Stoat Observations

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This study attempted to determine what information about stoat ecology could be obtained by soliciting reports of sightings of stoats from members of the public visiting national parks.

All the national parks have at least one visitor centre, where the request for reports of sightings could be publicised and the stocks of record cards stored, as well as a permanent staff of rangers to distribute and collect cards and answer questions. Stoats are common enough to be easily recognised, but rare enough to be remembered; they are active by day and not shy of human activity on roads and in villages; and there is considerable public concern about them as introduced predators in the parks, the most extensive reserves for New Zealand's diminishing native fauna.

In November 1976 a poster and reply-paid record cards were distributed to each national park for prominent display in the visitor centres from December 1976 to November 1978. Record cards were stocked at the centres and made available to visitors on request. In some visitor centres displays about introduced predators were mounted, and the survey mentioned in open lectures which helped to publicise it to visitors, but it was not advertised outside the parks.

The 10 national parks in New Zealand vary considerably in size, accessibility, and popularity with visitors. Most parks keep a rough tally of people passing through their visitor centre, thus providing a gross estimate of the number of people who might have seen the posters. At the conclusion of the survey a questionnaire was sent to each park board to obtain details of how and where the posters were displayed, how people had reacted to them, and the approximate number of visitors in 1976/77 and 1977/78.

A total of 1779 cards were returned: 1747 reported sightings of stoats or weasels *(M. nivalis)*, 13 of ferrets *(M. putorius furo)*, and 19 were not usable.

As few people can reliably distinguish weasels from stoats in the field, cards marked as referring to weasels (less than 15) were analysed with those for stoats.

Stoats were seen throughout all the parks. They were recorded on sunny beaches and snowy alpine tops; in forest and in open grassland; in remote bush and on grassy ridgetops above the treeline; in rubbish bins and campsites; under buildings, in hen houses, and on lawns.

Small mustelids generally have a reputation for fearless curiosity, and the records confirm a willingness, extraordinary in a wild animal, to approach and even enter man-made structures – not only outhouses and hen coops, but even occupied hotels and tents. Three separate observers reported stoats seen or caught actually inside campers' tents, presumably looking for food (Arthur's Pass, January 1978; Fiordland, April 1977; and Westland, December 1976 – in the last case the observer's wife was inside and was very frightened). The garden of the chief ranger's house was visited three times at Westland (once stealing fat put out for birds), and once each at Arthur's Pass and Egmont – in the latter case the stoat was attacking a thrush. At the Alpine Motel at Arthur's Pass in February 1977, a single stoat was seen on six different days by six different people. It seems likely that these animals were not just visiting – they were actually living close to man (Table 1).

From half to two thirds of all records each year were of stoats "running across the road". Other kinds of recognisable behaviour patterns were also regularly recorded. Four different observers noted stoats carrying their tails very high, even erect, while running. At least five were seen swimming; others crossed streams over natural or man-made bridges or by boulder-hopping. Sightings were made at any time of day from early morning to dusk, and 12 were at night.

A total of 232 cards (13 percent) mentioned some kind of prey with the stoat. Table 2 shows these and compares the pooled distribution of prey in all parks as reported by field observers and as calculated from analysis of the contents of 1250 stoat guts by King and Moody (1982).

The sightings agree with the gut analysis that birds, lagomorphs (hares and rabbits), and opossums are important prey of stoats. Smaller items, such as mice and insects, are less easily detected by direct observation. Stoats were often seen rummaging in rubbish bins (31 occasions), and 12 of the 1250 guts analysed contained rubbish such as newspaper, tinfoil, paper, or plastic. Most observers reporting stoats with live lagomorph prey remarked that the victim was a 'small' rabbit, or else a leveret, and most hares mentioned as prey were road-kills. One stoat was seen being 'kicked in the head' by a (presumably adult) rabbit. Also, road-killed adult opossums are clearly a useful, if hazardous, source of food for stoats living in roadside forest.

In the gut analysis, lagomorphs were found less often in winter, when young rabbits and hares are least numerous, and the seasonal distribution of opossums suggested that many were made available to stoats as trapper's carrion.

In this survey many lagomorphs were recorded as prey at Mount Cook, partly because rabbits and hares are

Table 1: Locations of sightings reported

	Percentage* of total sightings for each park										
	UW	TG	EG	AT	NL	AP	WL	MC	MA	FL	Outside parks**
On or near a road	44	51	64	13	15	39	74	23	34	34	77
On a track	6	8	0	16	12	2	2	8	11	18	8
In the bush	26	7	20	15	25	11	6	9	33	18	4
Near houses or villages	1	14	12	6	19	30	7	44	2	4	4
Campsite	4	11	0	21	11	3	3	5	3	3	2
In or under buildings	0	2	0	1	2	5	2	4	1	0.3	0
In or near a lake, river, beach	13	0	4	28	7	4	5	2	9	17	4
On a bridge	1	3	0	0	2	1	2	0.3	7	2	0
In a pile of rocks or logs	1	0	0	0	2	3	0	4	1	1	1
Near rubbish or offal	4	4	0	0	5	2	0	0.3	4	3	1
Total*	140	148	25	68	124	140	230	296	178	333	130

* Note: The number of locations listed may exceed the total number of sightings for the park, as the categories are not mutually exclusive: a stoat could have been recorded on the road outside a house, in a rubbish bin at a campsite, etc., in which case it was scored in each place.

** Sightings made near, but not in, national park, or in other reserves such as forest parks.

Table 2: Prey items associated with stoats observed

	Numbers of observations reported (King and Moody, 1982)													
	UW	TG	EG	AT	NL	AP	WL	MC	MA	FL	Outside Parks*	Total	% of 232	% occurrence in guts (all parks) n=1250
Wild bird/eggs	2		1	7	3	3	5	7	5	9	3)	51	22.0	42.6
Hens/eggs				1			5				)			
Rabbit/hare — live	1	1	2	1	1			28	5		2)			
DOR		1				2		1	1		3)	50	21.6	17.5
?				1							)			
Possum DOR	4		3			3	21		8	3	3)	46	19.8	10.0
?				1							)			
Unident. DOR	1				1	1	6			2	3)			
Other Unident.		3				1	2	1	2	2	)	25	10.8	
Mouse	2							1	3	2		8	3.4	19.3
Rat	3	1										4	1.7	6.4
Frog	1											1	0.4	0
Fish (incl. eel)				1	1		1			5		8	3.4	0.2
Other					(a)							1	0.4	
Insects					1				1			2	0.9	0.4
Rubbish	3	6			4	2		1	8	6	1	31	13.4	1.0
Carrion (mostly deer)	1						(b)			3	1	4	1.7	1.4
	17	12	6	12	12	12	41	39	33	32	16	232		
%	12.2	9.5	24.0	16.7	9.9	9.3	18.5	15.5	18.2	10.1	10.1	13.3		
Total sightings for park	139	126	25	72	121	129	222	252	181	321	159	1747		

DOR dead on road (a) four pet guineapigs (b) fat put out for birds

common, in some years, on the open grasslands around the village and easily visible. Likewise, road-killed opossums were often recorded as prey at Westland, because relatively heavy highway traffic passing through the park provides both the meat and the opportunity for travellers to see stoats eating it. Nevertheless, the importance of these foods is real and confirmed by the gut analysis. Two observers witnessed successful kills of rats, and another reported that a stoat had got away after removing four of his six guinea pigs.

Few observers identified the species of birds they saw in association with stoats. Six reported stoats stalking or attacking wekas, but none witnessed a kill, and one stated that the weka drove the stoat off. One stoat was seen chasing a quail and one was being harried by a magpie. One climbed a tree and killed three tui nestlings. Other identified bird prey included a blackbird, sparrow, silvereye, kea, paradise duck, fantail, and one either tomtit or fantail. Eggs were twice seen being taken from hen houses.

Stoats are usually thought of as solitary, except when the female and her young form a temporary family bond. One litter a year is born, in late September or October, usually with 4-8 young in a litter. The distribution by month of 149 records of two or more stoats seen together (Table 3) confirms that families first appear in October, and may be large. Table 3 adds the previously unknown information that families may stay together until February. Of the few records of family groups which distinguished the adults and young by size, six mentioned one adult with smaller young, and one mentioned two adults with smaller young. Records of two stoats seen together came from most months from March to September. Many of these sightings were marked 'playing' or 'fighting' (often indistinguishable to the casual observer), so perhaps these winter 'pairs' were engaged in territorial disputes. Breeding in autumn and winter can be ruled out, because stoats have only one brief oestrus a year, in October or November.

In 1976 there was a moderate fall of seed in South Island beech forests. The temporary increase in numbers of both mice and stoats which followed, from mid 1976 to mid 1977, was documented by standardised trapping in Fiordland (King 1980, 1981), and in Nelson Lakes (R. H. Taylor, pers. comm.). In the following year, 1977-78, no beech seed was produced, and the numbers of mice and stoats caught dropped sharply.

In Fiordland, Arthur's Pass, and Nelson Lakes – all South Island parks with large areas of beech forest – from two to four times more stoats were reported per 1000 visitors in 1976/77 than in 1977/78 (Table 4). The difference was especially great in Fiordland, perhaps because the visitor centre there had a special display on mustelids in its front window (visible even when the centre was closed) from November 1976 to February 1977; but otherwise, all three parks gave the poster the same prominence in both years. At Mount Aspiring, also with large areas of beech forest and adjacent to Fiordland, more stoats were sighted in 1976/77 than 1977/78, but the numbers of visitors each year were not known.

The difference between the two years was less evident in the non-beech forest parks (Urewera, Westland) and ran strongly in the opposite direction at Mount Cook, where the vegetation is mostly open scrub and grassland. The Mount Cook data are an especially interesting contrast to Fiordland. As well as the number of visitors, the rangers there also record the number of rabbits shot in routine control operations. Numbers of rabbits began to build up from September 1976, and numbers of stoats in December and January 1976/77, when the young of the presumably unusually successful litters of October 1976 began to appear. This same pattern was observed in Fiordland after mice increased over the winter of 1976, and there we confirmed that the increase in numbers of stoats caught was due mainly to an exceptionally large crop of young stoats (King 1981). At Mount Cook the increase in numbers of rabbits shot in the summer and autumn of 1977/78 was matched by an increase in number of stoats sighted per 1000 visitors in the same period, which lasted until the rabbits were poisoned in September 1978. The removal of rabbits at the critical time for female stoats about to bear their young, and/or the effects of secondary poisoning, might be expected to reduce numbers of stoats sighted in the summer of 1978/79. Unfortunately, the present study finished in November 1978, and the cards and poster were withdrawn.

Table 3: Distribution of multiple sightings

No. stoats together	Number of sightings of > 1 stoat												
	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	
2	3	1	0	3	2	14	55	16	8	5	7	0	
3				1	1	4	8	1					
4				1	-	1	4	1					
5					1	2	3						
6					1	3	2						
7+						1							
Total multiple sightings	3	1	0	5	5	25	72	18	8	5	7	0	149
Total sightings reported†	27	28	25	45	50	220	741*	247	123	114	84	43	1747

† Counting multiple sightings as one.

* The very large increase in sightings reported from December to February is partly because more people visit parks during the long school holidays, especially in January, and partly because more stoats are available to be seen then (King 1980).

Table 4: Number of sightings per year: the effect of variations in abundance of prey on stoat populations

		UW	TG	EG	AT	NL	AP	WL	MC	MA	FL
Total sightings	1976-77	51	56	4	4	82	104	132	87	108	271
	1977-78	70	41	17	11	40	40	94	197	69	59
Thousands of visitors*	1976-77	19.3		84.8		6.7	18.0	89.5	87.0		23.5
	1977-78	20.4		81.9		6.0	15.2	81.7	91.1		21.3
Sightings/1000 visitors,	1976-77	2.6		0.05		12.2	5.8	1.5	1.0		11.5
	1977-78	3.4		0.2		6.7	2.6	1.2	2.2		2.8

* TG about 66 000/year; MA about 12 000/year; AT unknown; WL, Franz Josef centre only.

In 6 of the 10 parks, the number of stoats reported per 1000 visitors varied from about 1 to about 12, a relatively narrow range considering how many variables must affect the number of reports received (Table 4). At Abel Tasman and Fox Glacier (Westland) the poster was not displayed during the two years specified, and at Tongariro and Mount Aspiring there were no monthly estimates of visitor numbers. At Egmont the poster was displayed at Dawson Falls Visitor Centre and at Stratford Mountain House, but there had recently been a large-scale opossum poisoning operation which could explain the few sightings there in 1976/78. In February 1981, stoats were reported to be numerous again at Egmont.

Of 164 dead stoats reported, 37 were killed on the road (several alongside other carrion), 2 on the railway, 82 in traps (accidentally in opossum traps, or deliberately), 11 were shot, 7 killed by a dog or cat, 4 drowned, 1 believed poisoned by cyanide paste (used by opossum hunters), 2 hit with a rock or stick, and 16 died of unknown causes. Once was carried off by a harrier, and another photographed in the talons of a New Zealand falcon. A surprising number of observers (28, i.e., 17 percent) deliberately tried to or actually killed the stoats they saw. This probably reflects the widespread hostility towards stoats in New Zealand, where they are introduced and commonly believed to harm native bird life. Other observers, actually witnessing a kill, identified with the prey rather than the predator, whether or not the prey is considered to be a pest in its own right. For example, one stoat outside the Mount Cook Post Office attempted to kill a rabbit, which was saved by the postmistress; yet Mount Cook rangers spend considerable effort on controlling rabbits in the park.

Rangers reported considerable interest in the survey. Overall, the cards give an interestingly different view of the life of a stoat, compared with that obtained from dissecting dead ones. They also tell us something about the attitude towards stoats of many people in New Zealand.

Falcon with stoat, taken at the mouth of the Worsley River at the head of North Fiord on Lake Te Anau. A. Cragg.

Some of the observations merited publication as field notes, although few of the observers would think of writing them up. The frequently hostile attitude towards stoats of people in New Zealand was also once strongly held by gamekeepers and birdlovers in the northern hemisphere; and it still is to some extent, though less than in the last century, and less than in New Zealand, then and now. With greater knowledge of the ecology of birds and their predators, a more informed and rational attitude should eventually prevail.

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