

Running, Tanya

From: Running, Tanya
Sent: Tuesday, November 9, 2021 4:27 PM
To: Michael Parsonson
Cc: 'Mike Wood'
Subject: SH1/SH29 | Updated Bat Management Plan
Attachments: SH1-SH29__BMP_Final_ Updated 091121.pdf; FW: WRC Section 92 request

Kia ora Michael

Please find **attached** an updated Bat Management Plan dated today's date which includes the Vegetation Removal Protocol.

Changes have been made to the Bat Management Plan as a result of comments and proposed changes from Gerry Kessels following his review of the Waka Kotahi section 92 response dated 15 October 2021, as detailed in the **attached** email from Gerry Kessels dated 1 November 2021.

Kind regards Tanya



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Running, Tanya

From: Michael Parsonson <michael@southernskies.co.nz>
Sent: Monday, November 1, 2021 2:58 PM
To: Mike Wood; Running, Tanya
Subject: FW: WRC Section 92 request

Comments from Gerry. Can discuss tomorrow.

From: gkessels@bluewattle.co.nz <gkessels@bluewattle.co.nz>
Sent: Monday, 1 November 2021 11:52 am
To: Michael Parsonson <michael@southernskies.co.nz>
Cc: 'Jorge Rodriguez' <Jorge.Rodriguez@waikatoregion.govt.nz>; connie.daws@waikatoregion.govt.nz
Subject: RE: WRC Section 92 request

Hi Michael,

As well as my comments of the bat related managed plans which I have just emailed you, here are a few ecology related points I have in relation to the s92 response from Waka Kotahi:

1. I still have concerns about the 1:1 ratio proposed for replacement vegetation being sufficient. The vegetation, while exotic and weedy, does provide foraging and commuting habitat for bats (and possibly roosting habitat). While the BMP address loss of potential and occupied roost trees (and noting I don't agree with quantum for occupied roost trees as proposed), it does not replace functional commuting and foraging habitat for bats – this habitat is clearly significant in terms of Table 11-1 of the Waikato regional Policy Statement and hence s6c of the RMA, hence a high bar is required for mitigating loss of habitat. Condition 43 of the proposed conditions points to prep of a Vegetation Management Plan (which I don't have in front of me at this point in time). I would like to know where the location of this planting is proposed and what the performance standards are.
2. I don't agree that the 1:8 ratio of planted trees and bat boxes for replacement of lost occupied roost trees as being sufficient. I have stated this on several occasions now. I presume Waka Kotahi wish to address this matter in evidence during the hearing process now as an unresolved point of difference in opinion between the ecologists?
3. I am unclear what the consultation with WRC and DOC entails in terms of addressing the loss of occupied roost trees. There is no specified outcome required as a consequence of this consultation as far as I can tell.
4. The response mis-interprets my advice to undertake ABM surveys in the tree felling protocols. I never stated that ABM surveys should be the only method for determining bat roost occupancy. Each of the methods proposed are not perfect, but using a combination of all of the methods reduces the risk of non-detection (and hence harming bats) when felling potential bat roost trees. The baseline ABM surveys can also provide useful baseline data when developing monitoring conditions to ensure the efficacy of the proposed mitigation measures.

Finally I am unclear of any monitoring requirements and performance standards pertaining to ecology and will be recommending measures to ensure the consent conditions incorporate a suitable monitoring and performance standard compliance regime as it relates to bats, lighting, and the protection and maintenance of the revegetated areas.

Ngaa mihi | Kind Regards
Gerry Kessels

Principal Ecologist/Managing Director



M: 027 286 8449

Kessels & Associates Ltd trading as Bluewattle Ecology

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From: Michael Parsonson <michael@southernskies.co.nz>
Sent: Friday, 15 October 2021 2:30 pm
To: gkessels@bluewattle.co.nz; James Oakley <james@wainuienvironmental.co.nz>; Peter Stacey <Peter.Stacey@ghd.com>
Cc: Jorge Rodriguez <Jorge.Rodriguez@waikatoregion.govt.nz>; connie.daws@waikatoregion.govt.nz
Subject: FW: WRC Section 92 request

Hi all

s92 response attached. Would you be able to review this by the end of next week?

Regards
Michael

From: Mike Wood <Mike.Wood@nzta.govt.nz>
Sent: Friday, 15 October 2021 2:13 pm
To: Michael Parsonson <michael@southernskies.co.nz>
Cc: Running, Tanya <tanya.running@wsp.com>
Subject: WRC Section 92 request

Hi Michael, see attached s92 request for WRC. This includes a number of attachments. Please note that our stormwater specialist has been attempting to contact James regarding some further clarification around request 3.

Regards
Mike

Mike Wood (he/him) MRP, MNZPI

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Project Number: 2-A0011.04

State Highway 1 and State Highway 29 Intersection Upgrade

Draft Bat Management Plan

9 November 2021



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Document Details:

Date: Updated 9 November 2021
Reference: 2-A0011.04
Status: Final

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1 Introduction

1.1 Purpose

This document presents a draft adaptive Bat Management Plan (BMP), prepared by WSP, for Waka Kotahi New Zealand Transport Agency (Waka Kotahi), for the proposed intersection upgrade of State Highway 1 (SH1) and State Highway 29 (SH29) (the Project). This BMP outlines and guides implementation of the required management of effects on long-tailed bats. This document accompanies the Assessment of Effects on the Environment (AEE) in relation to ecology, which forms part of the resource consent lodgement package submitted to Waikato Regional Council (WRC).

The scope of this BMP includes:

- Summary of potential effects on long-tailed bats resulting from the Project;
- Details of measures to avoid, remedy and/or mitigate adverse effects; and,
- Vegetation Removal Protocols to be implemented.

1.2 Long-tailed bats

The long-tailed bat (*Chalinolobus tuberculatus*), a species classified as 'Threatened -Nationally Critical'¹ is found widely throughout the North Island and is common within the Waikato Region. The species roosts in cavities and damaged trunks/branches of mature native and exotic trees and often utilise sheltered areas of woody vegetation for foraging and commuting. If bats are confirmed present within an area, it is necessary for potential effects on bats to be identified and appropriate mitigation measures implemented to avoid any harm or disturbance to the species. As a native species they are protected under the Wildlife Act 1953. Therefore, any harm (direct or indirect) caused to bats during construction activities can result in prosecution, if all practical steps to avoid this are not demonstrated.

1.3 Project Bat Ecologist

A nominated Project Bat Ecologist (PBE) will be responsible for the implementation of this BMP and the associated Vegetation Removal Protocol (VRP) presented in Appendix A. As described in the Department of Conservation's (DOC) Bat Recovery Group, Bat handling competencies authorisation (Version 1.2, September 2021)², the PBE must be certified as "Competent" to the following levels:

- Competency 2.1.1: Bagging, storage, handling, measuring, weighing, sexing, aging, temporary marking and releasing appropriately.
- Competencies 3.1, 3.2, 3.3: High risk activities – Roost felling

¹ O'Donnell, C.F.J.; Borkin, K.M.; Christie, J.E.; Lloyd, B.; Parsons, S.; Hitchmough, R.A. (2018). Conservation status of New Zealand bats, 2017. New Zealand Threat Classification Series 21, Department of Conservation, Wellington, New Zealand.

² Bat Handling competencies authorisation provided in Appendix A.

2 Potential effects on long-tailed bats

There are potential direct and indirect effects on long-tailed bats that have been identified, both during- and post-construction. These effects are:

- Construction phase
 - mortality/injury during vegetation removal;
 - habitat loss; and
 - noise, vibration and light disturbance during construction.
- Operation phase
 - fragmentation; and
 - artificial light pollution.

The management of these effects are addressed in sections 3 to 6 below.

3 Construction phase

3.1 Avoiding mortality/injury during vegetation removal

3.1.1 *Assessment of vegetation for roosting potential*

Potential roosting habitat has been identified within the designation boundaries of the roundabout and the stormwater discharge works (as detailed in the AEE) and will be impacted by construction. Prior to the earthworks and vegetation clearance required for the construction of the access track, discharge and associated erosion protection structures, the PBE will undertake a roost tree suitability assessment of the vegetation proposed to be removed.

All potential roost trees will be marked, given an ID number and their location recorded on a GPS device. This information will be used as a reference to improve efficiency during tree clearance, and to ensure no potential roost trees are accidentally felled.

3.1.2 *Avoiding direct harm to bats*

There is a possibility that vegetation to be felled could be an active bat roost and, as mentioned in section 1.2, it is important that measures are taken to avoid direct harm to bats. Strict protocols (VRP, Appendix A) therefore must be implemented for **all** vegetation to be removed or pruned for construction purposes. The protocols outline monitoring and inspection methods to be used to ensure bats are not occupying vegetation immediately prior to removal, such as:

a) Acoustic monitoring

This involves the installation of automated bat monitors (ABMs) in the tree(s) that are to be removed, for at least two consecutive nights preceding tree clearance and with weather conditions favourable for bats (see Appendix A). If ABMs detect bat activity in the vicinity of the subject tree(s) further investigation through visual inspections and/or roost watches are required. If no activity is detected on the two nights immediately prior to clearance, then the tree can be removed on that same day.

b) Visual inspections

This method requires arborists to climb all vegetation (where safe to do so), under the supervision of the PBE, and inspect all identified roost features or areas of the tree the PBE cannot see from the ground. Arborists will relay any potential evidence of bats (e.g. urine staining, cavities, droppings) by way of live audio-visual equipment and/or photographs for review by the PBE. This inspection must be undertaken immediately prior to (same day) removal. At the time of visual inspections, the PBE may also use a thermal camera to inspect roost features from the ground.

c) Dawn/dusk roost watches

This method will be used when vegetation is not safe or not practical (i.e. dense ivy covering tree) for arborists to climb. Vegetation will be subject to two consecutive nights of watches at both dusk and dawn, carried out by PBE and at least one other experienced ecologist where health and safety considerations allow. A thermal camera and handheld acoustic detectors will be used to assist with observations. If the PBE is confident after the second dawn watch that bats are not occupying the subject vegetation, then it can be removed on that same day.

d) Active bat roosts

If bats are confirmed, via the methods above, to be roosting within the subject vegetation, it must not be felled. The roost will be isolated and marked, and all relevant staff will be notified to ensure the roost is not removed or disturbed by nearby construction activities. The PBE will consult with suitable WRC and DOC staff to decide an appropriate way forward before any further monitoring

and subsequent clearance can occur. This will be a risk assessment-based approach, dependent on the type of roost identified

3.2 Habitat Loss

3.2.1 Avoidance

To minimise the effects of roost habitat loss, tree clearance will be kept to a minimum, and only removed when absolutely necessary. A total of six exotic trees of moderate roosting suitability have been proposed for removal within the roundabout footprint, which will be unavoidable.

However, for the stormwater discharge and associated access track works, there will be opportunities for avoidance. Several mature trees with varied moderate to high roosting suitability have already been identified by ecologists, and as a result these trees will not be removed. The approximate location and path of the access track has now been decided but there are further opportunities for avoidance of roost trees achieved through minor adjustments to the track design.

To guide these alterations and finalisation of the track design, a walkover meeting between the PBE, contractors and engineer representatives will be held. The PBE will then identify any high value roost trees that will be affected by construction and will discuss options for avoidance by moving the track away from the potential roost tree and its dripline.

The finalised track will be clearly delineated using tape and/or marker pegs to ensure that no trees are unnecessarily removed.

3.2.2 Mitigation

Mitigation for the loss of potential roost trees will be offered in the form of planting of both native and exotic tree species. Exotic tree species tend to mature and produce roosting features much faster than native species. Table 1 provides a list of both exotic and native species, known to provide such habitat for bats, and will be considered for mitigation planting.

For the loss of **each** tree assessed as having “high” roosting suitability the following mitigation will be provided:

- Planting of eight trees (1:8 ratio); four of which will be exotic species and four will be native species.

If roosting bats are confirmed within any of the vegetation to be removed (while implementing the Vegetation Removal Protocol), and the tree cannot be retained by any means, then the PBE will consult with suitable WRC and DOC staff to decide an appropriate way forward. This will be a risk assessment-based approach, dependent on the type of roost identified. The following mitigation will also be provided:

- Planting of eight trees (1:8 ratio); four of which will be exotic species, and four will be native species; and
- Installation of four artificial bat boxes of the “kent” design on a suitable tree(s) adjacent to the designation, and with aluminium predator exclusion banding situated both above and below the boxes. Locations and installation will be under the guidance and supervision of the PBE.

The PBE shall also determine whether any natural roosts found during tree clearance. (i.e. cavities and their extents) can be relocated and attached to another tree that will be unaffected by construction, therefore preventing the loss of the roost.

If planting of trees is required (due to loss of high suitability and/or confirmed roost trees). The formation and location of the plantings will be considered in a way that will naturally encourage foraging and commuting behaviours. Trees can be planted to provide further edge habitat; whether this is a single external edge, or in a tunnelling formation to provide both internal and external flyways. Trees will also be planted in areas that are able to grow and eventually decay naturally without encroaching into road corridors or areas that will pose future threats to safety and therefore as a result, have to be felled.

Table 1. List of exotic and native tree species that will be considered for mitigation planting, if required.

Common name	Latin name
<i>Exotic species</i>	
Giant gum	<i>Eucalyptus regnans</i>
Brown Barrel	<i>Eucalyptus fastigata</i>
Messmate	<i>Eucalyptus obliqua</i>
Tasmanian Blackwood	<i>Acacia melanoxylon</i>
Radiata pine	<i>Pinus radiata</i>
London plane	<i>Platanus x acerifolia</i>
Sessile oak	<i>Quercus petraea</i>
<i>Native species</i>	
Ti kouka	<i>Cordyline australis</i>
Kahikatea	<i>Dacrycarpus dacrydioides</i>
Rimu	<i>Dacrydium cupressinum</i>
Kanuka	<i>Kunzea</i> var.
Manuka	<i>Leptospermum</i> var.
Mahoe	<i>Melicetyus ramiflorus</i>
Totara	<i>Podocarpus totara</i>
Matai	<i>Prumnopitys taxifolia</i>
Tawa	<i>Beilschmiedia tawa</i>

3.3 Minimising fragmentation

Embankment planting (from a landscape architecture aspect) is currently planned on all sides of the roundabout, as well as specimen trees along the cycleway for shading. The PBE will work with landscape architects to incorporate tall growth tree species into the vegetation management plan to encourage commuting bats through the landscape. These trees will also help to guide bats safely over the roundabout, reducing the already minor risk of collision with vehicles. Minimising fragmentation will also be achieved by the installation of best practice lighting as outlined in Section 4.1, whereby bats will tend to avoid the lit zones (pers. obs. Caitlin Dodunski, Simon Chapman) and oncoming traffic by flying over the top or around. In addition, the general improvement of road lighting from the current situation should encourage bats to commute within the adjacent landscapes more often.

3.4 Minimising noise and vibration disturbance to active roosts

While long-tailed bats can roost and remain very active close to lit sections of road and appear tolerant in many situations of the associated traffic noise and vibration, the variability and less predictable nature of construction related disturbance potentially risks affecting the bats normal behaviour.

Noise and vibration, or even light from vehicles and plant could cause disturbance, including causing them to abandon roosts or emerge later than is optimal for foraging. Considering these risks, measures need to be implemented to minimise the potential for disturbance associated with active roost trees.

In the event that a roost is located by the PBE during vegetation clearance (while enacting the requirements of the VRP) the following actions will be taken:

- a) The immediate area of the roost will be cordoned off with safety fencing and signage erected, alerting any person approaching the area that a bat roost is present and to stay clear;
- b) The existence of the roost will be widely publicised to all construction staff and work instructions for the immediate area will be updated to reflect the presence of the roost and the measures to minimise disturbance; and
- c) No construction activities will take place within 50m of the roost from 2 hours before official dusk to 1 hour after official dawn unless approval is given by the PBE.

4 Operational Phase

4.1 Minimise artificial light pollution

To minimise light spill into the surrounding environment, low intensity, longer-wavelength and warm colour LED lighting will be installed. The following specifications will be followed for installation of all lighting:

- Luminaires shall produce no direct upwards light;
- Luminaires shall have a maximum colour temperature of 2700K (white); and
- Light levels on the boundary of key bat habitats (as presented in Figure 1) will not exceed 0.3 Lux.



Figure 1. Key bat habitats where light levels will not exceed 0.3 Lux.

Artificial lighting currently present along the SH1/SH29 intersection will also be decommissioned.

Landscape planting on all sides of the roundabout will block the majority of headlight glare from vehicles therefore reducing effects of headlight glare from what is currently present.

5 Reporting

A Tree Clearance and Mitigation Report will be submitted to Waikato Regional Council within 2 months following completion of all tree felling associated with this Project and will include:

- Details of all trees felled (GPS location, species, DBH, photos and roost suitability rating), and actions taken to ensure no bats were harmed during clearance;
- Details of measures taken to avoid wherever possible, felling of trees assessed as having high roosting suitability, or of confirmed bats roost trees; and
- Details and quantities of required mitigation based on number and quality of roost trees removed (as outlined in Section 3.2.2). This will include proposed planting sites and their protection and management, locations of artificial roost boxes and proposed management.
- Confirmation that mitigation for habitat loss (if required) has been implemented.



Appendix A

Vegetation Removal Protocol



Appendix A

Vegetation Removal Protocol

Adapted from:

Smith, D.; Borkin, K.; Jones, C.; Lindberg, S.; Davies, F.; Eccles, G. 2017. Effects of land transport activities on New Zealand's endemic bat populations: reviews of ecological and regulatory literature. NZ Transport Agency research report 623. Annex DH.

and,

Bat handling competencies authorisation. Version 1.2. 7/09/21. Department of Conservation, Bat Recovery Group.

1 Introduction

This document presents Vegetation Removal Protocols (VRP) to be implemented prior to removal of all vegetation for construction of the SH1/29 Intersection upgrade (the Project). These protocols follow industry best practice adhering to both the Bat Management Framework set out by Waka Kotahi New Zealand Transport Agency¹ and the Department of Conservation's Bat Roost Protocols (2021)²

These protocols are specific to this Project and they aim to provide clear, concise procedures that are to be followed prior to the removal of all vegetation for the Project, with the goal of avoiding mortality or injury to long-tailed bats during clearance activities.

There are four protocols that must be adhered to:

- Protocol A: Identification of potential bat roost habitat;
- Protocol B: Pre-felling procedures;
- Protocol C: Felling procedures; and
- Protocol D: Bat Injury or Mortality.

1.1 Project Bat Ecologist

A nominated Project Bat Ecologist (PBE) will be responsible for the implementation of these protocols. The PBE, or any ecologist overseeing clearance activities on behalf of the PBE must be certified as "Competent" to the following levels as described in the Bat handling competencies authorisation (DOC, 2021)³, and are required to be present on site **at all times** during vegetation removal:

- Competency 2.1.1: Bagging, storage, handling, measuring, weighing, sexing, aging, temporary marking and releasing appropriately.
- Competencies 3.1, 3.2, 3.3: High risk activities – Roost felling

¹ Sedgeley, J.; O'Donnell, C.; Lyall, J.; Edmonds, H.; Simpson, W.; Carpenter, J.; Hoare, J.; & McInnes, K. 2012. DOC best practice manual of conservation techniques for bats. Version 1.0. Inventory and Monitoring Toolbox: Bats, Department of Conservation.

² Bat Roost Protocols. Protocols for minimising the risk of felling bat roosts. Department of Conservation, Bat Recovery Group. Version 2 October 2021

³ Bat Handling competencies authorisation provided in Appendix A.

2 Vegetation Removal Protocols

2.1 Protocol A: Identification of potential bat roost habitat

Prior to undertaking this protocol, ensure the designation boundaries have been visually delineated using flagging tape or boundary pegs, to ensure all trees that are required for removal are assessed appropriately. This also ensures that no more vegetation than necessary is removed.

- 1 All vegetation that might be disturbed and/or removed for construction must first be assessed by the PBE for presence of roost features. Vegetation identified as potential bat roosts⁴ are those >15 cm Diameter at Breast Height (DBH) and have one or more of the following attributes:
 - Cracks, crevices, cavities, fractured limbs, or other deformities, large enough to support roosting bat(s);
 - Sections of loose flaking bark large enough to support roosting bat(s);
 - A hollow trunk, stem or branches; and/or
 - Deadwood in canopy or stem of sufficient size to support roost cavities or hollows.

Based on the presence (or absence) of the above, vegetation must then be categorised⁵ as to their suitability as bat roosts (Table 1). This method was adapted from roost tree assessments conducted for the Southern Links Project (AECOM, 2019).

Table 1: Criteria for assessing vegetation for their suitability as bat roosts.

Suitability as a roost	Justification of assessment	Further survey required?
Low	A tree of at least 15cm DBH but no roost features visible or with only limited roosting potential i.e. loose bark present, but not sufficient to provide shelter for roosting bats.	No
Moderate	A tree of at least 15cm DBH with one or more roost features that could be used by individual bats or where it is not clear from the ground inspection whether roost features are present or not and therefore requires further inspection.	Yes
High	A tree of at least 15cm DBH with one or more roost features which could provide habitat for several bats due to their size and ability to provide sufficient shelter and protection.	Yes
Confirmed	A tree known to have been used by bats as a roost tree.	Yes

⁴ Roosts tend to be observed in mature trees that are >15cm DBH; however, native bats have also been observed in tree ferns, cabbage trees and epiphytes, therefore this vegetation should also be considered as potential roost habitat.

⁵ This method was adapted from roost tree assessments conducted for the Southern Links Project (AECOM, 2019).

- 2 Potential (those assessed as moderate suitability or higher) or vacant bat roost trees must only be removed between 1st October and 31st April. Weather parameters provided in Section 2.2.1 must also be met before any potential bat roost trees can be removed.
- 3 All trees of at least moderate suitability shall be subjected to pre-felling monitoring as per Protocol B.
- 4 No trees or vegetation identified as potential roosts can be felled or cleared without the approval of the PBE.

2.2 Protocol B: Pre-felling procedures

For all vegetation assessed as having moderate or high suitability as bat roosts using Protocol A, occupancy will be confirmed using a combination of methods outlined below, immediately prior to vegetation clearance. The most effective method(s) will be determined by the PBE on a case-by-case basis.

2.2.1 *Acoustic monitoring via Automated Bat Monitors*

Due to current knowledge of bat activity being common within the Project area, this method will likely be used as supplementary information to visual inspections, and/or roost watches, as detailed in the following sections. If acoustic data is to be solely relied upon for confirming presence or absence of roosting bats, monitoring must be undertaken using the following methods and parameters:

- 1 The identified potential roost tree(s) will be acoustically monitored for two consecutive “valid” survey nights immediately prior to felling.
- 2 The Automatic Bat Monitors (ABMs) should be placed so that detection of bats is likely if they are using the potential roosts.
- 3 Monitors will be programmed to detect activity from one hour before official sunset dusk until one hour after official sunrise.
- 4 A “valid” survey night requires the following overnight weather conditions:
 - (a) Air temperature remains above 10°C until four hours after official sunset;
 - (b) Rainfall of < 2.5mm in the first two hours after official sunset, and <5 mm in the first four hours after official sunset.
 - (c) Where a night of monitoring is lost to adverse weather, or equipment failure, further monitoring will take place until two consecutive nights of monitoring is achieved.
- 5 If no bat activity is detected at any time during the two consecutive valid survey nights, then the tree(s) can be removed the same day without any further monitoring.

2.2.2 Visual inspections

This will be the predominant method used on the Project due to the likelihood of consistent bat activity being detected on ABMs on nights preceding vegetation removal, and particularly within the more densely vegetated habitats. The extents of all potential roost features will be inspected for presence of bats. If roost features are low enough, the PBE will undertake the inspection, however if they cannot be reached, or the full extent of the vegetation cannot be seen by the PBE from the ground, arborists will be required to climb and inspect the tree, under supervision of the PBE. The following guidelines are to be used:

- 1 All vegetation identified as having moderate-high suitability as a roost may be inspected to confirm occupancy by roosting bats.
- 2 An arborist may undertake a visual inspection of vegetation by climbing (under guidance and supervision of the PBE) and relaying any potential evidence of bats (e.g. urine staining, cavities, droppings) by way of live audio-visual equipment and/or photographs for review of the PBE. This must be undertaken immediately prior to (same day) removal. The arborist will also check for signs of roosting bats using a handheld bat detector (to detect social and echolocation calls from roosting bats).
- 3 Arborists may carefully inspect and check the extents of split branches, and if necessary, use an endoscopic camera to inspect cavities for presence of roosting bats.
- 4 If potential roosts are located within tree ferns or other 'delicate' vegetation, climbing will only be undertaken if it is safe to do so for the climber and if this will not damage the roost or disturb potentially roosting bats at the time of inspection. All climbing must take place under the careful supervision of the PBE to prevent roost damage or disturbance/injury to roosting bats. Photographs will be taken of any roosts or roost evidence found.
- 5 A thermal camera may also be used from the ground to inspect any roost features at the time of tree inspections. This technique is useful when a particular branch or tree cannot be climbed to provide certainty that a tree is unoccupied.
- 6 If no bat activity or evidence of roosting bats at the potential roost trees is identified and the PBE determines the vegetation can be removed, this information should be relayed to the contractors in sufficient time to allow clearance of vegetation to be completed prior to dusk the same day.

2.2.3 Dusk/Dawn Roost Watches

This method will be used if potential roosts cannot be ruled out using visual inspection techniques and/or a tree cannot be climbed (e.g., vegetation that is unsuitable for climbing, dense ivy covering). In this instance, the following methodology should be implemented.

- 1 Roost emergence and re-entry watches⁶ will be undertaken for two consecutive valid survey nights prior to removal, and require the same weather conditions as described in Section 2.2.1 (4a-c).
- 2 Each tree shall be watched from just prior to official sunset and continue until it becomes too dark to see by people observing all potential exit points. Bats begin to leave their roosts while there is still light outside therefore there is potential to observe bats without the aid of cameras or video equipment.
- 3 The tree shall then be watched the following morning to determine if bats return to the tree(s), at a minimum two hours prior to official sunrise, or two hours prior to when the last passes were recorded on ABMs on previous nights.
- 4 Hand-held bat detectors will be used to alert the ecologist(s) to the presence of bats nearby, narrowing down the potential roost site locations and allowing roosts to be confirmed. ABMs should also be deployed simultaneously.
- 5 A thermal imaging camera should be used wherever possible to assist in the detection of bats and provides the opportunity to review footage should there be any bat passes observed and/or heard.
- 6 If no bat activity at the potential roost tree(s) is identified after the second re-entry watch and the PBE is confident that no bats are roosting within the subject tree(s), then it can be removed. Removal must occur on the same day following roost watches (i.e., if the survey ends in the morning, the tree can be felled the same day only. If the tree is not able to entirely felled and there is residual risk (roost features still present), then roost watches must continue.

2.3 Protocol C: Felling Protocol

- 1 If bats are confirmed via either of the methods detailed above, to be roosting within the tree, it must not be felled. The following actions will be taken:
 - (a) Roost trees should be clearly marked, and the immediate area will be cordoned off with safety fencing and signage erected in a 10 m radius around the roost, alerting any person approaching the area that a bat roost is present and to stay clear.
 - (b) The PBE will notify the Waikato Regional Council (WRC) and DOC within 12 hours of when the occupied bat roost was discovered and provide relevant information such as photos, location, date(s), tree species, roost type and methods used to confirm bat presence.
 - (c) All relevant Project staff will be briefed to ensure the tree is not removed. The PBE will determine whether all tree clearance works should be suspended or whether inspections and clearance can continue away from the roost.

⁶ Two sessions required per "valid survey night" i.e. one emergence watch and one re-entry watch per night until two consecutive nights with no roosting bat activity is observed.

- (d) Further monitoring must continue until the PBE can confirm that no bats are roosting within the vegetation in question.
 - (e) If the tree is a maternity roost tree removal works shall be scheduled to only occur within the period 1 March to 31 April inclusive.
 - (f) The PBE will review whether it is possible to relocate the roost into an area that would remain of value to bats, for example. could the hollow be kept and attached to another tree as a bat box? Could the tree be relocated as standing dead timber? Therefore, preventing the loss of the roost through careful repositioning.
 - (g) If bats are confirmed to still be roosting within the vegetation after fourteen nights of monitoring, then a meeting will be set up by the PBE between suitable Waikato Regional Council and DOC staff to decide on an appropriate way forward. This will be a risk assessment-based approach dependent on the type of roost identified.
- 2 The PBE should be onsite to supervise all potential vegetation clearance operations and to advise staff should bats be detected (either leaving trees or injured) and to inspect each felled tree or vegetation for signs of bats. Removal must occur on the same day as per the pre-felling procedures listed in Protocol B. If this is not possible then monitoring and/or repeat inspection of roost features must be continued until the tree can be removed in its entirety.
 - 3 Potential or vacant bat roost trees will only be removed between 1st October and 30th April. However, trees that are identified as “potential roost trees” from the ground based on limited visibility but are later climbed by an arborist to find that no roost features are present, are exempt from this period, and can be felled at any time.
 - 4 If bats are detected while felling is in progress, felling must stop long enough to allow any uninjured bats to escape (if it is safe to do so). Felling should only resume after consultation with DOC and the PBE. Every effort should be made to relocate the section of the trunk/branch where the bats were roosting before felling may recommence.
 - 5 Attempts should be made to capture any observed bats (those that don’t fly away) by the PBE for assessment. Any bats found should be placed in a cloth bag in a dark, quiet place at ambient (or slightly warmer temperatures and Protocol D shall be implemented.
 - 6 All potential bat roost vegetation shall be thoroughly inspected immediately after felling with the aid of a handheld detector by the PBE, to check for any roosting bats remaining within the tree.

2.4 Protocol D: Bat Injury or Mortality

In the event of finding a bat during tree removal, the following procedures will be implemented:

- 1 Bats will be placed in a dark material-lined bag by the PBE to ensure the bat is handled appropriately, and put in a dark, quiet place at ambient (or slightly warmer temperatures A maximum of two bats should be kept in one bag.
- 2 Bats will be taken immediately to the nearest available veterinarian for assessment/treatment. The veterinarian will make a decision as to whether to euthanise the bat, or if its injuries/or lack thereof will allow rehabilitation and return to the wild



- 3 DOC must be notified and consultation between the vet, the PBE and DOC will be undertaken to decide an appropriate rehabilitation programme for the bat(s).
- 4 If the bat is dead or has been euthanised by the veterinarian, it will be taken to the local DOC office as soon as practicable (required under the Wildlife Act 1953). The bat(s) must be stored in a fridge at less than 4°C.



Appendix A

Bat Ecologist Competencies

Bat handling competencies authorisation

Version and Date: V 1.2, 7/9/2021

Revision date: 7/9/2021

Approved by: Bat Recovery Group

1. Context:

- Certification by the NZ Bat Recovery Group is required for any permits that require handling bats (for NZ Wildlife Act 1953 Authorisations).
- New Zealand bats, which are threatened species, are small, delicate and thus vulnerable to injury if handled incorrectly. Therefore, anyone that handles them must have levels of competency that ensure they are handled ethically. A competent handler will know how to catch, hold and release appropriately, understand if a bat is in torpor or not and adjust their handling appropriately, and when and how to attach monitoring devices.
- Bat workers can reach a level of competency in up to 27 skills described below.
- Each skill is represented by a separate competency.
- Details of skill requirements are outlined in the NZ Bats Best Practice Manual:

<http://www.doc.govt.nz/Documents/science-and-technical/inventory-monitoring/im-toolbox-bats/im-toolbox-bats-doc-best-practice-manual-of-conservation-techniques-for-bats.pdf>).

2. Purpose:

To outline the ethical standards required to be registered as competent, authorised bat workers by the NZ Bat Recovery group.

3. Definitions and registration processes:

- **Registered Bat Trainee:** A person who has registered with the Bat Recovery Group as a Trainee.
- **Bat Banding Trainee:** A person who has registered with the NZ Banding Office as a Level 1 bat bander.
- **Trainee Log:** A logbook of all training sessions undertaken, with each session signed by an Authorised Trainer. Logbooks are available from bathandler@doc.govt.nz or from DOC—6228629).
- **Competent bat worker:** A person who has been certified as ‘Competent’ in a particular skill by the NZ Bat Recovery Group.
- **Authorised Trainer:** A person who is registered as competent in a particular skill AND has been authorised by the Bat Recovery Group to teach and supervise Registered Trainees in that skill (but only if they are working under an existing Research or Collection Permit and Wildlife Act Authority or if they are a Department of Conservation Trainer). The Trainer **must** be present for all training and inspect all competency activities.

4. Training:

- While people are designated as Trainees, training must occur under the direct supervision of an Authorised Trainer (see above).

- Once a competency or competencies has/have been signed off by the Bat Recovery Group, the bat worker can work independently with respect to that skill(s) (if they have the appropriate permits).
- The Trainee will keep a logbook that describes experience in each competency (DOC-6228629). This needs to be signed by an Authorised Trainer(s).
- The Trainee must have read and understood the NZ Bats Best Practice Manual (see link above).
- Trainees can be certified either in individual competencies or multiple competencies. Like bird banding in New Zealand, it is envisioned that for most trainees it may take several years to achieve all competencies because opportunities for hands-on bat work are limited.

5. Application for competency:

- When trainees reach target handling levels described under each competency, they may apply to the Bat Recovery Group, via bathandler@doc.govt.nz, for certification in that competency. However, reaching the target level does not automatically give the applicant certification and an application for competency must be accompanied by a letter of endorsement in writing from at least one Authorised Trainer.
- Applicants can apply for certification for single or multiple competencies.
- Applications must include a short summary of bat handling experience, copies of signed training logs, and the names of two bat trainers that can attest to the applicant's competency.
- Applications will be reviewed by the Recovery Group at its monthly meeting.
- Applicants will receive confirmation of competency from the Recovery group within 2 months of applying.
- If competency for banding long-tailed bats is sought then the Trainee must apply to the Department of Conservation Banding Office for Level 1 Bander registration (bandingoffice@doc.govt.nz) after filling in the appropriate form (Level 1 banders; <https://www.doc.govt.nz/our-work/bird-banding/how-to-become-a-certified-bander/>).

6. Rescinding competency:

- The Bat Recovery Group may rescind certification if practitioners are no longer considered competent or do not follow Best Practice.

7. Authorised trainers:

- Competent bat workers may apply in writing to the Bat Recovery Group, via bathandler@doc.govt.nz, to be Authorised Trainers.
- Authorisation is at the discretion of the Recovery Group and discussion with the Recovery Group is recommended before applying.
- Applicants can apply for authorisation for training against single or multiple competencies.
- Authorised Trainers must be able to demonstrate:
 - a. A deep understanding and experience of the ecology of New Zealand bats.
 - b. Considerable experience well beyond competency levels in catching, handling and manipulating bats.
 - c. A strong aptitude for, and experience of, teaching others about bats.

- d. A clear understanding of teaching standards.
- e. Knowledge of the Wildlife Act and Wildlife Regulations as they apply to working with bats.
- f. Effective communication skills, understanding of Health & Safety requirements, and administration of records.

8. List of competencies:

Catching bats

1.1 Use of mist nets

- 1.1.1 Extract, bag and store correctly a total of 30 individuals of either species
- 1.1.2 Demonstrate correct mist net placement, set up, smooth operation, appropriate mist net attendance, assessment of risks and safe extraction and handling on 10+ different nights

1.2 Use of harp traps (free standing)

- 1.2.1 Lead identification of appropriate harp trapping sites and set up and monitor trap(s) on 10+ different nights
- 1.2.2 Extract 10+ bats appropriately from free standing traps
- 1.2.3 Demonstrate harp trapping protocols (animal welfare considerations, trapping in the breeding season, rain, repair and maintenance etc)

1.3 Use of harp traps (at roost entrances)

- 1.2.4 Lead set up and monitoring of trap(s) on 10+ different nights
- 1.2.5 Extract 10+ bats appropriately from traps hoisted up trees
- 1.2.6 Demonstrate harp trapping protocols at roost entrances (safe trapping at tree roosts (risk management), predation risks, disturbance risks, animal welfare considerations, trapping in the breeding season, rain, repair and maintenance etc)

2. Handling bats

2.1 Bagging, storage, handling, measuring, weighing, sexing, aging, temporary marking and releasing appropriately:

- 2.1.1 For long-tailed bats: 50 individuals
- 2.1.2 For short-tailed bats: 50 individuals

2.2 Banding long-tailed bats:

- 2.2.1 50 individuals
- 2.2.2 Demonstrate knowledge of how to remove bands safely (2 methods; demonstrate on model bat)

2.3 Pit-tagging insertion in short-tailed bats:

- 2.3.1 Pit-tag insertion to short-tailed bats
- 2.3.2 Bat handling for pit tagging

Note that that transponder skills require exacting standards and specialised training from a select few people, and if people need this skill, they should contact the Bat Recovery Group to apply to get trained.

2.4 Attaching radio transmitters (should first be competent in 2.1 and/or 2.2):

- 2.4.1 For long-tailed bats: watch 5 individuals having radio transmitters attached by a Competent Bat Worker or Authorised Trainer
- 2.4.2 For long-tailed bats: attach radio transmitters to 5 individuals correctly under supervision
- 2.4.3 For short-tailed bats: watch 5 individuals having radio transmitters attached
- 2.4.4 For short-tailed bats: attach radio transmitters to 5 individuals correctly under supervision
- 2.4.5 Demonstrate understanding of reasons for attaching transmitters, Animal Ethics issues, (risk management and animal welfare considerations, trapping

2.5 Taking wing biopsies

- 2.5.1 Watch 5 individuals having biopsies taken by a Competent Bat Worker or Authorised Trainer
- 2.5.2 Take biopsies from 10 individuals under supervision
- 2.5.3 Understand and follow the Standard Operating Procedure (available on request from Bat Recovery Group Leader)

3. High risk activities – Roost felling (all of these competencies include the understanding of what to do when bats are found during tree felling as per Appendix 6 of 'Initial veterinary care for New Zealand Bats')

https://cdn.ymaws.com/www.nzva.org.nz/resource/resmgr/docs/other_resources/Initial_Vet_Care_NZ_Bats.pdf)

- 3.1 Assessing roost tree use using Automatic Bat Monitors - Demonstrate correct timing, placement, and interpretation of data for 10+ times according to DOC's Bat Roost Protocols.
- 3.2 Undertake roost watches/emergence counts at 10+ occupied roosts where the entrance is visible.
- 3.3 In at least two different forest/habitat types, including the forest/habitat type where trees are going to be assessed: evaluate 10+ potential roost features in trees (e.g., cavities, peeling bark, epiphytes).

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