CURRENT CHANGES TO VERTEBRATE PEST MANAGEMENT IN NEW ZEALAND

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ABSTRACT: Vertebrate pest control in New Zealand is changing as a result of a reduction in state funding. Monetary assistance for control programmes is being withdrawn at $0.8 million per year and currently is $5.4 million. This reduction affects several parts of the organization and the Agricultural Pests Destruction Council has initiated various programmes to rationalize control. The major effect of reducing assistance is that the landowners have to contribute more money. The necessity of blanket control of rabbits is now questioned and two investigations are underway to determine the extent of the areas where rabbit control is required and demonstrate the effects of withdrawing any form of control from certain land classes.

A national recording scheme is being implemented and computerization with a common format will enable pest districts to pinpoint problems and the APDC to summarize the national scene.

Changes in technology have enabled the work force involved in control to reduce from 1200 (1972) to 400 (1986) with no apparent increase in reported pest problems. These changes include increased mechanization of bait manufacture, improvements in ground-laying techniques from 4-wheel drive vehicles, motorcycles and use of fixed-wing aircraft or helicopters. Increased reliance is placed on Rhodamine bait trials for deciding whether poisoning programmes go ahead and trials of anticoagulants for rabbit control are continuing.

An Environmental Impact Report on the introduction of rabbit fleas and the virus myxomatosis was commissioned by the APDC but not submitted for audit because of public opposition, uncertainties in performance, and perceived technical problems relating to the establishment of the rabbit flea in parts of the problem areas.

INTRODUCTION

Like many other pest control organizations in the world, we in New Zealand are also in the state of change.

Animal control is carried out by two organizations:

1. The New Zealand Forest Service, which is responsible for animal control on occupied and unoccupied crown land plus national parks.

2. The Agricultural Pests Destruction Boards which are responsible for the control of pests on all rateable land in New Zealand.

This year the New Zealand Forest Service is being abolished, its animal control organization will become part of a new Ministry of Conservation, and other than that, its future is uncertain. In agricultural pest destruction, the Government is steadily reducing their financial input, thereby forcing changes to the organization.

The Government contribution to pest destruction was frozen for 4 years in the period 1981-84 at $7 million N.Z. ($3.5 million U.S.). Then in 1985 and 1986 it was reduced by $0.8 million N.Z. ($400,000 U.S.) per year to $5.4 million. At the present stage the money will continue to reduce yearly by $0.8 million to zero or to be pegged at some unknown cut-off point in the future.

This decreasing Government contribution and an inflation rate of over 10% per year has forced the ratepayer contribution, in many cases, to more than $1 N.Z. per hectare per year. Current cost of pest destruction on rateable land in New Zealand is $14 million N.Z. ($7 million U.S.). The increased costs are making many ratepayers question the need for the level of rates, and this in turn is forcing Pest Destruction Boards and staff to look at where pest control is needed and methods of reducing costs. Some boards are calling for management plans to be prepared, plus looking at the rating system currently on their boards. Historically, pest board rates were struck on the ability to pay; this is changing with emphasis. Now on making the user pay, the land that needs regular pest control will pay a higher share of costs. It is interesting to note, as costs force staff numbers down, and labour-intensive work has been reduced, the pest problems haven't increased and generally the level of pests is as low as it ever has been for a number of years.

Vertebrate Pest Management has been discussed in our organization quite a lot in the past 3 to 4 years; and while responsible staff and ratepayers accept its concepts, there are still many that believe the only target to aim for is eradication of the pests. The other area of change is in the approaches and techniques of pest control. This paper outlines the changes undertaken, proposed, and their effect on pest management in New Zealand.

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New Zealand is approximately two-thirds the size of California and consists of two main islands with a total area of approximately 27 million hectares (66 million acres). Fourteen million hectares (36 million acres) are developed for mainly pastoral farming while the rest is either hill or mountain country covered with forest, scrub or similar cover. The main types of farming are sheep, cattle and dairy, though deer and goat farming are increasing. Crops, fruit and nurseries occupy approximately 0.4 million hectares with many types of subtropical fruit being grown for the export market. The Agricultural Pests Destruction Council, for whom I am Field Adviser, is responsible for the control of rabbits (Oryctolagus cuniculus), hares (Lepus capensis europaeus), possum (Trichosorus vulpecula), wallabies (Macropus eugini; and M. rufogriseus), and rooks (Corvus frugilegus) on all rateable land in New Zealand. Some work is also done on Crown Land on a contract basis.

Some of the major changes that are occurring in the control of these pests are:

1. Modifying techniques by either more use of mechanization or by other baiting strategies.
2. More use of bait trials, particularly Rhodamine bait trials to assess bait acceptance.
3. Classification of all rateable land in New Zealand into prone and nonprone land for all pests.
4. Mapping all farm properties to assist with planning of control work and the identification of problem areas.
5. The setting up of a system to computerize field records in New Zealand over the next few years so that all control work records can be assessed.
6. The introduction on a large scale in various areas of New Zealand of the total withdrawal of all rabbit control for an initial trial period of 5 years.
7. Increasing assessment of pest population changes in areas that are currently controlled.
8. Introduction of a higher level of staff training which will be a prerequisite for new staff before acceptance to permanent staff.
9. Looking at other vertebrates to see whether there will be a need to continue these in the future.
10. Consideration of myxomatosis as a control method.

CHANGES IN VERTEBRATE PEST MANAGEMENT

Changes in Techniques

Control techniques over the years have changed considerably, and the pest poisons like arsenic trioxide and strychnine were used but have been phased out on humane grounds. The use of dogs, traps, ferrets, rifling and vehicle nightshooting have been reduced due to labour costs involved. The main methods now used are:

Rabbits - 1080 poison on oats, carrots, and pellets; motorcycle nightshooting, fumigation (Larvacide).

Possums - 1080 poison, pellets, carrot, paste (jam), plus some cyanide paste.

Wallabies - 1080 poison, pellets, and carrot; ground and helicopter shooting.

Hares - Mainly motorcycle nightshooting.

Rooks - DRC 1339 on bread, maize, walnuts, and brown beetles.

Bait application has been mechanized as much as possible, both in bait preparation and methods of application.

Bait Manufacture

Pollard pellets of various types are produced by a commercial company and two factories owned by Agricultural Pests Destruction Council.

New machinery has been developed to produce regular-shaped carrot baits, and large-scale oat bait production is mechanized.

Bait Application Methods

Bait can be applied in a number of ways including helicopters and fixed-wing aircraft and 2- and 4-wheel vehicles.

Helicopter companies have developed some versatile underslung buckets that are capable of applying oats, pellets, and carrot at various application rates, and these buckets are loaded mechanically very quickly. Fixed-wing aircraft can also effectively lay oats, carrots, and pellets, and have been fitted with various types of agitators to keep bait flowing from the hopper.

Quite a variety of bait applicators and ploughs have been developed for 4-wheel drive vehicles to lay bait. Likewise bait feeders and ploughs can be fitted directly to the motorcycle, or other types that can be towed by them. Also developed are spitting devices that turn over the earth, spit at regular intervals and apply the bait.

Three- and four-wheel motorcycles are now starting to replace 4-wheel drive vehicles, as are 4-wheel drive tractors, and these can be fitted with bait applicators. This mechanization became necessary because staff has been steadily reduced over the years from 1200 (1972) to 800 (1978) and 400 (1986), and reductions to 200 to 250 may occur in the next few years.

Poisons Used

Ten eighty is still our main poison used for pest control. Current annual use is between 1 to 1.5 tonne of 1080, depending on the amount of possum control for bovine tuberculosis. At the present time there is a tender being called for 3 tonnes of 1080, and this will probably be purchased from U.S.A. Our current stock of 1080 will be over 5 tonne and subsequently annual useage will be replaced. The only other poisons widely used in New Zealand are cyanide paste (possum control) and brodifacoum. The latter proved very successful, but at the present time it is restricted for use on land that is not grazed by stock. This has limited its use to horticulture and, to a lesser degree, urban areas.

Poisoning Techniques

Current techniques of poisoning rabbits is for two pre-feeds prior to the toxic application, and with possum control, one or no pre-feeds. At present we are testing baiting strategies; and if it is possible to reduce or cease pre-feeding, then cost savings would be high.

Several field trials have evaluated one-shot oat poisoning as used in Australia, and this looks promising.

Bait Application

With rising costs of labour, mechanization of bait application has assisted in the poisoning of large tracts of land, and aerial application by fixed-wing and helicopters is still the most economical method of bait application by vehicle. Motorcycles are still used where farm size or practice makes aircraft use impracticable. Staff have developed very efficient ploughs and mechanical layers that lay bait from motorcycles and these are being improved all the time.

While staff generally have used simple bait preference trials before most poison operations, Rhodamine bait acceptance trials are now more widely used. These trials involve pre-feeding twice a 10 to 15 hectare representative sample of the proposed poison area, then laying bait dyed with 0.04% Rhodamine. Two to 3 nights after that bait application an optimum sample of 40 animals is shot with silenced .22-calibre rifles for screening under portable U.V. lights. This method has shown us the wide variation in some areas of the acceptance of bait over a period of time and this can vary from 20% to more than 90% over a 2- to 3-month period. It also shows that in some problem areas a 90% plus result only occurs once every 1 to 2 years.

All toxic bait in New Zealand must be dyed green to a standard specification for bird protection. As dyes are withdrawn from the market, trials of different companies' green dyes are carried out.

Classification of Land for Pest Proneness

The object of this classification is threefold:

1. To identify areas of land that need pest control operations so that agricultural production is protected.

2. To define areas in priority order which could be used as a basis for distribution of any government financial input.

3. To create a management tool for changed land use, e.g., provide a basis for pest boards to classify land for rating purposes.

A project team between Agricultural Pests Destruction Council and Ministry of Agriculture & Fisheries Rabbit Research Group, has been set up to carry out this project in the coming year.

There are 96 pest boards covering the rateable land in New Zealand, and the degree of rabbit infestation varies from board to board; therefore different amounts of effort to assess their actual proneness will be required. The survey will incorporate all pests, i.e., rabbits, possum, rooks, wallabies, and hares. Previous work by M.A.F. Research on two boards provides a background model of how pest boards can be partitioned and suggestions of rating changes to reflect the work apportioned to different districts. Already maps have been prepared by research showing the board boundary, 915 (3000 ft) contour, introduced and native forest, and areas specifically classified by the National Water & Soil Conservation organization criteria. These classes of land are non-rabbit prone.

All pest boards are currently summarizing, on prepared sheets, all field records, over the 3-year period April 1982 to March 1985. These computerized records will show yearly tables of hours worked on

any property in their district, a breakdown of where poisoning was done, method used, infestation level, hours spent, and area covered. Information on control of possums, hares and other pests is also being recorded to give indication of the distribution.

1. Grouping areas poisoned in each district at various times between poisons. These can then be examined for correlations with soil--land use, stock-carrying capacity--and provide possibly a predictable basis for future expansions and reduction in risk classification.

2. Trouble areas in various categories would provide useful data for distribution of Government money.

3. Alert the organization and boards where further work or checking is required, or potential problems.

The initial data base will provide a more precise population-density index for the country than is currently available. The maps will also show where other pests are destroyed, and this will indicate the range of problems on a national and regional basis. As rabbit, possums, and hares damage soil and erosion plantings, the organizations responsible for these plantings are supplying planting information over the last 3 years, and forecast planting for the next 3 years. Information on other pests, e.g., rodents, birds (seagulls), feral and domestic geese, Canada geese, swan, pigeons, sparrows, plus hedgehogs and goats, that may affect catchment plantings--pasture, crops, horticulture, and forest--will be collected. It is interesting to note that already senior staff when extracting these data from their records, question why they did certain work! Once this project is completed, it is likely that all subsequent field information will be put into computers so that records are kept up-to-date.

An example demonstrates how computers can help us is in our rook control programme. At the same time each year for the last 6 years, all rookeries in New Zealand have had their nests counted and the results entered into a computer. In addition, results of poisoning operations, including nontarget species destroyed, are also recorded. This enables us to have not only a fairly accurate idea of the number of rookeries and rooks in New Zealand but also records of nontarget deaths. This system has proved invaluable to our organization, both in gauging the size of the problem and the effectiveness of control operations (Appendix I).

Mapping

Currently we are persuading all pest boards to map each property on their boards, and indicate fences, cover, and other features that will enable new employees to find their way about the property. All boards are zoning their areas into work zones and giving each property a unique number. This will mean in the future that an accurate identification of any parcel of rateable land will be possible.

Computerization

The Agricultural Pests Destruction Council has employed computer consultants to develop and introduce a computerized field research system into New Zealand. This required a standard time sheet and a standardized code identifying techniques. The system is being introduced to assist senior staff in sound vertebrate pest management decisions in the future. This, tied with the Pest Prone Survey, will allow more accurate identification of the true problem areas of New Zealand. These, in turn, can be studied to see why they are problems.

Limited Control

The APDC became involved in limited control trials in 1984. They realized that reorganization of the industry using vertebrate pest management procedures needed a knowledge of those areas of New Zealand that didn't require regular control operations. They also needed to convince a range of boards and ratepayers that certain classes of land do not require work. MAF rabbit research experiments on limited control on two areas of New Zealand had shown that some land didn't require any work over a 10-year period. Not all people accepted these experimental results because of their small area (1800 ha) and their location.

The purpose of the limited control programme is to introduce the concept to a select number of boards, covering various cover types, soil and farm practices, and weather patterns. Each programme will be implemented for a minimum period of 5 years.

The minimum area per board on which all rabbit control is withdrawn over a period of the trial is 20,000 hectares and the only work allowed is:

1. Patch poisoning of high-value crops (horticulture, tree planting, etc.).

2. Patch poisoning of new grass and crop paddocks if damage occurs.

3. Control of public areas, golf courses, parks and within town boundaries.

At present 8.5 million hectares are controlled by nightshooting and the limited control demonstrations will show that this work is ineffective in most cases and so unnecessary. Currently there are 350,000 hectares in five areas of New Zealand where control has been withdrawn and this year a proposal to consider another 400,000 hectares. It is likely that by early 1987 up to 1,000,000 hectares could be involved in these experiments.

In the trials, spotlight count routes are placed in each area to cover approximately 10% of the area involved. The actual selection of the count routes is by the following criteria:

1. Properties that have historically produced the highest rabbits shot per hour over the last 5 years.

2. To cover a variety of farm types.

3. To ensure a reasonable distribution throughout the area.

4. To ensure that the properties of any farming leader in the district are covered.

Each route is at least 20 to 25 km in length with the only basic restriction being a length that can be counted in 3.5/4 hours in one night. The routes are permanently marked with reflector tape for ease of recounting. Each route is counted a minimum of three times as closely as possible to each other by the same person using the same powered light travelling at a similar speed at the same time of the evening each occasion. The information is recorded on a special sheet and covers weather, ground conditions plus all vertebrate pests seen (Appendix II).

All routes are mapped and are counted annually at the same time of year when the population is at its lowest, i.e., outside the breeding season. Currently the no-control areas are being overmonitored but at a later date some routes will be dropped or only counted every second year. Additional count routes are also placed outside the trial area to monitor the effect of the control operations boards are still carrying out. Currently there are approximately 90 count routes on 220 properties with a count route length of over 2000 km. All this spotlight monitoring is carried out on motorcycles by staff trained in the technique.

Monitoring of Pest Populations

Over the last 2 to 3 years, staff have been monitoring pest populations far more. In much of the rabbit problem areas there are a number of permanent county routes in place. These are used for pre- and post-poison counts, and to monitor changes in pest populations. With rabbits, there is a need for far more permanent routes throughout New Zealand.

At the present time, other than rooks, we have no national monitoring of pest populations.

Staff Training

The industry has had a training scheme for staff who are interested in increasing their knowledge of pest control, as well as a small cadet scheme. Consideration is now being given to making training compulsory in the industry. To this end a training directorate has been established and a training officer appointed with an objective of introducing training at all levels. No new staff members will become permanent staff until a certain level of training has been obtained. They then have an option of continuing training to:

1. A Certificate of Pest Management.

2. A Diploma of Management (Agricultural Pests).

The diploma will remain in force providing the holder attends a refresher course every 2 years.

Other Pest Control

As well as the pests already listed, most pest board staff carry out the destruction of wasp nests.

The organization is currently holding discussions on accepting responsibility of bird control on all secondary airports in New Zealand. The likely procedure is that the airport superintendent will contact the pest board if he has a bird problem, but all poisoning will be by a few specifically trained staff working to rigid guidelines as in our rook control.

With the massive increases in horticulture, it is likely in the future that rodents and birds will also become part of our brief.

Myxomatosis

There was a move in early 1985 to reintroduce the virus myxomatosis as another means of rabbit control. This time it was planned to introduce also the European rabbit flea as a vector. The failure of the virus introduction in 1951 to 1953 was thought due to the apparent lack of a suitable vector.

The Government directed the APDC to prepare an Environmental Impact Report on the proposal before any decision was made. This report was completed in October 1985 but the APDC, after considering it, recommended to the Government not to proceed with the audit of the report at the present time. The APDC stated that its decision was based on new information brought out relating to:

1. Evident technical problems, particularly those related to the ability of the European rabbit flea to become established in some parts of the rabbit problem area, and the lack of support of another vector.

2. Uncertainties about its performance in New Zealand conditions.

3. Substantial public opposition.

4. Its introduction at this stage may jeopardize effectiveness of myxomatosis at a later date.

The APDC remains of the view that myxomatosis is a control weapon which must be kept in reserve against the possibility that one day its use might be absolutely essential. The current uncertainties about its possible performance and consequences may well be removed by continuing overseas research.

It was interesting to note that the opposition to the proposal was mainly from animal welfare and urban populations. This informs us of the danger all animal control agencies are in, being subject to the whims of the uninformed and unenlightened public. Little do these people realize there is a need at times to control pest animals when they reach a certain threshold.

Most control staff wish to carry out control as humanely as possible, most are animal lovers in the true sense of the word, and are far more true environmentalists than many of our critics.

ACKNOWLEDGMENT

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APPENDIX I

Example of the computer printout on two rookeries.

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N0011RISSINGTON          B12441383439A1921EX060701
ABSOLUM & SHERRETT       H04011
0142 1056
0132 0965
0133 0969
0043 0975
0014 0976
0037 0978
0093 0979
0050 0980
0000 0981
0000 1082
N0012OKAWA A             H13441243326C1954EX0102
LOURY T C                H04012
0037 1056
0022 0965
0063 1067
0104 1068
0130 1069
0173 1072
0229 0975
0024 0976
```

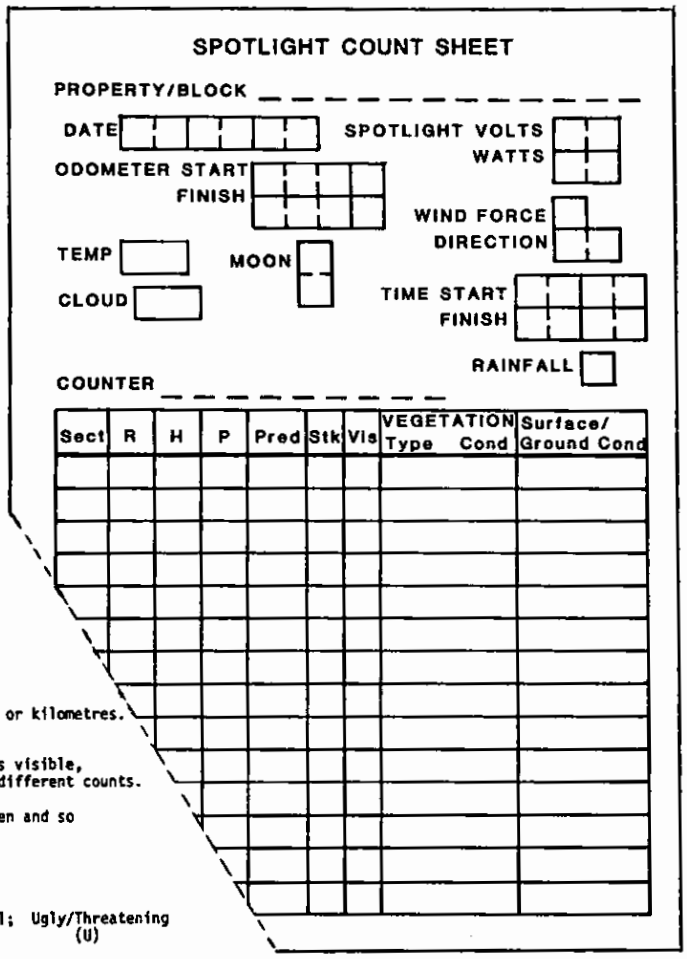
National rook survey--comparison between three years (1982-1983-1984).

	Number of nests			Estimated number of rooks			Occupied Rookeries			Extinct Rookeries		
Board	1982	1983	1984	1982	1983	1984	1982	1983	1984	1982	1983	1984
Ashburton	99	134	85	346	469	297	5	3	5	11	13	13
Banks Peninsula	736	774	943	2208	2709	3300	17	17	21	4	6	8
* Cent. King Country		3	–		7	–	–	1	–	–	–	–
East Coast	8	12	–	25	42	–	2	3	2	5	7	10
East Otago	49	59	76	171	196	266	3	3	3	4	4	4
Hawkes Bay	3017	1865	1852	10560	6528	6482	94	92	89	118	123	131
Kaikoura	–	4	–	10	14	20	–	1	–	1	1	1
Manawatu	–	–	–	3	–	–	–	–	–	3	3	3
Marlborough	–	–	–	–	–	–	–	–	–	3	3	3
Matamata Cty	–	–	–	–	–	–	–	–	–	8	8	8
Piako Cnty	–	–	–	–	–	–	–	–	–	2	2	2
Plains	259	123	171	906	431	599	7	7	8	52	52	54
Rodney Cnty		–	1	–	–	3	–	–	1	–	–	–
Ruahine	17	13	24	60	45	84	3	1	2	16	18	18
Selwyn	12	12	8	36	42	28	1	1	1	–	1	1
Sthn. Hawkes Bay	4441	3996	4323	15561	13986	15130	143	141	144	88	97	101
South Otago	3	–	1	40	–	3	1	–	1	–	4	4
* Taihape		–	–	–	–	–						
Tuapeka	–	–	5	–	–	17	–	–	1			
Waikato & Hauraki	27	28	30	91	98	105	4	3	2	1	2	3
Wairarapa	140	176	260	490	616	910	10	12	13	12	12	15
Western	4	–	–	8	0	–	1	–	–	9	10	10
TOTALS:	8812	7199	7749	30515	25183	27139	291	285	293	337	366	389

* No Returns 1984

APPENDIX II

An example of special count route sheet.



An explanation of the factors and codes used to fill in the spotlight count record.

FILLING IN THE SPOTLIGHT COUNT RECORD

Please print and ensure that figures are legible.

Fill in the front of the count sheet before starting.

Count Route: Correct identification of property and route.

Start and Finish Times: Twelve hour clock.

Odometer Start/Finish: Record to 1/10 units and also whether miles or kilometres.

Spotlighting: Voltage - 6 or 12 volt system.
Wattage - variation in bulb's wattage affects numbers visible, and if changed affects comparison between different counts.

Counter: Name important as change in counter can affect numbers seen and so account for variation.

Temperature: Record Very cold,; Cold; Mild; Warm.
(VC) (C) (M) (W)

Cloud: Record Clear; Part Cloudy; Cloudy; Overcast; Gloomy/Dull; Ugly/Threatening
(B) (PC) (C) (O) (G) (U)

Rainfall: Record significant rainfall in the previous 6 hours as Yes or No.

Wind Force: Record as a figure 0-7.

0	Calm	- Smoke rises vertically.
1	Light air	- Smoke indicates direction.
2	Slight breeze	- Leaves rustle, felt on face.
3	Gentle breeze	- Leaves, twigs in constant motion.
4	Moderate breeze	- Causes dust and loose paper to be blown around.
5	Fresh breeze	- Small trees sway.
6	Strong breeze	- Large branches in motion.
7	Near gale	- Whole trees in motion - too strong to count rabbits.

Wind Direction: Record N, NE, E, SE, S, SW, W, NW. Leave blank if force is zero.

Amount of Moon Visible: Record 0, 1/4, 1/2, 3/4, 1.

Sector: Identify each section; this can be 1 km long, or distance between gates etc. that have been marked on the route map.

Rabbits (R), Hares (H), Possums (P): Record actual number seen in each sector.

Predators: Record using a letter to identify the species, e.g., one cat - 1C, Two ferrets - 2F.

Cat; Ferret; Stoat; Weasel.
(C) (F) (S) (W)

Stock: Record if stock on sector of route has affected the count (Y). A blank indicates no stock disturbance.

Visibility of Rabbits: A combination of weather and pasture factors.

Record Excellent; Good; Poor; Uncountable
(E) (G) (P) (U)

Vegetation: (VEG) Type - Record Pasture; Crop; Cultivated; Trees.
(P) (C) (W) (T)

Surface/Ground Conditions:

Record - Surface/Ground conditions in each sector.

Dry; Dew on dry ground; Wet; Slushy; Frost.
(DR) (DD) (WE) (SL) (FR)

Any changes in rainfall in each sector. Leave blank if no rainfall.

Trace; Drizzle; Rain; Showers; Mist.
(T) (D) (R) (S) (M)

e.g., wet with mist is recorded as (WE M).
