BEFORE THE NEW PLYMOUTH DISTRICT AND TARANAKI REGIONAL COUNCILS

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER applications from NZTA to alter a designation and for resource consents for the Mt Messenger Bypass Project (SH 3 between Uruti and Ahititi).

COLIN FRANCIS JOHN O'DONNELL

SUPPLEMENTARY EVIDENCE ON BEHALF OF THE DIRECTOR-GENERAL OF CONSERVATION (Bats)

Dated: 5 October 2018

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1. INTRODUCTION

1.1. My full name is Colin Francis John O'Donnell.

1.2. I provided a Statement of Evidence in relation to this matter dated 24 July 2018 (Evidence in Chief or EIC).

1.3. This Supplementary Statement of Evidence responds to the second Supplementary Statements of Evidence of Simon Chapman and Roger MacGibbon for the NZ Transport Agency.

1.4. I have the qualifications and experience set out in my EIC.

1.5. I repeat the confirmation given in my EIC that I have read the Code of Conduct for expert witnesses and that my evidence has been prepared in compliance with it.

2. REMAINING ISSUES DOC/NZTA

2.1. The Second Supplementary Statements of Mr Chapman and Mr MacGibbon correctly set out the engagement that I have had with the NZ Transport Agency since adjournment of the hearing.

2.2. In my EIC I explained that:

(a) A pest control programme has the potential to benefit long-tailed bats if the pest control area is of a sufficient size and quality to have a high probability of maintaining or enhancing the breeding success and survival of that species [9.11].

(b) Annual survival of adult female long-tailed bats must be greater than 79%. In my opinion if survival is lower than this, then pest control will not be effective at maintaining or restoring long-tailed bat populations and populations will decline [9.12].

(c) Predator control trials at Eglinton Valley show that to achieve this adult female survival rate, predator control must be focussed on known roosts and, in that example, when control was increased to 3350 ha with a sufficiently large buffer to achieve low pest numbers around roost trees, the desired survival rate for most colonies was achieved and the bat population is now increasing [9.16].

(d) In my EIC I suggested a minimum pest control area of 5000 ha, as a pragmatic size, to maximise the chance of protecting roost trees where we could be reasonably confident survival will achieve ≥ 80% with sustained control [9.18]. That was on the understanding that roost trees had not been identified (through radio-tracking).

Identifying a PMA through radio-tracking long-tailed bats

2.3. The NZ Transport Agency now proposes a radio tracking (monitoring) programme in order to identify long-tailed bat maternity roosts. Broadly speaking, pest management will be related to the presence of maternity roost trees. This is a much-improved development in my view.

2.4. I have reviewed the radio-tracking techniques and study programme proposed for identifying maternity (breeding) roosting areas in the Mt Messenger area. This plan is now described in detail in Section 5.7.1 of the revised ELMP (dated September 2018). I can confirm that the study is well-designed and follows the Department of Conservation's best practice.

2.5. I agree with the definition of "maternity roost" in the conditions, for this purpose. Male roosts are usually solitary and often more widely dispersed and in different parts of the landscape. Maternity roosts should be the focus. They are most vulnerable to predation and habitat loss.

2.6. I agree with the bat monitoring methodology set out in paragraphs [13] – [19] of Mr Chapman's evidence, and the majority of proposed changes to the ELMP to reflect that. However, the revised ELMP in Section 5.7.1.4 (A) (paragraph 2) says that radio tracking will cease if 10 or more roosts are located in the PMA in a shorter time frame. This guideline should be focused on maternity roosts only. Stopping radio-tracking prematurely after finding 10 maternity roosts should only occur if those roosts are in the core of the PMA (see [2.9] – [2.11] below).

2.7. I also agree that roosts identified should be included within the Vegetation Removal Protocols, or if the radio tracking reveals that particular types of roost or roost tree species are favoured those will also be included.

2.8. I note that the revised ELMP and Condition 29 do not reflect DOC's standards for granting Wildlife Act Authorities for felling potential bat roosts in some respects. The Applicants have adopted my recommendations laid out in my EIC [9.7] – [9.9]. However, the Applicant's documents still propose only checking trees >80cm dbh (or ones 50-80 cm dbh at the bat ecologist's discretion). In my EIC I indicated that previous studies have identified that long-tailed bats roost in trees >15 cm dbh [8.11] – [8.12] and in one study, all roosts were <71 cm dbh [8.11]. I refer to my recommendation that the VRP be applied to all trees that are potential bat roosts trees between 15 cm and 80 cm diameter (dbh) [9.5], because there is the potential for bats to occupy these and be killed or injured. However, I would be happy for this Condition to state that the VRP should be applied to these trees at the discretion of the 'Supervising Bat Ecologist' [9.5].

Deciding if the Intended or other PMAs are suitable for long-tailed bats

2.9. Deciding on whether the Applicant's proposed "Intended PMA", the "Wider PMA", "Study Area" or "Alternative PMA" (Figures 1, 2 & 3 of Mr MacGibbon's Second Supplementary Statement of Evidence) should be accepted depends on the number of maternity roosts found, their locations in the greater Mt Messenger area, and their locations relative to the edge of the PMA.

2.10. If long-tailed bat maternity roosts do occur within the Intended PMA, some roosts almost certainly would be close to the forest edges, as I have found in previous long-tailed bat radio-tracking studies. However, in my opinion, if during the proposed radio-tracking study, the Applicants find 10 maternity roosts within the core of the Intended PMA, or, 10 roosts in the Study Area and a significant proportion of these are in the core area of the PMA (say 70%), I would be comfortable that the Intended PMA contained a significant number of roosts and that some would be adequately protected.

2.11. I consider this number adequate because it represents a realistic number of roosts to find during the Applicant's proposed radio tracking study period. It would also indicate that other maternity roosts are nearby (and thus, unidentified roosts would benefit from predator control), and the roosts would be farthest from the predator reinvasion front along the PMA edge. In my experience long-tailed bats roosts are

often found in clusters of trees, rather than being spread evenly throughout the landscape. Therefore, if several are found within the core area, there are likely others nearby.[1]

2.12. In my EIC, I set out the reasons why 'buffering' is important [9.22] – [9.27]. I made some comments about the PMA proposed at that time, that there was no buffer between the PMA and surrounding habitats e.g. north east and south west [9.25]. An area that is farther than 1 km inside the outer boundary of the PMA is the area in which I consider there would be a lower probability of predators reinvading if the control programme is effective.

2.13. In my EIC, I explained that the extent of the PMA that would be viewed as a 'buffer' area is based upon the movement distances of the predators being targeted for control [9.24]. I set out there that stoats move on scales of many kilometres as do cats. Ship rats move on smaller scales, although these can still be up to 800 metres at a time.

2.14. I remain of the view that the home range widths of target predators should be used to guide the design of the PMA and should guide what should be viewed as buffer areas. Unless there is very intensive pest control around the perimeter, only in the 'core' areas we can be confident that there is sufficient pest control to protect maternity roost trees, due to the risk of pest incursions from surrounding land.

2.15. In discussions with the NZ Transport Agency experts, and as explained by Dr Barea, DOC has agreed in principle that the Intended PMA may include the 1335 ha area of Parininihi if maternity roosts are confirmed by the radio tracking study to be located there. Although Mr MacGibbon states that refining the precise location of the Intended PMA has taken into account proportion of edge to core[2], the configuration does still have a high proportion of edge.

2.16. Mr Chapman states that DOCs proposed approach of treating the 1 km outer extent of the PMA as a buffer area is "unnecessarily conservative" and carries a high risk of leading to the Intended PMA and even the

[1] O'Donnell, C.F.J. 2001. Home range and use of space by *Chalinolobus tuberculatus*, a temperate rainforest bat from New Zealand. Journal of Zoology (London) 253: 253-264.
Monks, J.M.; O'Donnell C.F.J. 2017. Social implications of a colony collapse in a highly structured vertebrate species (long-tailed bat, *Chalinolobus tuberculatus*). Animal Conservation 20: 360-369.

[2] MacGibbon Second Supplementary at [46].

Applicant's Wider PMA and Study areas being rejected. In my opinion, for the long-tailed bat population, the risk of the PMA in closer proximity to the Project Area being rejected is a far lesser risk to choosing a PMA that has insufficient buffering.

Option of increased intensity of pest control over PMA

2.17. Acknowledging that NZTA wanted a greater certainty the Intended or Wider PMA areas could be used, DOC put forward an alternative option to the requirement that 10 or more maternity roosts (or a significant proportion) must be found in the 'core' area. With my input, this alternative option proposed that very intensive pest management would need to occur right around the entire boundary.[3] That is, the intensity of currently proposed predator control in the buffer areas would be increased significantly to protect those roosts. There would also need to be suitable ongoing annual monitoring of predators within the buffer zone so that the Applicants can adapt and intensify control if predator numbers remain too high. It is clear from NZTA's evidence that this option has not been accepted.

2.18. The current version of the ELMP appears to have no monitoring of predators along the edges, which is a critical omission, and only annual monitoring in the core after 5 years (ELMP Section 9.5.3.1). In addition, the ELMP proposes a two-year lag between recording high predator numbers and a management response after 5 years (Section 9.5.3.1). In the first five years of the predator control, the Applicant will monitor predator levels 3 times per year, which is normal practice for predator control operations. Monitoring 3 times a year provides information on relative predator levels, whether their numbers are above or below the target management threshold, and most importantly, the rate at which their population is increasing. In DOC, we use these data to predict whether we will need to intensify predator control over the following 3-6 months. The three monitoring sessions per year must be retained in perpetuity so that the Applicant can respond adaptively to changes in predator numbers in a timely manner.

[3] Email S Ongley, DOC legal counsel, to D Allan, NZTA legal counsel dated 21 September 2018: Suppressing Rat RTI to below 1% and maintaining non-detection for mustelids.

2.19. For management to respond to the situation where rat indices are above 5%, then monitoring must also occur in the forest edge zone (noting that Mr Chapman predicts that most roosts will be in this zone).[4]

Option of increased intensity of pest control around 5 roost trees

2.20. Following completion of discussions with NZ Transport Agency, I have considered the proposal set out in the NZTA witnesses' Second Supplementary Evidence for intensive pest management around 5 maternity roost trees that are located 500 metres from the edge of the PMA. This is a very small number of additional trapping devices considering the potential extent of bat habitat along edges (as suggested by Mr Chapman, above).

2.21. I understand the intensified pest management would consist of traps and bait stations installed at 20 metre spacings extended 50 metres out from the roost tree and be activated prior to the bat breeding season every year, maintained until the young of the year have left the maternity roosts.[5] Dr Barea's evidence comments on whether similar approaches have been successful for kokako, where it has been applied.

2.22. For bats, the approach of protecting only 5 roosts intensively does not provide any certainty that a bat colony will be protected in order to achieve the target of at least 80% annual survival of adult female long-tailed bats, for the following reasons:

(a) As stated in Mr Chapman's Second Supplementary Statement[6] the figure of 10 or more maternity roosts was chosen because "*10 maternity roosts found within the PMA during one field season would indicate that the Intended PMA provides important roosting habitat (noting that this would indicate that many more roosts would likely be found there if monitoring continued over multiple field seasons)*".

(b) Intensive pest management for five of these roost trees, if found within 500 metres of the outer boundary, would likely be a very small proportion of overall maternity roost trees in that landscape (fewer than 3% of a colony's maternity roosts). Although I stated in my EIC that bats often use the same roost tree again and again (moving on

[4] Chapman Second Supplementary at [27].
[5] MacGibbon Second Supplementary [31]-[32].
[6] [23(d)(i)].

a strict rotation among trees during the breeding season)[7], they do move within a larger number of roost trees. Long-tailed bats in all populations studied to date move to new roost trees virtually every day (70% of roosts in studies in the Waitakeres, King Country, Hawkes Bay, South Canterbury and Fiordland were used for one day). This means that individual colonies occupy in the order of >150 maternity roost trees during a breeding season.[8]

2.23. Similarly, as I stated in my EIC [9.15], in nearby Pureora Forest Park, survival of long-tailed bats has not been high enough to sustain their numbers. We attribute this to not maintaining rodent tracking indices below 5% because of reinvasion into the area. For example, tracking rates over the last four years have only been below 5% on 8 monitoring runs, and tracking averaged 22% overall. Therefore, we are currently expanding and intensifying control to encompass c. 5000 ha of surrounding farmland, forestry and other public conservation lands to provide an effective buffer.

2.24. Mr MacGibbon rightly points out that we were able to increase survival of long-tailed bats when rat tracking rates averaged 6.5% in the Eglinton Valley when the control covered 3350 – 4800 ha.[9] However, he omits the important context around these achievements; firstly that we knew exactly where the maternity roosts were and could centre the control on **all** the long-tailed bat roosts, and secondly, that this programme was supported by long buffering trap lines that were intended to capture reinvading stoats, extending up to 10 km from the core control area. I clarified these details in my Speaking Notes to the Hearing at [20].

The Alternative PMA

2.25. As stated in my EIC, I consider that if radio-tracking does not identify sufficient maternity roosts to achieve the results necessary to allow the PMA to be located in the Intended or Study areas, according to the conditions attached to Mr Inger's evidence, and if suitable buffering and predator control intensity cannot be achieved, the Alternative PMA in

[7] EIC at [8.6].

[8] O'Donnell, C. F. J. & Sedgeley, J. A. 2006. Causes and consequences of tree-cavity roosting in a temperate bat, *Chalinolobus tuberculatus*, from New Zealand. In: *Functional and Evolutionary Biology of Bats* (Ed. by Zubaid, A., McCracken, G. F. & Kunz, T. H.), pp. 308-328. New York: Oxford University Press.

[9] MacGibbon Second Supplementary at [37(c)].

nearby Waitaanga forest provides a useful solution for long-tailed bat compensation [9.27].

2.26. Previous surveys and radio tracking studies indicate that both long-tailed and short-tailed bats occur within the Alternative PMA (See Map 1).

2.27. The edge of the Alternative PMA is only c.16 km directly east of the top of the Mt Messenger road. It is close enough, that potentially, the bats being recorded in the Mt Messenger area by the Applicants could be from the same population. This is because my studies of the movements of long-tailed bats indicate they frequently forage 5 – 15 km from their roosting areas and colony range widths usually span c. 8.5 – 12 km [my EIC 9.20] with a maximum range recorded of 30 km.

2.28. Both Mt Messenger and Waitaanga are within the Taranaki Ecological Region and the same North Taranaki Ecological District, and much of the forest at Waitaanga is similar to the Mt Messenger conservation area (ie podocarp-hardwood forests with beech forest in more rugged area).[10] From the perspective of the habitat requirements of long-tailed bats, both sites would provide comparable bat habitat. Dr Barea's evidence provides more information on this site.

2.29. As I stated in my EIC [9.22] – [9.27], I have considerable reservations about the defendability of the PMA, largely because there is no external buffering against reinvasion of predators and the jagged shape makes it difficult to defend. I consider that the Alternative PMA is much better buffered, and its shape and area is conducive to pest control. This is because it is part of a more extensive and continuous forest block. It is also buffered well against reinvasion, because the whole forest has 3-yearly aerial 1080 applications across c. 19,000 ha of forest as part of DOC's Battle for our Birds programme.

2.30. This is similar to the approach we have used in the Eglinton Valley, where our intensive predator control has led to the maintenance and recovery of at least three long-tailed bat colonies. In the Eglinton, intensive predator control focuses over a core area of 5,000 ha with

[10] Nicholls, J. L. 1956. The historical ecology of the indigenous forest of the Taranaki upland. New Zealand Journal of forestry 7: 17-34.

extensive periodic control across an additional 22,000 ha in the surrounding habitat.

2.31. I am also comfortable that the Alternative PMA could be identified and managed without an additional radio-tracking study being undertaken, as long as the PMA is centred on short-tailed bat roosts identified previously (see Map 2). This is because in nearby Pureora forest in the King Country, and in the Eglinton Valley in Fiordland, where both long and short-tailed bats coexist, they have similar tree-roosting preferences[11] despite Pureora being dominated by podocarp-hardwood forests and Eglinton dominated by beech forests. In both places, both species roost in similar patches of forest and frequently roost very close to each other (sometimes in adjacent trees). Thus, I consider short-tailed bat roosts to be good indicators (or a proxy) for the presence of long-tailed bat roosts.

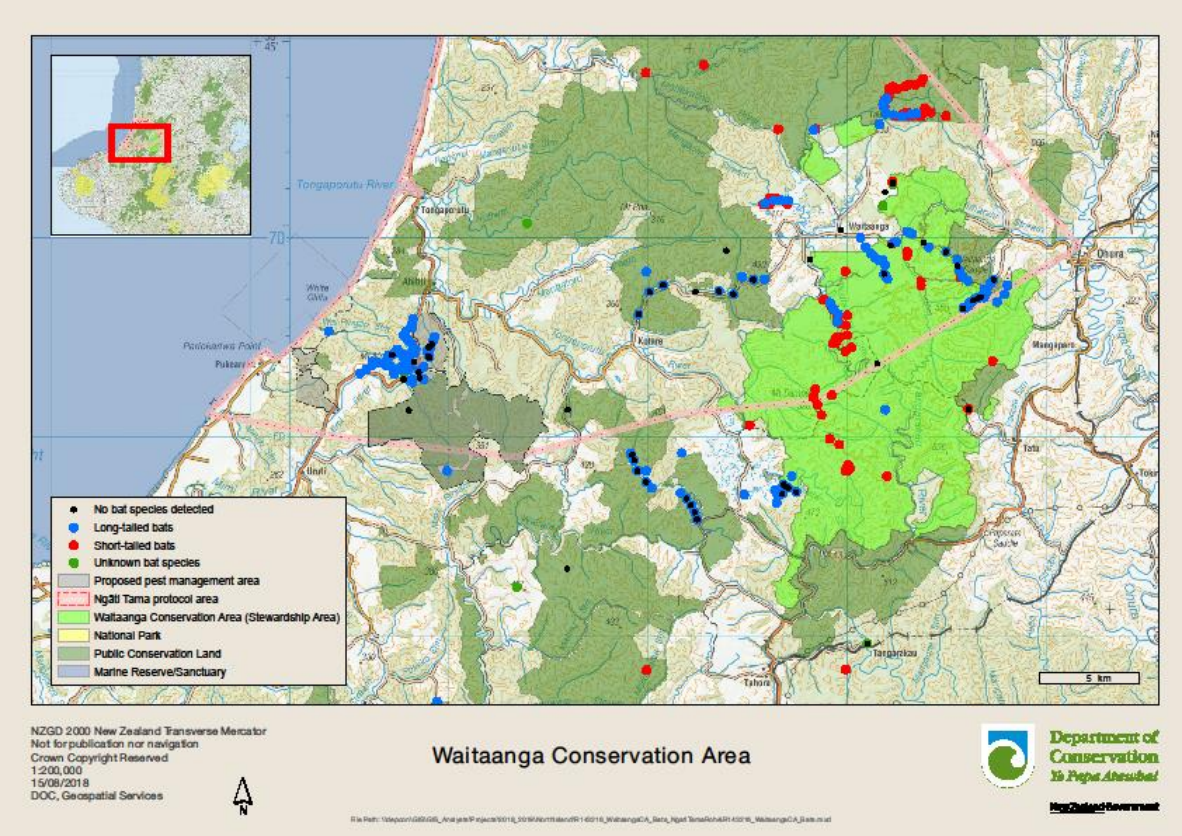
2.32. If the Alternative PMA is not centred on known short-tailed bat roosts, then a long-tailed bat radio tracking study will be required there.

Summary

2.33. In summary, I understand the Applicant's desire to locate the PMA in the areas it proposes, but for management of a species with a threat status of Nationally Critical such as the long-tailed bat, I consider a more conservative approach is required for the matter of buffering. In this respect, I agree with Mr Chapman that, for example in the Waikato Region, there are few areas remaining where DOC's criteria for pest control can be achieved. In situations where we *can* achieve pest control around known bat populations, in my opinion we should do so.

[11] Sedgeley, J.A. 2003. Roost site selection and roosting behaviour in lesser short-tailed bats (*Mystacina tuberculata*) in comparison with long-tailed bats (*Chalinolobus tuberculatus*) in Nothofagus forest, Fiordland. New Zealand Journal of Zoology, 30: 227–241;
Sedgeley, J. A.; O'Donnell, C. F. J. 1999. Roost selection by the long-tailed bat, *Chalinolobus tuberculatus*, in temperate New Zealand rainforest and its implications for the conservation of bats in managed forests. Biological Conservation 88: 261–276.

Map 1. Locations of all long- and short-tailed bat records in Waitaanga forest (from DOC's national database of bat records).



Map 2. Locations of short-tailed bat roosts identified during a radio tracking study of short-tailed bats at Waitaanga in 2002.