

# 1 AVIFAUNA MANAGEMENT

Clearing of vegetation has the potential to negatively impact on birds, particularly if birds are nesting in vegetation at the time it is cleared. Native avifauna are legally protected by the Wildlife Act 1953 (WA) and significant habitats for indigenous fauna are protected under the Resource Management Act 1991 (RMA).

## Wildlife Act (1953) Authority

Most indigenous birds are legally protected under the Wildlife Act (and subsequent amendments). A Wildlife Act Authority (WAA) is required to capture, handle, and relocate native wildlife.

## Resource Management Act 1991

Landscape features that provide significant habitat for indigenous species, including birds, are protected under the RMA (Section 6(c)). This includes ostensibly low value exotic vegetation that can support populations of native birds.

### 1.1 Potential Adverse Effects on Birds

The project requires earthworks and vegetation clearance. If indigenous birds are present within the affected area, potential adverse effects on birds may include:

Direct effects:

- Adult and chick mortality during physical clearance/construction works
- Injury during physical clearance/construction works

Indirect effects:

- Temporary loss of habitat
- Temporary noise and dust disturbance
- Disruption to nesting and breeding behaviour

Site development cannot be achieved without vegetation removal, and therefore potential adverse effects on native birds cannot be avoided. Adult birds are highly mobile and expected to move to nearby unaffected habitat once disturbance commences. Nesting birds and chicks that have not fledged are unable to move away. Therefore, managing effects on birds requires mitigation through monitoring for signs of nesting activity and displays of breeding behaviour.

To mitigate the effects of direct mortality and indirect disturbance on breeding and nesting birds, the following protocol will be followed for all vegetation that will be cleared.

### 1.2 Bird Survey and Management

#### 1.2.1 Timing

In the first instance, vegetation clearance between 1 September and 28 (29) February should be avoided where practicable.

If vegetation clearance must occur within this time frame, the nesting bird survey protocols will be adopted, as detailed below.

### 1.2.2 Nesting bird survey

- A survey will be undertaken to identify if and/or where native bird nesting behaviour (including courtship, nest building, and active nesting) is occurring.
- The survey will be completed by an appropriately qualified ecologist.
- The survey will include inspections for tree cavities, tree nests and ground nesting species such as pūkeko.
- Where no nesting behaviour or activity is observed, the vegetation may be cleared within 24 hours of the survey being completed. If clearance does not occur within 24 hours, the area must be surveyed again to verify the absence of nesting behaviour prior to clearance.
- If nesting behaviour, or an active nest is located, an exclusion area with a diameter of 10 m will be demarcated around the tree (or nest if it is a ground nest) and works shall not occur within this cordon until it has been confirmed by the appropriately qualified ecologist that all nestlings have fledged. Once the appropriately qualified ecologist has confirmed this, the vegetation may be cleared.

### 1.3 Inadvertent Bird Injury or Death

If a native bird is found injured or dead during vegetation clearance, the following steps will be taken:

- Injured native birds will be placed in an appropriate carrying box/cloth bag and immediately transported to a veterinarian for assessment.
- If the species has a conservation status of At Risk or Threatened (Robertson et al. 2017), the local Department of Conservation (DoC) office will be contacted as soon as practicable, but within 24 hours.
- All deceased birds (including those found dead on site, or any that are ultimately euthanised by a veterinarian) will be transported to the local DoC office as soon as practicable.
- All injuries or mortalities will be accurately recorded and reported to DoC on request.

Native bird management is required in all areas where vegetation clearance will occur, including the grassed paddocks on the flat portion of the site.

### 1.4 Management of Dotterels

The site does not currently provide habitat for NZ dotterels (*Charadrius obscurus aquilonius*; Threatened – Nationally Increasing). In Auckland they tend to favour open areas and bare ground. They are known from the wider Silverdale area, with eBird.org records showing them in various urban areas, though mostly around the fringe. As works progress, it is expected the open areas will be generated by earthworks and clearance of the pasture within the site. It is possible that they may utilise these open areas as they become available. Dotterels are known to establish nests on construction sites where habitat conditions are suitable.

#### 1.4.1 Deterrence

From July onwards, dotterels begin looking for breeding territory. Weekly inspections of the works area should occur to determine if dotterels are present. Breeding dotterels are territorial and will show defensive behaviour to anything that they think is a threat (including people). Defensive behaviour includes alarm calls, running in front of potential threats to distract and lure them away ('rat run'), and

pretending to be injured ('broken wing'). It is this behaviour that should be looked for during weekly site inspections.

The easiest method to manage dotterels on a site is to deter them from establishing nests in the first place. From early July onwards, one or more of the methods in Table 1 should be employed to discourage dotterel presence within the site.

**Table 1. Deterrence options (adapted from NZTA, 2012<sup>1</sup>).**

Method	Description	Likelihood of success	Comments
Long grass	Allow grass to grow long so not considered by dotterels to be a good place to lay eggs.	High	Leave grass to grow from at least April to ensure it is long
Machinery*	Park large machinery close to where dotterels are showing an interest. Start the engine from time to time.	Moderate	Machinery cannot be left for long periods or the birds may get used to it.
Silt fences	Erect shade cloth at knee height. Place in rows. Space at 5– 10 m.	High	These fences obscure dotterel vision from nesting sites as they actively seek areas with good sight lines
Metallic or reflective tape	Streamers attached to posts that flutter when there is wind	Moderate	Works for a short time (up to three weeks) and then birds habituate

\* to be used in early to mid-July only. If nests establish, movement of machinery increases the risk of nest damage.

The likelihood of success column used in Table 1 has been developed based on known dotterel behaviours. However, they are known to become used to activities, such as machinery, if it is left stationary for any period of time, and reflective tape can become ineffective within a few weeks. Actions that alter the site to make it less attractive for nesting are considered to be the most effective options over a long period of time.

#### 1.4.2 Eggs found within the construction zone

If, despite deterrence options being in place, eggs are still found within the construction zone, the following measures should be followed.

- If eggs are found on the ground within the construction zone activities within 50 metres of the nest are to stop immediately and people are to leave the area.
- Contact the project ecologist.
- If the nest needs to be marked in order for the project ecologist, or others, to find it the markers should be at least 10 m away from the nest. Use two on either side of the nest if necessary as long as they are at least 10 m away.
- The project ecologist will monitor the nest on a weekly basis to confirm when chicks have fledged (usually 6-7 weeks after hatching). Once this has occurred, the ecologist will confirm when works in the area can re-commence.

<sup>1</sup> NZTA. 2012. Guidance in Relation to New Zealand Dotterels on NZTA Land. NZ Transport Agency, Wellington.

## 2 HERPETOFAUNA MANAGEMENT

### 2.1 Management of Potential Adverse Effects on Lizards

#### 2.1.1 Statutory protections and management of lizards

##### Wildlife Act (1953) Authority

All indigenous lizards are legally protected under the Wildlife Act (and subsequent amendments). A WAA is required to capture, handle, and relocate native wildlife.

##### Resource Management Act 1991

Landscape features that provide significant habitat for indigenous species are protected under the RMA (Section 6(c)). This includes ostensibly low value exotic vegetation that can support populations of native lizards.

#### 2.1.2 Potential adverse effects on lizards

The project requires earthworks and vegetation clearance. If indigenous lizards are present within the affected area, potential adverse effects on lizards may include:

Direct effects:

- Lizard mortality during physical clearance/construction works
- Injury during physical clearance/construction works

Indirect effects:

- Temporary loss of habitat
- Temporary noise and dust disturbance

Site development cannot be achieved without vegetation removal, and therefore potential adverse effects on indigenous herpetofauna cannot be avoided. Managing the effects on lizards requires mitigation through a salvage and relocation programme and potential release site habitat enhancement.

#### 2.1.3 Project herpetologist

A suitably qualified herpetologist or ecologist ('project herpetologist') is required to implement all herpetofauna management, and a WAA to capture and relocate indigenous lizards is required. The credentials and contact details for the project herpetologist are outlined below:

[To be included as part of final plan]

## 2.2 Lizard Search and Capture Methodology

Lizard capture and relocation will be associated with consented vegetation clearance activities through the methods outlined in this section.

### 2.2.1 Timing of activities

Vegetation clearance should occur between October and April (inclusive); lizard salvage activities are confined to warmer months when lizards are the most active and likely to be detected if present.

All lizard management activities are required to be undertaken during fine, calm, and dry weather.

The timing for the proposed vegetation clearance is:

[To be included as part of final plan]

### **2.2.2 Destructive searches**

Destructive searches will be undertaken by the project herpetologist prior to vegetation removal, in coordination with the appropriate contractor undertaking the clearance works. This will involve systematic manual searches of suitable habitat (e.g. log piles, tree bark) and destruction of habitat where practicable. Leaf litter, ground cover vegetation and small debris may be hand-raked, and larger debris overturned to search for refuging lizards.

### **2.2.3 Felled trees searches**

Destructive searches involve searching through branches and foliage of felled vegetation. The crowns of large trees shall be felled intact as far as practicable. All branches and foliage of felled vegetation will be thoroughly searched. Where practicable, the crowns of any larger trees that cannot be fully searched after felling should be left in any areas of vegetation to remain on site, to allow any undetected lizards to disperse naturally.

### **2.2.4 Construction (machinery) assisted searches**

Suitable ground cover will be searched during machine-assisted clearance. The machine will be fitted with a toothed scraping bucket (or similar) during vegetation clearance to lift habitat such as non-woody vegetation, logs, and debris piles.

Machine-assisted searches will continue until all habitat for lizards has been removed and there is no suitable habitat for native lizards remaining within the affected area, as assessed by the project herpetologist.

### **2.2.5 Post-clearance search**

At the conclusion of the machine-assisted searches and vegetation clearance, the suitably qualified ecologist would undertake a final site walk over to detect any remaining lizards.

### **2.2.6 Lizard handling and containment**

All indigenous lizards found during the destructive searches, machine-assisted searches and post-clearance search, will only be captured and handled by, or under supervision of, the DoC-authorized suitably qualified ecologist. Hands should be sterilised before and after handling lizards, along with all field equipment that indigenous lizards may encounter.

All captured lizards would be placed in a holding container(s) with adequate ventilation and kept at ambient temperature. Vegetation, soil and leaf litter from the capture site will be placed in the box to provide shelter and protection during containment/transport. Lizards would only be held temporarily for the period of the active searches or trap inspections, before being released at the approved relocation site (refer Section 2.4).

It is not anticipated that lizard taxa with conservation statuses higher than 'At Risk' would be encountered on-site. However, if 'Threatened' lizard species were encountered, the individual(s) would be captured and temporarily contained, and the local DoC office contacted for further instruction.

## **2.3 Inadvertent Lizard Injury or Death**

The following steps will be implemented should any injured or dead indigenous lizards be found during the vegetation clearance activities:

- The project herpetologist would notify DoC as soon as possible (within 24 hours);
- Any lizard death of 'Threatened', 'At Risk' or 'Data Deficient' species shall be sent to Massey University Wildlife post-mortem service for necropsy. The body should be chilled if it can be delivered within 24 hours, or frozen if delivery will take longer than 24 hours;
- Where appropriate, measures shall be undertaken to minimise further lizard deaths;
- Injured lizards found during salvage will be taken to a suitably qualified vet as soon as possible for assessment and treatment. Injured lizards will be kept in an appropriate portable enclosure (i.e., a clean, well-ventilated (plastic container) under the direction of the project herpetologist to ensure the lizard is handled appropriately until it can be treated;
- Lizards assessed by the vet or alternative specialist as uninjured, or otherwise in suitable condition for release, would be transported to the relocation site in the portable enclosure and released; and
- Euthanasia of an injured lizard is only to be undertaken under direction from DOC.

## 2.4 Release Site

All salvaged indigenous lizards are required to be released into an approved release site. Factors that should be considered when selecting a release site include ecological appropriateness, long-term security, habitat suitability, and protection from predators and future human disturbance (DOC Lizard Technical Advisory Group, 2019). Key considerations include, but are not limited to, the following:

- It is important that the release site is an appropriate distance from the project footprint to prevent the lizards from re-entering the works area. However, the release site should be located as close as possible to the salvage site to help retain similar microhabitats and environmental conditions.
- The habitat within the release site should be representative to, or of higher ecological value than the salvage site.
- Areas with long-term protection should be favoured, such as reserves managed by DoC or Council, vegetation covenants or areas protected by Auckland Unitary Plan provisions (e.g., SEA overlay, riparian habitat).
- Potential existing species composition and density at the release site should be considered as far as practicable, to limit potential adverse effects of intra- and inter-species competition at the release site.

### 2.4.1 Proposed release site

It is generally preferred that lizards are relocated within or adjacent to the project footprint as far as practicable, to maintain local biodiversity and reduce the risk of adverse effects that may occur with longer distance relocations. A key consideration of relocation is ensuring the habitat suitability (quantity and quality) is present to support relocated lizards.

[Details within this section will be included in the final Fauna Management Plan, and will recommend release sites within the site, and/or within the surrounding environment. Figure showing potential release sites will be included.]

### 2.4.2 Habitat enhancement

Refuge structures (e.g., felled logs, rocks, branches) should be recovered prior to vegetation clearance by the project herpetologist and relocated into the release sites. In addition, if five or more indigenous

lizards are captured for relocation, the implementation of supplementary refugia is also recommended prior to lizard release. The provision of permanent refuges, including but not limited to log piles, natural debris (e.g. decaying vegetation), artificial cover objects (i.e., Onduline sheets) and rock piles should be installed to supplement the natural refuges already present. Salvaged skinks would be released beneath these refuge structures to provide immediate protection.

## 2.5 Capture Trigger

If more than 20 native lizards are captured, then contact should be made with DoC immediately to discuss the next steps. These may include continuation with the current programme, additional habitat enhancement and/or protection, or the requirement of additional permits.

## 2.6 Completion Reporting

A completion report or Amphibian/Reptile Distribution Scheme (ARDS) Card will be prepared by the project herpetologist and submitted to Auckland Council within 30 days of the completion of all vegetation removal. The information provided should detail the number of lizards captured and the locations they were captured from, and whether any post-release monitoring (and timing) is recommended based on the number of lizards salvaged.

### 3 BAT MANAGEMENT

All vegetation removal should occur under the following protocols. The protocols are required to minimise the likelihood of adverse effects on potentially occupied bat roosts as vegetation is cleared. They have been adopted from the *Protocols for minimising the risk of felling bat roosts* prepared by the New Zealand Bat Recovery Group<sup>2</sup>. If no bats were detected during the pre-vegetation clearance survey, felling can occur without implementation of the protocols.

#### 3.1.1 Timing of activities

The timing for the proposed vegetation removal is:

[To be included as part of final plan]

#### 3.2 Identification of Potential Roost Habitat

All trees to be removed within the site should be visually assessed prior to vegetation clearance by an appropriately qualified ecologist with Competency 3.3<sup>3</sup>. Each tree should be classified as either high risk, or low risk, with regard to bat roost habitat.

Low risk trees have a diameter at breast height (DBH) of  $\leq 150$  mm.

High risk trees have a DBH of  $\geq 150$ mm and have one or more of the following features:

- Holes, cavities, crevices, cracks and/or fractured limbs that could potentially support roosting bat/s
- Hollow trunks and/or branches
- Loose, flaking bark, or deep incised bark crevices that could potentially support bat/s
- Deadwood (including debris caught in tree forks) or epiphyte communities in the canopy or in the trunk that could potentially support bat roosts
- Evidence of bat droppings, grease marks and/or urine staining around cavities

All low-risk trees can be felled at any time, subject to requirements of other management measures (e.g. for birds). The only exception is where low risk trees have evidence of bat droppings, grease marks and/or urine staining around cavities, in which case they will be treated as high-risk trees.

High risk trees, including adjacent groupings of high-risk trees will be subject to a pre-felling assessment. Pre-felling assessments will be undertaken by an appropriately qualified ecologist.

#### 3.3 Pre-felling Procedures

High risk vegetation should only be cleared between 1 October and 30 April to align with the season when bats are active. A Competent Bat Worker<sup>3</sup> (CBW) will be present to supervise the clearance of all high-risk vegetation and they must be available at all times during the vegetation removal stages in order to respond immediately to any incidental discoveries of bats within the site.

The following procedure must be adhered to:

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<sup>2</sup> DoC 2024. Protocols for minimising the risk of felling occupied bat roosts (Bat Roost Protocols). Dated October 2024.

<sup>3</sup> A person who has been certified as 'Competent' in a particular skill by the NZ Bat Recovery Group.

- All high-risk vegetation will be clearly identified by a CBW prior to clearance commencing.
- All high-risk vegetation will be acoustically monitored using ABMs for two consecutive nights (with optimal weather conditions<sup>2</sup>; Table 2) immediately prior to vegetation removal. Results will be analysed the following morning, as early as possible. If vegetation removal does not take place the day after monitoring, monitoring will continue until it does.
- Where a night does not meet optimum conditions<sup>2</sup> (Table 2), monitoring must continue to take place until a total of two consecutive nights of optimum conditions have been monitored.
- If no bats are recorded:
  - The ecologist will notify the site manager immediately after data is reviewed, and permission will be given to clear the monitored vegetation within 24 hours.
- If bats are recorded:
  - If bat activity recorded on the ABM/s suggest bats may be roosting in the vicinity of the ABM, or if a bat roost is observed, the site manager shall be notified immediately after reviewing the data and the affected vegetation cannot be cleared until additional investigations have been completed.
  - The ABM survey must continue until no bat activity has been recorded for two consecutive nights; OR
  - If safe to do so, the suspected roost/s will be visually assessed by an arborist trained to identify bat roosts. The arborist will take photos of any roosts or roost evidence found. If necessary, an endoscope and handheld bat detector will be used to examine potential features.
- If bat roosts are confirmed:
  - The tree/s will not be removed until further acoustic monitoring (for seven nights) confirms the bats have abandoned the roost.
  - The tree/s will be clearly marked and a 10 m radius exclusion zone established around the site. The zone will be identified with fencing or other appropriate materials. All relevant people (e.g. site manager, vegetation contractors) will be notified the area must be left as is.
  - Representatives from DoC and Auckland Council will be informed via email, of the relevant information, including photos if available. The CBW, DoC and Council will agree on options for next steps in the event roosting continues after seven nights.
  - If bats are still roosting in the tree/s after seven nights, a meeting will be held between the CBW, site manager, DoC and Council to determine an appropriate way forward. The meeting must occur within three days of the end of the seven day monitoring period.
  - Immediately following clearance of high-risk vegetation, trees will be inspected for bats and evidence of bat roosts by the CBW.

**Table 2. Optimal weather conditions required for bat surveys<sup>2</sup> (derived from DoC 2024).**

Component	Conditions
Timing	Begin one hour before sunset and end one hour after official sunrise
Temperature	Temperatures of 8°C or higher for the first four hours after official sunset

Wind	Little to no wind of $\leq 20$ km/hour for the first four hours after official sunset
Precipitation	Little to no precipitation ( $\leq 2.5$ mm) in the first four hours after official sunset

### 3.4 Managing and Reporting Injury or Mortality

If any living bat/s are found during or after vegetation clearance that are not able to fly away, they will be taken immediately to a veterinarian for assessment. Bats will be placed in a clean, dark, cotton bag by the CBW, and then in a carrier to ensure safe transportation. The site manager, and relevant representatives from DoC and Council will be notified as soon as practicable, but within 24 hours of the bat being found. Any bat found dead or subsequently euthanised by a veterinarian will be returned to DoC.

Bats assessed by the veterinarian as uninjured will be transported back to site in the cotton bag and placed in an open, temporary artificial roost box suspended within a tree outside of the site but as close as possible to the site the animal was found. The roost box will be open to allow the animal to come and go as it chooses and will be placed within the tree prior to dusk on the same day the bat is found.

### 3.5 Bat Mitigation

If bats are detected on site during the pre-vegetation clearance survey, mitigation in the form of habitat enhancement will be required if vegetation to be cleared is identified as suitable for bat nesting/roosting.

To replace roosting habitat following vegetation clearance, artificial bat roost boxes will be installed in area suitable for roosting, as directed by the CBW. Emphasis should be placed on the established riparian bush areas or SEAs in the immediate surrounding environment, as they will be largely protected from future vegetation clearance.

The number of roost boxes will be installed at a rate of one per every 10 high risk bat roost tree/s removed. The boxes should be installed at a minimum height of four metres from the ground, with no clutter within 2 m of the box opening. 'Possum bands' will be wrapped around each tree where a box is installed to deter mammalian predators. Any bat box installed must be checked annually to remove any nesting materials that have been brought in by birds.

In recent years, several bat box designs have been installed at sites in New Zealand:

- A timber 'Kent' bat box design (Auckland Council);
- A timber 'Microbat box' design (Auckland Council);
- A bespoke timber design similar to the 'Kent' (Waikato Regional Council); and
- Four Schwegler 'woodcrete' designs (models 2F, 2FN, 1FF and 1FD; DoC, South Canterbury).

Any of these designs are considered suitable for use within the site, as needed.

### 3.6 Revegetation areas

[Provide details of areas where vegetation is to be retained and where additional planting is proposed to be provided and maintained for the purposes of the connectivity of long tail bat habitats. This is to be completed post consent]

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