Managing bird damage to fruit and other horticultural crops

A bird management plan provides a grower with the appropriate information on which to base decisions on how best to manage losses due to pest birds. The level of detail required for a plan will vary according to the nature and scale of both the property and the bird problem.

Set out below is a checklist of the type of information a grower needs to collate to develop a property specific plan, followed by a sample plan for a fictitious property. These are provided as guides only and are neither exhaustive nor intended to be prescriptive.

Checklist of information to develop a bird management plan

Note: detailed guidance on options for measuring and managing bird damage can be found in Chapters 3–7 and Appendix A*.

Property map

Prepare a property map (see Figure FS.1) showing the location of:

- different crops grown;
- varietal blocks;
- surrounding vegetation;
- property features relevant to bird damage
  - powerlines
  - roads and tracks
  - dams, damp or swampy areas, other watering points
  - sheds and farm buildings, especially those used for grain or fodder storage;
- sensitive areas such as
  - property owner's house(s)
  - neighbours' houses
  - nearby townships
  - horse stables and dairys;
- where most damage occurs on individual blocks;
- bird flight lines;
- areas most frequented by birds ;
- areas of high human activity; and
- alternative feed.

Bird problem

Which species cause damage

- list the pest bird species known to visit the property;
- note which species are causing damage in each crop or varietal block;
- rank them in order of importance based on estimated damage caused; and
- determine a pattern of presence for each species
  - those present most of the year (resident)
  - those present only as the crop ripens (migrant/nomad)
  - those present at other specific times.

When does damage occur?

- record expected harvest dates for each crop or varietal block;
- record when damage starts; and
- if possible, compare the data to previous years to establish any patterns.

* Where this factsheet is provided separately, please note that it is an extract from, and makes reference to: Tracey, J., Bomford, M., Hart, Q., Saunders, G. and Sinclair, R. (2007) *Managing Bird Damage to Fruit and Other Horticultural Crops*. Bureau of Rural Sciences, Canberra

What is the cost of bird damage on the property?

If the information is available, collate:

- record(s) from previous years experience; and
- an ongoing record of what is happening in the current year/season.

Estimate for each year:

- the tonnage of crop lost due to birds;
- the total value of the tonnage lost; and
- the value of loss due to dockage for reduced quality of fruit due to birds.

Estimate the cost of bird control activities including:

- depreciated cost of any equipment used for bird control;
- consumable items (fuel, ammunition, gas etc.); and
- labour (include own labour costs).

From the above, calculate the annual cost of bird damage to the business (see Table FS.1).

Management resources

List the bird management resources/techniques available for use on the property, for example:

- visual scarers; e.g. hawk-kites, scarecrows, eye-spot balloons, plastic bags on poles, streamers, shiny tape, air-filled 'scarey-man';
- static noise scarers; e.g. firearm, gas gun, electronic and bioacoustic bird scarers;
- noise scarers combined with movement; e.g. motor bike without a muffler, model or real aircraft, barking dog trained to scare birds;
- exclusion netting;
- habitat management; e.g. decoy feeding, sacrificial crop, strategic mowing, pasture management, irrigation, revegetation; and/or
- culling.

Management and monitoring strategies

Select management strategies to address damage caused by resident and migrant/nomad pest bird species.

Aims

Set a quantifiable aim(s) against which results of management can be compared to measure success; for example, a defined percentage for:

- reduction in the loss of crop;
- increase in yield;
- reduction in current control costs; and
- increase in profit.

Management actions

Prepare separate action lists for resident and migrant/nomad pest bird species.

List the actions to be taken to achieve the aim(s):

- what resources/techniques (of those listed above) will be used to manage the main pest species;
- when will these resources/techniques be used;
- how will these resources/techniques be used (e.g how often, in what order);
- how will the ongoing effectiveness of each resource/technique be maintained;
- where will the resources/techniques be used; and
- who will be responsible for ensuring that these actions are carried out.

Monitoring

Document the monitoring of:

- the management resources/techniques used;
- the actions that have been implemented; and
- what needs to be done to improve the effectiveness of both the resources/techniques and the actions.

Monitoring records could include:

- an estimate of loss from the same place(s) within the crop on regular occasions throughout the season/period; and/or
- a regular estimate of the number and species of birds feeding on the crop at a particular time of the day.

Communications

The following information should be recorded as part of the plan:

- list all neighbours to the property and their contact details; and
- list with contact details facilities that may be affected by management actions (particularly noise) on the property e.g. schools, hospitals, horse studs.

Record what information will be supplied to neighbours:

- name(s) of property owner/manager; and
- contact details including mobile and after hours phone numbers.

List what action will be taken to notify neighbours:

- prior to implementing the management plan;
- while the plan is activated; and
- if unusual circumstances arise.

List the method of communication to be used:

- phone call
- fax/e-mail
- personal visi
- letterbox drop
- record the date neighbours are contacted.

List what action will be implemented as a result of a complaint by a neighbour and record what action was undertaken.

Sample Bird Management Plan*

This sample plan for a *fictitious* property has been prepared to assist growers in developing their own property-specific bird management plan. It contains more narrative and greater detail than most growers would be willing to set down on paper because the intention of presenting it this way is not to tell growers what to do, but rather to suggest the type of information that could be put into a plan of their own. Although the plan is for a vineyard, the principles it contains will be similar for most horticultural properties.

BIRD MANAGEMENT PLAN
FOR "ORANA" VINEYARD

O'Briens Rd, Ashenville SA 5111
Owner/Operator: J & C Smith
Ph: (05) 8390 0000

"Orana" is a 25 hectare property with 15.5 hectares of grapes in a grape growing district of South Australia. A small seasonal creek runs through the middle of the property. There are open pasture paddocks to the west, native scrub and a powerline on the east, a neighbouring vineyard owner's house to the north-west and a non-producer's residence to the north-east across O'Briens Road.

PROBLEM DEFINITION

a) Where does damage occur on my property?

So that I can see where to put my major effort and devise suitable management actions, I have marked a map of my property (Figure FS.1) with the:

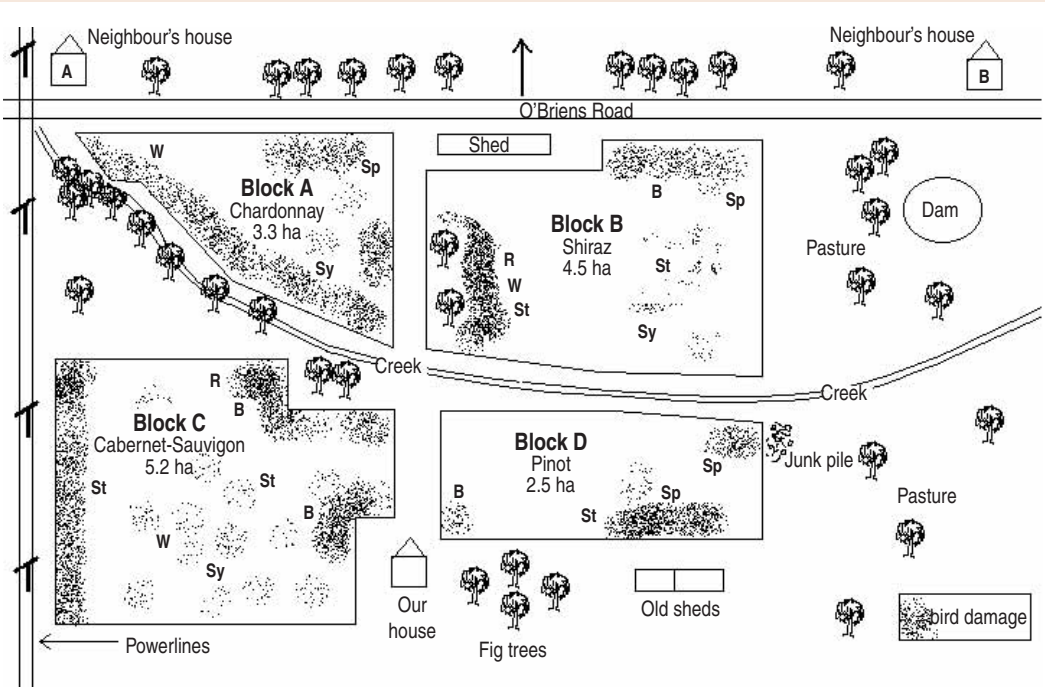
- different varietal blocks;
- features that I think contribute to damage — e.g. a powerline; patches of native scrub along the creek; other structures birds use as cover before entering the crop (e.g. road-side feral olives and boxthorns, a junk pile with a lot of old wire netting, an old shed where sparrows and starlings roost in the roof etc); several large isolated trees used as launch sites;
- features that I think reduce damage (e.g. areas of high human activity near the packing and machinery sheds);
- areas that might offer alternative food (several old fig trees and a pasture paddock adjacent to a dam); and
- potential noise sensitive areas such as the neighbours' residences.

I know from previous years, which parts of the different blocks get the most damage and the areas that seem to be in birds' flight paths – these have been shown on the map.

b) Which species cause damage and what damage do they cause?

Last year I spent some time early in the mornings when the grapes were ripening to watch and record who was doing what in the vineyard. This allows me to prioritise species against which to direct my best efforts. I recorded rosellas, wattlebirds, starlings, silvereyes, crows, grey currawongs, magpies, blackbirds, sparrows, red-rumped parrots and goldfinches in the vines. I did not see magpies, red-rumped parrots or goldfinches doing any damage. Although I could hear currawongs calling and occasionally saw them in the vines, I decided that they, like the crows, were few in number and I could give them a low priority. In the table below, I have ranked the main species according to nature of the damage they cause and my visual estimation of the amount of that type of damage in each block in previous years. I noted whether I thought birds were residents or migrant/nomads.

* Where this factsheet is provided separately, please note that it is an extract from, and makes reference to: Tracey, J., Bomford, M., Hart, Q., Saunders, G. and Sinclair, R. (2007) *Managing Bird Damage to Fruit and Other Horticultural Crops*. Bureau of Rural Sciences, Canberra



Block	Species	Resident or Migrant	Priority	Grape damage
A	Wattlebird	M	1	Neat 3-5 mm peck or hole or completely hollowed out fruit leaving skin only
	Rosella	R	1	Bite across fruit, often leaving seeds
	Silvereye	M	2	Small 1-2 mm triangular peck or hole
	Sparrow	R	2	Skin torn, fruit partly squashed, damaged fruit on ground under vine
	Blackbird	R	2	Fruit cleanly plucked off
B	Starling	M	1	Fruit cleanly plucked off
	Silvereye	M	2	
	Rosella	R	3	
	Wattlebird	R	4	
	Blackbird	M	4	
	Sparrow	R	4	
C	Starling	M	1	
	Blackbird	R	2	
	Wattlebird	M	3	
	Rosella	R	3	
	Silvereye	M	3	
D	Sparrow	R	1	
	Starling	M	2	
	Blackbird	R	3	

MAP KEY

B = Blackbird
R = Rosella
Sp = Sparrow
St = Starling
Sy = Silvereye
W = Wattlebird

Figure FS.1: *"Orana" property map and species prioritisation.*

Starlings and blackbirds together probably account for more individual fruit loss (i.e. plucked fruit) than do wattlebirds, rosellas, silvereyes and sparrows (pecks, bites and tears) but the damage from these latter birds probably costs me more because they leave the damaged fruit on the vine to be harvested. In addition, the damaged grapes allow rots to develop which spread to undamaged grapes and this can be sufficiently widespread to result in significant down-grading of fruit at the winery.

c) When does damage start?

The first signs of damage on each of the four grape varieties on my property usually appear 6-7 weeks before harvest. I have noted on a calendar below when to expect damage as this allows me time to prepare management actions including:

- purchasing scaring items such as eye-spot balloons and hawk-kites;
- constructing scaring devices like scare-crows;
- testing existing equipment, e.g. gas-gun, electronic scarer;
- obtaining a Destruction Permit from the relevant State Government agency (see Appendix E*) in case I need to shoot a few rosellas; and
- talking to my neighbours to give them information about what I will be doing, when it will happen and why I need to do it and to give us the opportunity to sort out any relevant issues.

d) How much do birds cost me?

The amount I am willing to spend on bird management is governed by the losses I am sustaining. This is made up of the value of the yield lost, dockage by the winery for reduced quality and current control costs. Based on last years figures:

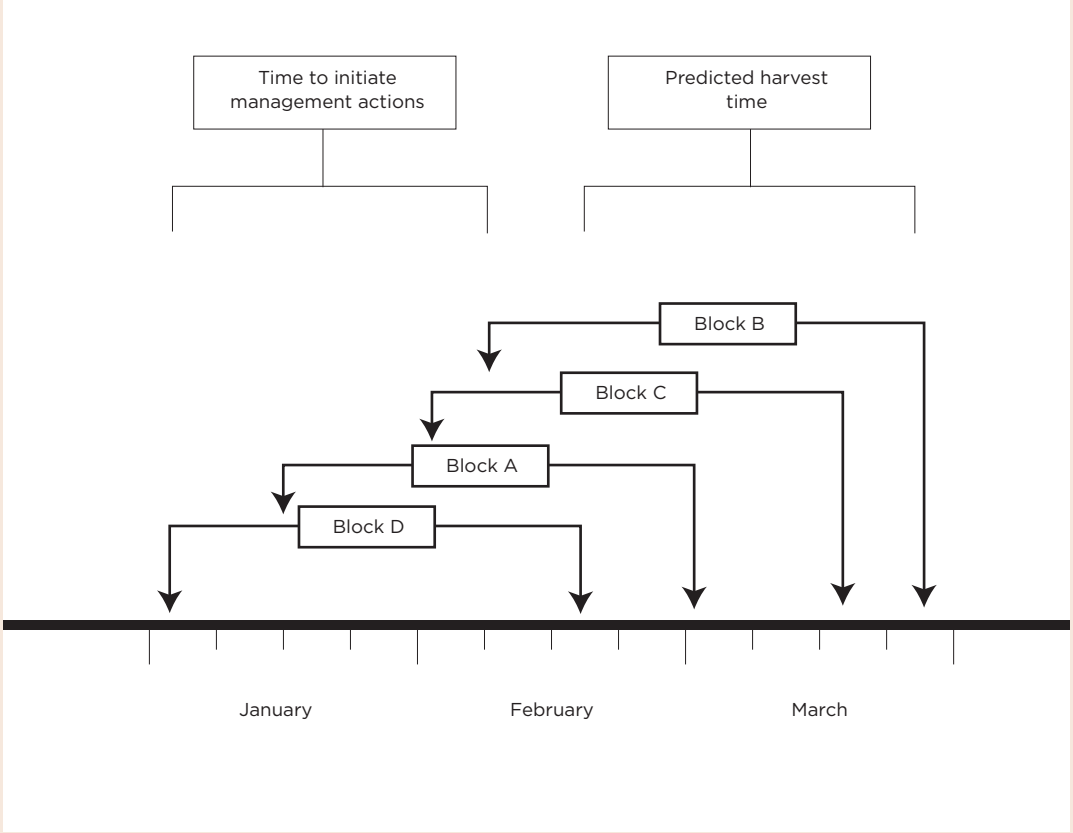


Table FS.1: *Yield lost and dockage.*

BLOCK	Area (ha)	Total yield (t)	Damage (%)	Tonnes lost	$'s lost
A	3.3	11.6	9	1.1	4,490[1]
B	4.5	21.7	6	1.3	2,470
C	5.2	20.2	3	0.6	1,100
D	2.5	9.0	5	0.5	600
TOTAL				4.4	**8,660**

1 This loss includes a $250/t dockage at the winery for excessive bird-damaged fruit and botrytis.

Table FS.2: *Current control costs*[2]

Capital Items	**Cost**
1.5 ha Bird netting (10 m wide x 3000 linear m x $0.30/m^2)	(over 6 yrs) $1,500
2 x Gas-guns with timers @ $1,000 ea	(over 10 yrs) $ 200
1 x Shot gun @ $600	(over 10 yrs) $ 60
1 x Electronic scarer @ $1,500	(over 10 yrs) $ 150
2 x hawk-kites @ $200 ea	(over 4 yrs) $ 100
4 x eye-spot balloons @ $75 ea	(over 4 yrs) $ 75
Running costs	
1 x person for bird control (4 hrs x 6 days/wk x 11 wks @ $15.00/hr)	$3,960
Net application and removal costs (labour + equipment)	$ 700
800 km mileage (depreciation, fuel, insurance) for 4WD ute @ $0.58/km	$ 460
Labour to make 2 scarecrows	$ 75
Consumable items	
Gas for gas-guns	$ 100
1000 x Shot gun shells	$ 250
100 x Birdfrite cartridges	$ 400
1 x 12v battery	$ 75
2 Reels reflective tape	$ 35
TOTAL	**$8,140**
Therefore the total cost of bird damage and bird management is **$16,800**.	

2 Costs include the requirement to harass resident species throughout the year. Ideally capital item costs would be 'depreciated' (see Chapter 5*), but even the rough non-depreciated estimates in this table will give a general indication of the costs versus benefits of bird management.

MANAGEMENT RESOURCES AVAILABLE

a) Visual scarers

- 2 hawk-kites
- 4 eyespot balloons
- 2 scarecrows
- metallic reflective tape
- 30 plastic shopping-bags on 3 m bamboo poles

b) Noise scarers

- 2 double bang gas-guns with timers
- 1 side-by-side 12 gauge shot gun
- 1 electronic bird scarer with 8 speakers

c) Noise and movement scarers

- Farm ute and truck with radios
- Old motorbike without a muffler
- 4 red tee-shirts for property staff

d) Exclusion

- 3,000 m of 10 m wide bird netting

e) Additional labour

One person employed part-time to run bird control programme — person has appropriate drivers licence, gun licence and knowledge of the Code of Practice for Humane Destruction of Birds (see Section 7.4*).

f) Other resources

Destruction Permit to shoot 20 rosellas if necessary.

MANAGEMENT STRATEGIES

a) Aims

In the past, my bird control has been somewhat haphazard, poorly directed, begun too late and lacked evaluation. However, I am aware that several of the species that are a major problem for me are not easy to control and I want to be realistic in setting an objective for my plan. Therefore my aim is to reduce my dollars lost by approximately $4000 and I will attempt to do this by reducing the amount of grapes lost to birds and improving the quality of my produce (fewer bird-pecked grapes going to the winery) without significantly increasing my control costs. I want to achieve this in an economic, safe and socially acceptable way.

b) Management actions

The management techniques available to me are deterring and scaring birds, excluding birds and some property management to modify bird habitat or the availability of alternative foods.

I use a different approach with the two types of birds (residents and migrant/nomad) that cause me problems in my vineyard. Residents (rosellas, blackbirds and sparrows) require some management over much of the year because they are permanent residents who appear to make my property part of their territory. I have been harassing rosellas and blackbirds (chasing/disturbing them, shooting at them) throughout the year to discourage them from using the vineyard blocks as safe places to feed. I have left them alone elsewhere on the property in the hope that they will learn to use alternative foods there. During winter and spring I have been removing as much of the sparrow harbour as possible and destroying blackbird nests particularly in and around the garden surrounding my house.

I only need to use short-term control techniques against visitor species (red wattlebirds, silvereyes and starlings) because they are only here in large numbers after veraison. Being transient, they do not have territorial claims on my vineyard and are generally easier to move on than resident species.

Nonetheless, because most bird management work needs to be done after veraison (my busiest time of the year), I will employ someone part-time as a bird-control person (BCP) specifically to run my management programme. Generally the person will work for 3 hrs in the morning and 2 hrs in the afternoon, 6 days per week. BCP will start the work in early January, approximately 6-7 weeks before the Pinot harvest.

Scaring

BCP will 'train' birds to be afraid of humans and human activities. The training will involve shooting at or close to birds initially whilst on foot and then from a range of different vehicles used on the property (motorbike, ATV, ute, truck, tractor). BCP will vary the route taken when patrolling the property. To add to the variability, BCP will sometimes wear a red tee-shirt and sometimes not. Sometimes other people working on the property will also wear a red tee-shirt. I have two life-like scarecrows dressed in similar clothes to those BCP wears when shooting. The scarecrows also hold a gun-like stick. They too will sometimes wear a red tee-shirt. Every 1-2 days they will be moved around the vineyard but will be kept in a shed when not in use.

On occasions, harassment-shooting will be combined with the sudden appearance of a novel visual scaring devices such as eye-spot balloons, plastic shopping bags on bamboo poles or strips of reflective tape tied to similar poles. As with the scarecrows, these devices will be moved regularly. The hawk-kites fly from a 5-metre pole mounted on wheels for easy re-location – these too will be used sparingly and only moved to places where damage is occurring when it becomes apparent that additional scaring is required.

BCP might use the gas-guns or the electronic scarer from time to time but only after the initial 'training' period and only on an infrequent and irregular basis. These devices will be used in accordance with relevant State guidelines on the use of noise-generating devices and relevant local government by-laws. They will only be used when birds are trying to feed in the crops i.e. usually in the mornings and afternoons and definitely not all day nor every day. The two gas-guns will be set to fire at approximately the same time so that it will sound like a shooter is moving through the area, but they will not fire more than 5 times an hour and for not more than 2-3 consecutive hours. They will be situated where birds are trying to enter a block and usually in the crop pointing out rather than outside of the crop pointing in. The gas-guns will not be left out in the vineyard when not in use. They will not be used at all in Block B because it is too close to Neighbour B's house. If they are used on other blocks, at no time will they face towards Neighbour B's house.

Both the ute and the truck have car radios and from time to time one or both of these will be parked with the radio on near places where bird pressure is high. They will be moved regularly.

BCP will use the old motorbike that does not have a muffler on occasions both when shooting and when patrolling.

BCP will visually assess birds' reactions to all scaring devices on a daily basis. At the first sign that a device's effectiveness has waned ie birds seem to ignore it, its function will be modified or it will be moved or swapped for some other device. In Block B where silvereye damage can be worst, no scaring might be the best option. This is because silvereyes become very 'flighty' when frequently harassed and tend to put one peck only in each grape before moving on to another place in the crop - if not harassed they might stay in the area near cover and not spread damage through the block.

Netting

I will again use bird netting to protect the western section of block C against starlings that drop into the vines off the powerline. I will leave the first 3 rows uncovered (as a sacrificial crop) and then cover the next 14 rows, 2 rows at a time. It takes 5 people 4 hours to put the net on and fix the bottom of the net and 4 people 2.5 hours to get it off and pack it away. When necessary, scaring will also be carried out in the eastern part of the block but care will be taken to minimise disturbance on the western side; otherwise the starlings may overfly the netting.

I might need to consider purchasing more throw-over netting because in Block B there are several stony rises where the soil is shallow and leaf cover is always thin and starlings often attack these areas first.

I will use wire bird-netting to keep sparrows and starlings out of the old shed rooves.

Property management

There are two aspects of property management available to me to alter bird behaviour. I have been reducing the favourability of certain habitats for sparrows by removing feral olives and boxthorns on the roadside, removing or burying old rolls of wire-netting especially in the junk pile near Block D and bird-proofing the shed rooves. I also want to try to improve habitat for some other species so as to provide an alternative food to lure them away from my grapes. Roughly once a week, I will slash a strip through the pasture paddock to lower the vegetation height and make weed seeds available to rosellas. As they are also used to eating apples on nearby orchards, I will try to encourage them away from the vines by putting chopped apple on the strip and then, if they are accepted, I will try oats or sunflower seeds. By irrigating some small slashed areas close to my dam (and well away from the vines), I will promote weed seed production for rosellas and provide moist ground where starlings and crows can dig for insects.

The old fig trees east of my house produce ripe fruit at about the same time as the Pinot begin to ripen so I will endeavour to not disturb birds that feed on them as they are an attractive alternative to grapes.

c) Monitoring and evaluation

As already stated, BCP will monitor the effectiveness of scaring devices on a daily basis. This will simply entail closely watching (using binoculars) how birds react in the vicinity of each device. In addition, BCP will set up monitoring 'posts'. There will be four of these within each block and each will be an area where at least 30 randomly selected bunches will be examined for damage once per week. An estimate will be made of the total number of grapes either missing (plucked off) or damaged (bitten, squashed or torn) for each bunch and an average calculated for all bunches at the 'post'. These records will allow me to regularly monitor how damage is progressing and provide me an opportunity to review the management programme if I think too much damage is occurring and a change is required.

Finally, just before each block is harvested, BCP will sample at least 100 bunches taken throughout the block to make a quantitative estimate of the percentage of grapes lost due to birds. I also intend to keep good records of how much money I spend on my management activities. A record will also be kept of any dockage for bird damaged fruit at the winery. These figures will help me to determine if my aims have been achieved and assist decisions for next year.

COMMUNICATION

Pro-active

There are only two residences within 500 metres of my vineyard. On December 25th I rang neighbour A and neighbour B to tell them that I will need to be initiating my bird management programme in the next two weeks and I would be making limited use of two gas-guns, an electronic scarer, shooting and a motorbike without a muffler. I briefly explained why I needed to do this and roughly what I was planning to do, in particular with respect to the gas-guns. I could not be precise in saying when and where various devices would be used as their use depends on changing things around in response to birds' reactions to them. I asked if they had any objections to this. Neighbour A had no objections as they have their own vineyard to protect and no-one would be home during the day. Neighbour B on the other hand, who is a non-farming resident, was concerned about noise impacts especially from the use of the gas-guns. I agreed not to use them in Block B ie the block closest to their house, not to use them every day (not that I had planned to do so) and not to use them on Sundays. They thought that the electronic scarer would not concern them as much and would not object to it being used, at least infrequently in Block B. I suggested they let me know if it did worry them.

Reactive

It is possible that even though I use noise scaring devices infrequently, neighbour B might complain to the Local Council that he is being subjected to amounts and levels of noise from me and other growers in his immediate vicinity that are in excess of the legal limits. If this occurs, I will contact the other growers with some suggestions as to how we, collectively, could minimise the noise impact on neighbour B. The sorts of suggestions might be to have a roster nominating who could use their noisy devices in the mornings or in the afternoons or on which days, or we could double the time between bangs or halve the number of devices in use at any one time. We may well need to contact our local industry representative to assist in setting up such a co-operative scheme.