

EVALUATION OF CONTROLS ON NOISE LEVELS FOR AUDIBLE BIRD SCARING DEVICES IN WHAKATĀNE DISTRICT

William Shaw and Della Bennet
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1. BACKGROUND

Whakatāne District Council (WDC) require advice on the use of audible bird scaring devices (ABSD), such as gas guns or gas cannons, and a proposal to reduce the permitted noise level ABSD from 100dB to 85dB. WDC have developed the following ‘placeholder’ provision for inclusion in the District Plan: “the proximity to significant indigenous biodiversity sites (within the 85dB contour) and the effects on any rare or threatened ecosystem.”

This issue relates specifically to the use of gas cannons in the horticultural industry where the activity is in proximity to Significant Indigenous Biodiversity Sites (SIBS) (i.e., Significant Natural Areas) recognised in the Whakatāne District Plan and potential effects on indigenous fauna using a SIBS. If a proposed ABSD will potentially result in a noise level over 85dB in a SIBS, then a consent application will be required, for a restricted discretionary activity.

This report provides a brief overview of noise effects on birds and outlines options for District Plan provisions going forward.

2. CURRENT DISTRICT PLAN PROVISIONS

The Operative Whakatāne District Plan contains the following provisions:

Rule 11.2.6.2 (Table 11.2 for specific activity noise limits) recognises ABSDs are a permitted activity providing they comply with the following noise controls:

- Hours of operation are from half an hour before sunrise to half an hour after sunset.
- Maximum sound from a device is 100dB LZpeak.
- Devices can operate at a frequency of three events per minute with a limit of 12 individual events per hour.
- A notice advising of device operation is fixed to the road frontage of the orchard containing the details of the person responsible for its operation.
- Variable noise devices (such as distress call) that are used over a short or variable time duration may not exceed 50dBA SEL2.

100dB LZpeak is the 100 decibel Z weighting peak sound pressure limit. ABSDs are measured in the Lpeak level as this measurement responds better to short duration events such as gunshots. The Z weighting refers to the frequency weightings (A, C,

or Z) used in sound level meters. The correct weighting is given to ensure that the meter is similar to what is heard and Z weighting is often used for environmental noise.

SEL or Sound Exposure Level is the summation of A weighted sound energy at a location over its true duration. SEL sound measurement is able to measure the net impact of an entire event such as the nature of distress calls which can be long in duration.

Where the above criteria cannot be adhered to, the use of an ABSD is a restricted discretionary activity. A resource consent would need to be submitted for Council to consider the activity and subsequent environmental effects against the requirements of the District Plan. Specifically for frost fans or bird scaring devices (Rule 3.5.4), Council would also require information on:

- Suitability of device with location against a manufacturing statement or assessed by a suitably qualified person.
- Other methods and alternative crop management options.
- The proposed operating conditions and practices to help manage effects on the environment.

The use of ABSDs is obviously a relatively widespread issue as there are provisions in many other district plans, with examples set out in Appendix 1. None of these provisions appear to address potential effects on indigenous fauna. A number of them do, however, specify noise thresholds at property boundaries to minimise disturbance to neighbours, and some of those thresholds might also be of direct relevance to the protection of indigenous avifauna in an adjacent habitat from adverse noise levels.

For context, the following examples of noise levels are provided on the Whakatāne District Council website:

- A whisper – 15 dB
- Normal conversation - 60 dB
- A lawnmower - 90 dB
- A car horn - 110 dB
- A rock concert or a jet engine - 120 dB
- A gunshot or firecracker - 140 dB

WDC commissioned an assessment of the noise effects of ABSDs (Hegley 2022) and this provides indicative noise contours for orchards in various parts of the District. Noise contours can obviously reflect topography, noise direction, and wind. It is evident, nevertheless, that the 85dB contour can extend 1-2 kilometres from an ABSD. Orchards that use ABSDs are generally on flat land and there are many SIBS within 1-2 kilometres, or thereabouts, on the Rangitāiki Plains, and also on hill country adjacent to the Plains. Some of these SIBS, such as wetlands, are important habitat for disturbance-sensitive species such as mātuku/bittern.

3. EFFECTS OF NOISE LEVELS AND TYPES ON FAUNA

A desktop survey was undertaken of local and international literature to identify the effects of gas cannons, pyrotechnics, and bio-acoustic devices on avifauna. The documents reviewed discussed the effectiveness of the scaring devices and the displacement of birds from an area to prevent loss or damage to horticultural crops. None of the literature investigated long-term or cumulative effects on indigenous fauna, but comments were made that noise could disturb roosting or nesting birds in general (e.g. see Sharp 2012).

To understand the potential effects of noise on indigenous birds, a search was undertaken on the effects of traffic noise and laboratory-controlled experiments, as set out below:

- No effect was detected on laying broiler chickens when a conveyer had a constant noise of 66-76 dB (Scott and Moran 1993).
- Another study of domestic chickens showed stress and fear at 90 dB compared to 65 dB (Campo *et al.* 2005).
- Starlings were found to be sensitive to sudden repellent tones that caused disturbance to feeding, and the level of response increased linearly in the range of 50-100 dB (Langowski *et al.* 1969).
- White-crowned sparrow decreased foraging by *c.*8%, increased vigilance levels by *c.*21% and decreased feeding duration by *c.*30% when exposed to traffic noise at 61dB (Ware *et al.* 2015).
- Fewer birds will breed within 400 metres of a busy road compared to an area 700 metres away (Dooling and Popper 2007).

Based on these findings, noise levels of 85 dB or even less will still potentially result in birds being scared from a horticultural site, and presumably also from a closely-adjacent SIBS. Furthermore, the noise level could be reduced to 65dB but would still potentially affect birds. At even these lower noise levels, birds will still increase their vigilance, decrease foraging, and avoid the adverse influence by leaving an area (Ware *et al.* 2015).

Although there is relatively little information on the effects of noise on birds in Aotearoa New Zealand, especially indigenous species, it is nevertheless clear from various infrastructure projects, such as roads, that there are different effects for different species, and it is clear that some species do become habituated to noisy environments. It is also clear, however, that some species are very noise-sensitive and will actively avoid noisy environments. Sensitive species include some that utilise habitats such as forest, freshwater wetlands, estuaries, and beach/dune systems.

The noise level of an ABSD can have a varying effect on birds depending on where they choose to roost and breed. Lower decibel levels will have less impact on breeding biology and communication between birds.

As noted above, if there are indigenous bird species, and their roosting and breeding habitats, within the immediate area where an ABSD is operating, or within an adjacent SIBS, then they could also be affected. The degree of effect, however, will depend on various factors:

- Noise type and level at the SIBS.
- The species present and their sensitivity to particular types and levels of noise.
- The relative importance of the SIBS as avifauna habitat.
- The threat status of the species utilising the SIBS.
- Seasonal use of the SIBS.
- Distance from the SIBS.
- Topography.
- Wind speed and direction.

This is evidence that overnight traffic affects long-tailed bats in Aotearoa New Zealand (Borkin *et al.* 2019),¹ although this could be due to the combined effects of light and noise.

Effects on a particular SIBS and the species using it as habitat will require consideration on a case-by-case basis. For example, even though a SIBS might be relatively close, in a straight line, the presence of a steep intervening ridge might potentially block a considerable amount of noise. Overall effects, will therefore depend on the species potentially present and a range of factors, including distance to the habitats used by indigenous birds.

There might also be significant habitats for mobile indigenous fauna that might not necessarily be mapped as a SIBS and where controls on noise levels would also be warranted.

4. FUTURE MANAGEMENT OF ABSD NOISE LEVELS

There are options for the management of potential ecological effects resulting from the use of ABSDs:

- If ABSDs are proposed for use in a location where a SIBS could be within the 85 dB noise contour, WDC could require an assessment of ecological effects.
- Specify a nominal noise threshold at the boundary of a SIBS.

These options are discussed further below.

Require An Ecological Assessment

If ABSDs are to be used in proximity to a SIBS/SNA, and part of the SIBS/SNA will fall within the 85 dB contour, then fauna ecologist should assess potential impacts on

¹ Mobile indigenous fauna which utilise habitats outside of SIBS-SNAs are addressed in the latest draft exposure version (June 2022) of the National Policy Statement on Indigenous Biodiversity (NPS-IB) but this doesn't yet have statutory standing.

the indigenous fauna present, or likely to be present on a seasonal basis, i.e. at the times during the year when an ABSD is to be used.

If an ABSD is to be used within the 85dB LZpeak of a Significant Indigenous Biodiversity Site, a fauna assessment should be undertaken by a suitably qualified and experienced ecologist to fully understand the potential impacts on indigenous fauna.

The following provision could be included in the District Plan:

An assessment will be undertaken by a suitably qualified and experienced ecologist to fully understand potential impacts on indigenous fauna from any impulsive¹ ABSD to be used within the 85 dB Lcpeak contour of a Significant Indigenous Biodiversity Site.

The following could be used as evaluation criteria to address such a requirement:

- Noise level contours within the SIBS.
- Species utilising the SIBS and their sensitivity to particular types and levels of noise.
- Relative importance of the SIBS as fauna habitat.
- Threat status of the species utilising the SIBS.
- Seasonal use of the SIBS by fauna.

Noise Threshold at a SIBS Boundary

A suitably conservative noise threshold could be specified for a SIBS boundary or any other significant habitat for mobile indigenous fauna. This may be problematical, however, as noise affects different indigenous bird species that utilise different types of habitats in different ways. Also, even relatively conservative noise levels may potentially have adverse effects on some sensitive species.

5. **CONCLUSION**

Noise effects on indigenous fauna is not well understood but it is nevertheless clear that noise affects different species in different ways, and some Threatened or At Risk indigenous species are known to be noise-sensitive. The use of ABSDs is common in horticultural landscapes across Aotearoa New Zealand, and noise control provisions are reasonably common in district plans. None of these provisions, however, appear to relate to the protection of indigenous fauna. It is warranted to address potential effects on indigenous fauna and an effects-based assessment should be undertaken to evaluate potential effects on SIBS (or any other significant habitat for mobile indigenous avifauna) that fall within the 85dB noise contour from an orchard where it is proposed to use an ABSD.

¹ Impulsive noise is a sudden sharp sound or a sudden bang of short duration, with an abrupt onset and rapid decay.

The following provision could be included in the District Plan:

An assessment will be undertaken by a suitably qualified and experienced ecologist to fully understand potential impacts on indigenous fauna from any impulsive ABSD to be used within the 85 dB Lcpeak contour of a Significant Indigenous Biodiversity Site.

The following assessment criteria could be used:

- Information on the species known to be or potentially using the SIBS, including seasonal use.
- Noise sensitivity of the fauna species in the habitats to be potentially affected.
- Relative importance of the SIBS for fauna potentially affected.
- Threat status of the indigenous fauna to be potentially affected.

6. **REFERENCES**

- Borkin K.M., Smith D.H.V., Shaw W.B., and McQueen J.C. 2019: More traffic, less bat activity: the relationship between overnight traffic volumes and *Chilinolobus tuberculatus* activity along New Zealand highways. *Acta Chiropterologica* 21(2): 321-329.
- Campo J.L, Gil M.G., and Davila S.G. 2005: Effects of specific noise and music stimuli on stress and fear levels of laying hens of several breeds. *Applied Animal Behaviour Science* 91: 75-84.
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- Hegley N. 2022: Audible bird scarers Whakatane District Plan assessment of noise effects. *Report No. 22037*. Prepared for Whakatane District Council. 16 pp.
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- Sharp T. 2012: Standard operating procedure. Adapted from BIR002 trapping of pest birds. Retrieved from shorturl.at/qsOPS.
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PROVISIONS IN OTHER DISTRICT PLANS

Sourced from a flyer produced by the New Zealand Kiwifruit Growers.

Gisborne

An audible bird scaring device shall:

Be allowed if the operation of audible devices (excluding firearms) for the purposes of bird scaring between sunrise and sunset provided that:

- The maximum sound exposure level (SEL) of 65dBA as measured at any residential zone boundary or notional boundary of any rural dwelling is not exceeded; and
- Maximum number of events shall not exceed six events in any 60-minute period
- An event shall not exceed three shots within a one-minute period.

The limit on the maximum number of events may be waived if the written consent of all adjoining property owners and/or occupiers is obtained and submitted to the consent authority prior to the commencement of the activity

Manawatū

In the Rural Environment, an audible bird scaring devices must be operated in accordance with the following conditions:

- Devices must not operate between sunset and sunrise.
- Devices must not be used within 200m of the boundary of a site zoned Residential or Village.
- Impulsive noise from bird-scaring devices must not exceed 65dB A weighted.
- Sound exposure level when assessed at any point within the notional boundary of any dwelling on any other site.
- There shall be no more than four noise events per hour or 12 individual shots per hour may occur within 500 metres of a dwelling.
 - For the purpose of this rule, a ‘noise event’ includes clusters of up to three shots from a gas operated device, or three shots from a firearm within a one-minute period.

Ōpōtiki

An audible bird scaring device shall:

- Be operated only from half an hour before sunrise to half an hour after sunset.
- Not exceed 65dB LAe at any point within the notional boundary of any dwelling on another site in the Rural Zone, or at any point of any Residential Zone (excluding any dwelling/s located on the same site as the device is being operated), unless the adjacent landowner has provided written approval to the activity and a copy has been provided to the Council.
- Only be operated when the horticultural crop is at risk from bird damage.
- Non-compliance shall be assessed as a Restricted Discretionary Activity.

Western Bay of Plenty

An audible bird scaring device shall:

- Only be operated from half an hour before sunrise to half an hour after sunset
- Shall be set to operate at no greater frequency than 12 times in any period of one hour, that is 12 single discharges or four groups of three discharges.
- Shall not be operated for any continuous period exceeding two seconds.
- Shall only be operated when the horticultural crop is at risk from bird damage.
- Shall not exceed 65dB ASEL at the notional boundary of any Rural, Rural Residential, Future Urban or Lifestyle dwelling or at the boundary of any Residential Zone (excluding any dwelling/s located on the same site as the device is being operated).
- Where those persons who experience noise levels over 65dB ASEL as described in above, have provided written approval to Council then the activity shall be permitted.
- Use of any audible bird scaring device not in compliance with the above performance standards shall fall to be considered as a Restricted Discretionary Activity.

Waikato

An audible bird scaring device shall not exceed permitted activity noise limits.

Any activity is a permitted activity if it is designed and conducted so that noise from the activity measured at any other site does not exceed:

- 50dBA (L10), 7am to 7 pm any day, and
- 45dBA (L10), 7pm to 10pm any day, and
- 40dBA (L10), and 65dBA (Lmax) at all other times.

Waipā

Any audible bird scaring devices shall be operated as follows:

- (a) Only between sunrise and sunset; and
- (b) At a frequency of not more than six clusters of up to three shots from gas
- (c) operated devices or three multiple shot from firearms in rapid succession per device
- (d) in any 60-minute period of the day; and
- (e) At a maximum density of one device per 10ha of crop.

The noise from any bird-scaring device shall not exceed 85dBA unweighted peak level at a Residential Zone boundary or the notional boundary of a dwelling on any Rural Zone property. Activities that fail to comply with these rules will require a resource consent for a discretionary activity.

Auckland

An audible bird scaring device shall:

- Not operate between the hours of sunset and sunrise; and
- At a frequency of more than six times in any 60-minute period with no more than three shots in rapid succession; and
- Where the noise level measured within the notional boundary on any other site exceeds 85dB LZpeak.

The standard above does not apply to bird scaring devices that generate a noise level less than 70 dB LZpeak measured at the notional boundary on another site.

Whangārei

In the Rural Environment, an audible bird scaring device shall:

- Not operate between half an hour after sunset and half an hour before sunrise; and
- Each device operates at not more than six “events” per hour where an “event” includes clusters of up to three shots from gas operated devices or three individual shots from a firearm in quick succession. (This rule does not apply to bird scaring devices that generate a noise level of less than 55 dB LAE within the notional boundary of any noise sensitive activity not owned by the operator of the device); and
- The sound level from any event does not exceed 65 dB LAE within the notional boundary of any noise sensitive activity not owned by the operator of the device; and
- The bird scaring device is only operated when a crop is at risk from bird damage; and
- The use of bird scaring devices in other environments is a discretionary activity

Central Hawkes Bay

An audible bird scaring device shall not exceed permitted activity noise limits:

- 55dBA L10 - 6:00am - 11.00pm Monday to Saturday
- 45dBA L10 - at all other times
- 75dBA Lmax - at all other times

Hastings

Gas Guns

- (a) There shall be no device operated between half an hour after sunset and half an hour before sunrise.
- (b) Devices shall not operate unless a legible notice is securely fixed to the road frontage of the site in which the device is to operate stating the name, address and telephone number of the person(s) responsible for the operation of the device.
- (c) There are no restrictions on events or individual shots for sound levels less than 85dBCpeak either:
 - At any point within the boundary of any Residential Zone.
 - At any point within the notional boundary of any noise sensitive activity in a Rural Zone.
- (d) Where sound levels are greater than 85dBCpeak but less than the limits specified in (e) below, measured at any point within the boundary of any Residential Zone or within the notional boundary of a noise sensitive activity within a Rural Zone, then:
- (e) There shall not be more than 4 events in any 1-hour period, or a total of 12 individual shots in any one-hour period, received:

- (f)
- At any point within the boundary of any Residential Zone.
 - At any point within the notional boundary of any noise sensitive activity within a Rural Zone.

Note: For the purposes of this rule, an 'event' includes no more than three individual shots within any one-minute period.

- (g) There shall only be one device per every 4ha of the site, provided that:
- In the case of a single site less than four hectares in area, one device shall be permitted
 - In the case where a site is over 4ha but does not meet the next 4ha an additional device shall be permitted.

Note: As an example, a site of up to 4ha is permitted one device, a site between 4ha and an 8ha is permitted two devices, a site between 8ha and 12ha is permitted three devices and so on.

- (h) Sound levels generated by an audible bird scaring device shall not exceed:
- 100dB_{Cpeak} at any point within any boundary of a Residential Zone.
 - 115dB_{Cpeak} at any point within the notional boundary of any noise sensitive activity in a Rural Zone.

Firearms

- Any firearm shall not be used for the purposes of bird scaring between half an hour after sunset and half an hour before sunrise.

Audible Avian Distress Alarms

- There shall be no device operated between half an hour after sunset and half an hour before sunrise
- Devices shall not operate unless a legible notice is securely fixed to the road frontage of the site in which the device is to operate stating the name, address and telephone number of the person(s) responsible for the operation of the device
- Sound emitted from the device shall not exceed 50 dB LAeq (15 min) when measured at any point within the notional boundary of any rural dwelling or at any point within a Residential Zone
- No device shall be placed in such a manner that in any public place receives noise exceeding 80 dB LAfmax.