structure in the Vermilion Pass area after a burn in 1968. The study used the same basic methodology as the 1971 study (trapping, tagging and release of small mammals) but it was more restrictive in that 21 grids were chosen as representative of major habitats and trapped periodically throughout the summer. The emphasis was placed on areas within the burn and more grids were trapped on the South-facing side of the highway than in 1971. Although high deaths in June biased some results, one could see certain parallels between the two study years. Clethrionomys was the primary inhabitant of the pristine forest where Peromyscus was the major species in the burn. Overall the numbers of Microtus had increased from 1971 to 1972 whereas Eutamias decreased. Trends of primary inhabitants in burn edge areas were difficult to see as several species were present in most of these habitats. A closer look was taken at the Zapus individuals trapped.

No significant difference in densities between any of the habitat areas was found. These results may have been based due to deaths in June in the representative pristine forest area. A note was made on possible over-wintering activities.

Several suggestions for further study were offered.

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TABLE 1: COMPILATION BY AREA OF TRAP DAYS, INDIVIDUALS CAPTURED, NUMBER OF CAPTURES, PERCENTAGE TRAP SUCCESS, TRAP DEATH AND PERCENTAGE TRAP DEATH.

Area	(a) Trap ½ days before July 11	(b) Trap ½ days July 11 - Aug. 7	(c) Trap ½ days Aug. 7 - Aug. 23	Total Map ½ days	Individual captures	Captures (a)	Captures (b)	Captures (c)	Total captures	Captures/100 ½ days (a)	Captures/100 ½ days (b)	Captures/100 ½ days (c)	Total captures per 100 ½ days	# Deaths (a)	# Deaths (b)	# Deaths (c)	Total # deaths	Deaths/100 captures (a)	Deaths/100 captures (b)	Deaths/100 captures (c)	Total deaths per 100 captures
3 - 1	360	324	324	1008	8	6	7	14	27	1.67	2.16	4.32	2.68	0	0	0	0	0.00	0.00	0.00	0.00
3 - 2	396	324	324	1044	7	11	20	2	13	2.78	0.00	0.62	1.24	4	0	0	4	36.36	0.00	0.00	30.80
3 - 3	396	324	324	1044	8	0	3	11	14	0.00	0.93	3.39	1.34	0	1	3	4	0.00	33.33	27.27	28.57
1 - 1	396	288	-	684	18	23	6	-	29	5.81	2.08	-	4.24	7	1	-	8	30.43	16.67	-	27.59
2 - 1	432	252	-	684	4	15	1	-	16	3.47	0.40	-	2.34	3	0	-	3	20.00	0.00	-	10.71
A - 1	144	144	144	432	7	10	4	9	23	6.94	2.78	6.25	5.32	0	0	1	1	0.00	0.00	11.11	4.35
A - 2	144	144	144	432	14	17	2	10	29	11.80	1.39	6.94	6.71	0	0	0	0	0.00	0.00	00.00	0.00
B - 1	256	144	144	544	5	2	3	2	7	0.78	2.08	1.39	1.29	0	0	0	0	0.00	0.00	00.00	0.00
B - 2	256	144	144	544	27	35	20	13	68	13.67	13.89	9.03	12.50	3	1	1	5	8.57	5.00	7.69	7.35
C - 1	96	144	144	384	9	9	0	11	20	9.37	0.00	7.64	5.21	3	0	0	3	33.33	0.00	0.00	15.00
C - 2	64	144	144	352	19	9	8	26	43	1.41	5.55	18.05	12.21	3	1	2	6	33.33	12.50	7.69	13.95
9 - 1	224	144	144	528	19	15	23	19	57	6.70	14.37	13.19	10.79	3	0	2	5	20.00	0.00	10.53	8.77
H - 1	144	-	-	288	10	9	18	-	27	2.78	12.50	-	9.37	2	0	-	2	50.00	0.00	-	7.40
H - 2	144	-	-	288	6	3	4	-	7	2.08	2.78	-	2.43	2	1	-	3	66.67	25.00	-	42.86
H - 3	144	-	-	256	1	1	0	-	1	0.69	0.00	-	0.39	1	0	-	1	100.00	0.00	-	100.00
H - 4	128	-	-	272	12	8	12	-	20	6.25	8.33	-	7.35	2	2	-	4	25.00	16.67	-	20.00
L - 1	144	-	-	256	4	7	8	-	15	4.86	7.14	-	5.86	1	1	-	2	14.28	12.50	-	13.33
L - 2	144	-	-	256	9	10	10	-	20	6.94	8.93	-	7.81	3	2	-	5	30.00	20.00	-	25.00
M - 1	144	-	-	288	1	1	0	-	1	0.69	0.00	-	0.35	0	0	-	0	00.00	0.00	-	0.00
M - 2	144	-	-	256	9	13	4	-	17	9.03	3.57	-	0.64	1	0	-	1	7.69	0.00	-	5.88
M - 3	144	-	-	256	13	23	18	-	41	15.97	16.07	-	6.01	2	0	-	2	8.69	0.00	-	4.88
TOTALS	4444	3672	1980	10096	210	227	151	117	495	5.41	5.00	7.08	5.53	40	10	9	59	23.06	6.98	6.43	17.45

TABLE 2: FOR EACH SAMPLING AREA AND SPECIES, THE NUMBER OF INDIVIDUALS CAPTURED AND THE NUMBER OF CAPTURES MADE ARE PRESENTED.

	Clethrionomys		Peromyscus		Microtus		Eutamias		Zapus		Other		monospecific inhabitation index	
	individuals	captures	individuals	captures	individuals	captures	individuals	captures	individuals	captures	individuals	captures		
Pristine Forest														
1 - 1	17	28	-	-	-	-	-	-	-	-	1	1	94.4	94.4
Pockets														
C - 2	17	41	2	2	-	-	-	-	-	-	-	-	89.5	
H - 1	6	13	5	14	-	-	-	-	-	-	1	1	50.0	73.7
H - 2	6	7	-	-	-	-	-	-	-	-	-	-	100.0	
L - 2	5	12	1	5	3	3	-	-	-	-	-	-	55.5	
Edge of Burn														
2 - 1	-	-	2	2	2	2	2	12	-	-	1	?	33.3	
C - 1	2	2	4	9	1	1	3	8	-	-	-	-	40.6	
H - 3	-	-	-	-	1	1	-	-	-	-	-	-	100.0	57.8
H - 4	-	-	10	18	2	2	-	-	-	-	-	-	83.3	
L - 1	2	7	2	5	2	2	-	-	-	-	-	-	33.3	
M - 2	3	4	2	8	3	3	2	2	-	-	-	-	30.0	
M - 3	11	28	-	-	2	13	-	-	-	-	-	-	84.6	
Middle of Burn														
3 - 1	-	-	6	21	1	1	2	5	-	-	-	-	66.7	
3 - 2	-	-	3	6	4	7	0	0	-	-	-	-	57.1	
3 - 3	-	-	5	9	3	5	0	0	-	-	-	-	62.5	
A - 1	-	-	1	13	1	2	-	-	5	8	0	0	71.4	
A - 2	-	-	6	12	2	2	-	-	7	15	0	0	46.7	75.5
B - 1	1	1	2	3	1	2	1	1	-	-	-	-	40.0	
B - 2	5	6	21	60	-	-	1	2	-	-	-	-	77.8	
9 - 1	0	0	18	47	1	1	3	9	-	-	2	?	81.8	
M - 1	-	-	-	-	-	-	-	-	1	1	-	-	100.00	

ABLE 3: DENSITY OF RESIDENT AND TRANSIENT MICE PER HECTARE AS A FUNCTION OF AREA AND DATE OF SAMPLING. UPPER FIGURE REPRESENTS RESIDENTS WHILE THE LOWER PARENTHETICAL FIGURE REFERS TO TRANSIENTS.

	June 1	June 15	June 30	July 1	July 15	July 31	Aug. 1	Aug. 15	Aug. 31
PRISTINE FOREST									
1-1			8-11 (3-8)			3-8 (0-3)			
UNBURNT POCKETS									
C-2	12-19 (6)					6 (12-19)		19-56 (6-12)	
H-1				6 (6-12)		12-24 (6-19)			
H-2				6 (0)		0-6 (12)			
L-2				6	6 (12-19)		6-19 (0-6)		
EDGE OF BURN									
2-1			5 (3)			0 (3)			
C-1	12 (6)					0 (0)		12-37 (0)	
H-3				0 (0)			0 (0)		
H-4				12-19 (0)			6-31 (6-12)		
L-1					6-19 (0-19)		6 (6-12)		
M-2					12-24 (6)		0-12 (6)		
M-3					19-44 (0)		24-44 (0)		
MIDDLE OF BURN									
3-1	0 (0-8)					3-5 (0)		3-8 (0-3)	
3-2	8-11 (0)					0 (0)		3-8 (0)	
3-3	0 (0)					3 (0)		3-14 (0)	
A-1				6-12 (6-12)		0 (6-12)			6 (6-12)
A-2				31-44 (12)		0-31 (6)			12-44 (6)
B-1			6 (0)			0 (6-12)			0 (12)
B-2			38-44 (44)			31-56 (31)			24-56 (6)
G-1	19 (12)					38-50 (6)			19-56 (12-24)
M-1					0 (6)		0 (0)		

TABLE 4: DENSITY OF MICE AND CHIPMUNKS. EXPRESSED AS NUMBER PER HECTARE. CALCULATED AS THE AVERAGE OF THE SAMPLE GRIDS.

	Density: Mice/Hectare	Standard Deviation	Density: Chipmunks/Hectare	Standard Deviation
PRISTINE FOREST				
July 1 - July 11(a)	8 - 11	0	0	0
July 11 - Aug. 7(b)	3 - 8	0	0	0
Aug. 7 - Aug. 23(c)	-	-	-	-
UNBURNT POCKETS				
(a)	7.5 - 9.2	3.0 - 9.0	0	-
(b)	6.0 - 13.7	4.9 - 9.2	0	-
(c)	19.1 - 56.0	0	0	-
EDGE OF BURN				
(a)	5.3 - 15.1	7.5 - 16.6	2.4	5.0
(b)	5.1 - 13.3	8.8 - 25.8	0	-
(c)	12.0 - 37.0	0	0	-
MIDDLE OF BURN				
(a)	9.8 - 13.0	13.3 - 16.6	2.0	4.2
(b)	8.3 - 16.1	15.0 - 23.2	0	-
(c)	7.8 - 21.3	8.7 - 23.7	0	-

ABLE 5: NUMERICAL RATIO AND PERCENTAGE OF JUVENILES IN TOTAL CAPTURE AND IN THE TRANSIENT POPULATIONS. EACH TRANSIENT VALUE IS THE AVERAGE OF THE HIGH AND LOW ESTIMATES OF THE INDIVIDUAL TRANSIENTS PASSING THROUGH THAT AREA.

	Ratio of juveniles to total captures June-July 11 (a)	Ratio of juveniles to total captures July 11-Aug. 7 (b)	Ratio of juveniles to total captures Aug. 7-23 (c)	Ratio of Juvenile transients to total transients June-July 11 (a)	Ratio of juvenile transients to total transients July 11-Aug. 7 (b)	Ratio of juvenile transients to total transients Aug. 7-23 (c)
PRISTINE FOREST						
1-1	0/7	0/2	-	0/2	0/.5	-
Mean	0.0%	0.0%	-	0.0%	0.0%	-
POCKETS (UNBURNT)						
C-2	1/4	0/4	5/10	0/1	0/2.5	1/1.5
H-1	0/3	4/7	-	0/1.5	0/2	-
H-2	0/1	3/3	-	0/0	2/2	-
L-2	0/5	1/4	-	0/2.5	0/.5	-
Mean	7.7%	44.4%	50.0%	0.0%	28.6%	66.6%
EDGE OF BURN						
2-1	0/3	1/1	-	0/1	1/1	-
C-1	0/0	0/0	4/5	0/1	0/0	0/0
H-3	0/1	0/0	-	0/0	0/0	-
H-4	1/3	5/8	-	0/0	0/1.5	-
L-1	1/3	0/2	-	0/1.5	0/1.5	-
M-2	2/5	1/1	-	0/1	0/1	-
M-3	0/7	3/8	-	0/0	0/0	-
Mean	18.2%	50.0%	80.0%	0.0%	20.0%	0.0%
MIDDLE OF BURN						
3-1	0/2	0/1	3/3	0/1.5	0/0	.5/.5
3-2	0/4	0/0	1/2	0/0	0/0	0/0
3-3	0/0	0/1	4/7	0/0	0/0	0/0
A-1	0/4	0/2	0/3	0/1.5	0/1.5	0/1.5
A-2	0/9	1/2	4/4	0/2	1/1	1/1
B-1	0/1	0/2	1/1	0/0	0/1.5	1/2
B-2	2/13	2/12	1/4	0/7	0/5	1/1
G-1	0/1	5/7	7/8	0/2	0/1	3/3
M-1	0/1	0/0	-	0/1	0/0	-
Mean	10.5%	41.3%	65.2%	0.0%	10.0%	72.2%
TOTAL MEAN	9.0%	38.8%	63.8%	0.0%	17.8%	71.4%

TABLE 6: t-VALUES FOR COMPARISONS OF DENSITIES OF MICE BETWEEN (a) MONTHS WITHIN EACH HABITAT AND (b) THE DIFFERENT HABITATS, USING HIGH AND LOW ESTIMATES OF DENSITIES.

a) Comparisons between months in each habitat

PRISTINE FOREST		
June-July (a)-(b)	0	N.S.
June-Aug. (b)-(c)	-	-
July-Aug. (a)-(c)	0	N.S.
UNBURNT POCKETS		
(a-b)	.19/.24	N.S.
(b-c)	3.8/5.2	significant @ 0.05 = 2.45, 0.01 = 3.71
(a-c)	2.6/4.6	significant @ 0.05 = 2.45, 0.01 = 3.71
EDGE OF BURN		
(a-b)	.01/.04	N.S.
(b-c)	.89/1.33	N.S.
(a-c)	.78/.92	N.S.
MIDDLE OF BURN		
(a-b)	.05/.08	N.S.
(b-c)	.09/.20	N.S.
(a-c)	.02/.11	N.S.

b) Comparisons between habitat types in each month

JUNE (a)		
P.F.-U.P.	.17/.20	N.S.
P.F.-E. of B.	.36/.25	N.S.
P.F.-M. of B.	.13/.12	N.S.
U.P.-E. of B.	.21/.23	N.S.
U.P.-M. of B.	.14/.15	N.S.
E. of B.-M. of B.	.21/.06	N.S.
JULY (b)		
P.F.-U.P.	.61/.62	N.S.
P.F.-E. of B.	.24/.20	N.S.
P.F.-M. of B.	.35/.35	N.S.
U.P.-E. of B.	.06/.10	N.S.
U.P.-M. of B.	.11/.07	N.S.
E. of B.-M. of B.	.13/06.	N.S.
AUG. (c)		
U.P.-E. of B.	-	
U.P.-M. of B.	1.29/1.46	N.S.
E. of B.-M. of B.	.48/.66	N.S.

KEY = t-value - numerator is low estimate - denominator is high estimate
N.S. = not significant, P.F. = Pristine Forest, U.P. - Unbuilt Pockets
E. of B. = Edge of Burn M. of B. = Middle of Burn.