Before the Expert Panel appointed under the Fast-track Approvals Act 2024

Under	the Fast-track Approvals Act 2024
And	
In the Matter of	an application for approvals by NZSki Limited to upgrade existing infrastructure at the Remarkables Ski Area, including a new passenger transport lift, carparking areas, and expanding the ski field into the adjacent Doolans Basin

Statement of Evidence of **Dr Richard Mark Allibone** on behalf of NZSki Limited in response to Section 53 Comments

Freshwater Ecology

Dated: 3 November 2026

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INTRODUCTION

1. My name is Dr Richard Mark Allibone.

2. I have A BSc (Zoology), MSc (Zoology) and a PhD (Zoology) all attained at the University of Otago. My MSc thesis was a population genetics study of migratory (whitebait) and non-migratory species of galaxiids across South Island and Stewart Island. This research was one of the precursors to the recognition of the diverse non-migratory galaxiid fauna of the South Island and especially Otago. My PhD study was the first biological study of the Taiari River non-migratory galaxiids.

3. I have previously worked for the Department of Conservation in Otago leading the initial investigations into the non-migratory galaxiids of the area, including in the Nevis River catchment. I have been a Post Doctoral fellow at NIWA and subsequently a freshwater fisheries scientist where I continued my research on both migratory and non-migratory galaxiids. In 2000-2002 I worked for the Department of Conservation and species Protection Office in the Biodiversity Unit in Wellington and was the lead author on the three freshwater fish recovery plans that are still in use in the present day. For two years I was the National Services Manager for the Queen Elizabeth II National Trust, managing all the Trust field operations across New Zealand. In 2004 I joined Golder Associates as a Senior Freshwater Ecologist and in 2014 I left Golders and formed Water Ways Consulting where I am the Principal Freshwater Ecologist.

4. During my career I have worked on projects of relevance to the NZSki Doolans expansion, including the Kawarau Water Conservation Order amendment for the Nevis River and freshwater conservation assessments for the Treble Cone and Coronet Peak ski field for concession renewals. I have conducted a two-summer programme of freshwater fish and macroinvertebrate surveys of the Takapo Military Training Area that included stream surveys to an altitude of over 1400 m. I have also conducted fish surveys across the Otago high country including the Pisa Range, the Dunstan Mountains, the Hawkdun Mountains, Rough Ridge and the Rock and Pillar Range as part of the Tenure Review Programme and general survey work for the Department of Conservation and clients. From 2002 to 2018 I was a member of the Department of Conservation-administered Expert Panel conducting the freshwater fish threat rankings including chairing the process in the 2009 classification process.

5. I have also taken part in major consent processes for hydro-electric schemes including the Clutha and Waitaki schemes, the proposed Mokihinui hydroelectric dam and Lake Coleridge HEPS. I have previously assisted the Department of Conservation with surveys of high-country rivers including the upper Waitaki

catchment and the upper Rangitata River. I have worked excessively on water allocation projects including for the Otago Regional Council on the Manuherekia and Taiari rivers, and as a technical reviewer of the North Bank Tunnel and Hunter Downs Irrigation scheme for Environment Canterbury. I undertook the "Making Good Decisions" course and was an independent hearings Commissioner for six years until other work commitments and Covid 19 issues meant I did not renew the Commissioner status.

6. This statement is given as part of NZSki Limited's (**NZSki**) response to comments on the Remarkables Ski Area Upgrade and Doolans Expansion (**Project**) made under Section 53 of the Fast-track Approvals Act 2024 (**FTA**). This statement responds to specific comments raised by:

   (a) Dr Christopher Kavazos in his Statement of Advice for the Department of Conservation.

   (b) Matthew John Dale in his Statement of Evidence on behalf of Te Rūnanga o Moeraki, Kāti Huirapa Rūnaka ki Puketeraki, Te Rūnanga o Ōtākou, Hokonui Rūnanga, Waihōpai Rūnanga, Te Rūnanga o Awarua, Te Rūnanga o Ōtaka Aparima, Te Ao Marama Incorporated and Aukaha (1997) Limited.

7. My original findings are provided in full in:

   (a) B.09 Allibone (August 2026).

   (b) Memo to NZSki: Doolans DC3 flow physical habitat relationship Memo to NZSki.

   (c) Contributions to the E3 Scientific memo (July 2026): Remarkables Ski Area Upgrade and Doolans Expansion Freshwater Ecological Impact Assessment Report – Otago Regional Council Feedback Response – (Torlesse 26/5/2026, 29/4/2026, Morphum 4/5/2026 and DOC 4/5/2026).

8. I have read the following reports and statements:

   (a) E3 Scientific (July 2026) Remarkables Ski area upgrade and Doolans expansion freshwater ecological impact assessment. Prepared for NZSki Limited; and

   (b) Stantec New Zealand (2025) Remarkables Ski Area Doolans Expansion water take concept report. Prepared for NZSki Limited.

(c) Cullen, N. (2026) Independent assessment of climate change resilience: The Remarkables ski area upgrades and Doolans expansion project.

9. Although this is not an Environment Court proceeding, I have complied with the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2023 as confirmed in B.09 lodged with the substantive application.

SPECIFIC RESPONSE TO COMMENTS

Zelandobius macburneyi

10. Dr Kavazos, in paragraphs 36 and 50, notes that the stonefly *Zelandobius macburneyi* is present in the Doolans Basin and this stonefly has the threat classification ranking of data deficient from the 2018 freshwater invertebrate threat ranking process (Grainger et al 2018). I have noted in the previous memo (E3 Scientific August 2026) that a data deficient species is not a threatened species. Rather it is a species for which there is insufficient data to determine population size and or population state (increasing, stable or declining).

11. In my experience with the threat ranking process the Department of Conservation is reluctant to use this as a threat classification, preferring to have a threat classification with the Data Poor qualifier. Geographic range data for this stonefly is available McLellan (2006) stating the species is found in Taranaki, Wellington, Mid Canterbury, Central Otago, Otago Lakes and Dunedin areas. During previous survey work I have detected this stonefly at six sites using Environmental DNA (eDNA) sampling in the Tekapo/Takapo Military Training Area. This is a region outside McLellan's (2006) reported range so extends the geographic range of the species. My Tekapo sites are similar to the Doolans Creek stream sites in that they were small high-country streams.

12. I have also viewed the Wilderlab eDNA results map[1] available online for data available to the public and this shows other new records for the species including streams on the Central North Island volcanoes, another previously unreported area. Given the lack of sampling in many high-country streams from Taranaki to Otago and the new location discoveries coming from eDNA sampling, I would expect this stonefly to be much more widespread than previously reported.

13. The E3 Scientific eDNA sampling also detected eDNA from this stonefly in Tarn 2. The eDNA sample site in this tarn was approximately 10 m from the inflow stream (M Hamer, pers comment). I have checked the 26 eDNA detection sites on the Wilderlab website and all are samples from streams and rivers and do not appear to have a lake or tarn upstream from the sample location. I would expect given the lack of eDNA detections in other tarns in the Doolans Basin and consistent detection

[1] https://wilderlab.co/explore

of its eDNA in stream samples the Tarn 2 detection of *Zelandobius macburneyi* is from stoneflies living in the tarn tributary rather than the tarn.

14. Therefore, I would conclude that while this taxon was classified as data deficient in 2018, the ranking reflects the knowledge at that time. The range increases since 2018 indicate it is a widespread stonefly and the previous lack of data reflects its small stream high altitude habitat rather than actual rarity.

15. Importantly, the present ranking of data deficient means this taxon does not trigger any threatened species requirements as the data deficient category is not one of the threatened categories as defined by the Department of Conservation's threat ranking process or the National Policy Statement -Freshwater Management (2020) (Figure 1).

Fishless Stream Values

16. Dr Kavazos (paragraph 37) and Mr Dale (paragraphs 23, 44) in their evidence agree that the upper areas of Doolans Creek are fishless. Dr Greer in his evidence in chief has no comments on the distribution of fish and therefore I assume also agrees with the fishless status of the upper Doolans Creek in the ski field area.

17. I do not agree with Dr Kavazos' generalistic statement (paragraph 37) where he considers fishless streams can support *higher valued macroinvertebrate assemblages* due to reduced predation pressure by fish. In the case of Doolans Creek, he presents no evidence to indicate that the Doolans Creek fauna is of higher value. The Surber samples collected by E3 Scientific found the abundance of the macroinvertebrates was low and the fauna is dominated by the mayfly genus *Deleatidium,* one of New Zealand's most widespread genus' of mayflies. Macroinvertebrate faunas with very high percentage occurrence of EPT taxa (mayflies, stoneflies and caddisflies) do indicate good habitat and water quality. However, this can be the case in fishless streams or streams with fish. In my experience and in studies such as Huryn (1996, 1998), the presence of salmonids such as brown trout are significant modifiers of the macroinvertebrate fauna rather than the simple presence or absence of fish. It is important that the macroinvertebrate fauna in Doolans Creek has no threatened species so the creek's macroinvertebrate fauna value is limited to the presence of an intact clean water macroinvertebrate fauna composed of common genera, and it does not provide a refuge for any threatened taxa that might give it higher value.

Doolans Creek water take

18. Dr Kavazos, in paragraphs 80 to 94, discusses the Doolans Creek water abstraction. He comments that the water take will occur during an expected low flow period in Doolans Creek. Dr Kavazos and I are in agreement over the assessment of the water take and have agreed recommendations for consent conditions if the abstraction is granted: that the abstraction has a residual flow condition of 50 % of the 7dayMALF, that requires at least 33.5 L/s is left in Doolans Creek.

19. I would note that in paragraph 86(a and b) Dr Kavazos notes two limitations of the System for Environmental Flow Analysis (**SEFA**) physical habitat model. Firstly, that it is based on a single transect and that is correct, and the model was constructed after consultation with other experts as there was sufficient water level and flow data to construct a model for this location. As I have stated (Allibone 2026), this limits the model applicability to the run section where Site DC3 was. Dr Kavazos' second limitation was that the model predicts no habitat for the *Zelandoperla* stonefly genus. This modelled habitat assessment is aligned with the macroinvertebrate Surber samples collected by E3 Scientific for the model site, Site D3, where no *Zelandoperla* was collected. This model result is then well fitted to the observed occurrence rather than this being a limitation of the model.

20. Mr Dale (paragraph 39) indicates a climate-change assessment of the proposed abstraction is required to examine annual water availability and seasonal shifts in runoff. The proposed residual flow consent condition of 33.5 L/s is a fixed flow rate rather than set as a percentage of 7dMALF. This means that the residual flow will remain at 33.5 L/s regardless of any reduction flow and the 7dMALF due to climate change. Any reduction in fin 7dMALF will then lead to the residual flow being a higher percentage of the 7dMALF. Therefore, the residual flow on the abstraction has a protective role that will avoid increasing any climate change related reduction in flow. If instream flows increase due to climate change then the maximum take in rate in the proposed consents of 30 L/s means the abstraction cannot take more water than the 30 L/s and more water will remain in Doolans Creek (see proposed consent conditions WAT.12 and WAT.13). Therefore, the combination of a maximum rate of take and the residual flow provide for the protection of instream habitat.

21. A second limiting factor for any climate change effect is the stream morphology. As long as instream habitat remains constant the instream habitat will remain the same. The habitat modelling conducted at the abstraction location (Allibone 2026) and subsequent proposed residual flow mean the instream habitat will be provided for.

22. If there are concerns regarding the duration of the water take extending if flow reduces at the abstraction site, I would recommend that the consent conditions allow

for some flexibility in the timing of the take so water abstraction could occur at higher flow periods to reduce abstraction duration.

23. Mr Dale (paragraphs 45 to 48) raises concerns over the combined outcome of the 35 year abstraction consent and the effects of climate change on the Doolans Creek ecosystem. At present, primary production in Doolans Creek is driven by algal growth and terrestrial leaf inputs. This vegetation production is limited by light, temperature and nutrients. Kilroy et al (2019), when modelling periphyton growth in New Zealand rivers, used a series of variables; water temperature, nutrients (N and P), conductivity and substrate. Stream bed substrate is important as it is the attachment site for periphyton. Doolans Creek stream substrate is not expected to change with climate change. The low nutrient concentrations are reported in the Nevis River by the Otago Regional Council (presented in E3 Scientific 2026), indicates that a nutrient limitation is a significant limitation on primary production in the Nevis catchment. This is supported by the very low algal cover recorded at all stream sites in Doolans Creek by E3 Scientific.

24. Nutrients are expected to remain at very low concentration in the Doolans Basin and potentially create limiting conditions on periphyton accrual. Without an increase in primary production the higher trophic levels, the grazers and predators in the macroinvertebrate community are limited to the present state low primary production ecosystem regardless of any climate change effects on water temperature or flow regime.

25. The limited ability for a detrimental ecosystem outcome as a result of an interaction between climate change and the water abstraction is further supported by the fact that the abstraction is expected to operate for a short duration of two to three weeks each year. The macroinvertebrate community will not be exposed to the reduced flow for sufficient time for a response to occur. For 49-50 weeks of the year natural flows will occur and the stream ecosystem will not be affected by any water abstraction related flow changes. Climate change may impact the natural flows and temperatures, but the interaction of climate change and the water abstraction remains limited to a very short window each year during a low temperature stress season. Therefore, I do not envision the water abstraction to have a detectable combined effect with climate change on the Doolans Creek ecosystem.

26. Mr Dale (paragraphs 15, 49, 50) notes the lack of site-specific assessment of the water abstraction flow reduction means the assessment of the abstraction on habitat has not been quantified. I have checked the reading list in Mr Dale's evidence (Paragraph 11). My memo (Allibone August 2026) providing the site–specific habitat modelling for the water take in Doolans Creek is not in that reading list or in the references Mr Dale cites. The modelling work has been undertaken and leads to

the proposed residual flow of 33.5 L/s and should address Mr Dale's concerns regarding the need for site specific assessments.

27. Dr Kavazos (paragraphs 90-91) comments that the water abstraction is a consumptive take. This is accepted and is the reason for the physical habitat assessment of the effect of the take and the accepted residual flow proposal of 33.5 L/s. I do not expect the melting of man-made snow in spring to have an effect on the ecological values of Doolans Creek. The reason for snow making is to replace the reduction in snow accumulation due to climate change and the man-made snow, when melting, will help retain the natural springtime stream flows.

Weir Construction

28. Dr Kavazos (paragraphs 95 to 104) discusses the construction of the Doolans Creek intake weir. I agree with Dr Kavazos' recommendation that if consent is granted, the construction should not allow Doolans Creek water to be exposed to wet concrete.

29. Dr Kavazos also notes that the loss of the natural stream bed and stream bank disturbance will occur at the site where the weir is to be constructed. I agree with this assessment that there will be is a loss of natural stream for approximately 20 m and stream bank modification at the weir location and for 12 m of stream bank at the flushing pipe outlet. Steps to minimise sediment release during the works should be undertaken. I note Dr Kavazos in his evidence (paragraph 99) and E3 Scientific in their site assessment have noted Doolans Creek at the weir site has no fine sediment and the macroinvertebrate community is sensitive to fine sediment deposition. Therefore, I would recommend that the consent conditions require fine sediment control and rapid rehabilitation of the disturbed areas of stream bank and these measures are in the CEMP and monitored by proposed condition WAT.33.

30. The Department of Conservation has recommended that the weir design adopts the best practice fish passage requirements. I strongly disagree with this recommendation. There is no benefit gained by providing fish passage at the weir as no fish are present in this area of Doolans Creek. However, if the downstream waterfall barriers in Doolans Creek fail, and in my experience, failure does occur, the most likely fish species to colonise the upper reaches of Doolans Creek is brown trout. I have recently caught brown trout at the 1400 m altitude mark in the Tekapo/Takapo military training area, and this is the altitude of the proposed water intake weir. Therefore, if the weir blocks fish passage it can provide an important barrier to prevent further upstream movement by introduced fish. This will provide additional protection for the valued fishless state of upper Doolans Creek and would not be detrimental to the macroinvertebrate fauna.

31. The weir structure will become a permanent alteration to the stream bed that will result in a loss of habitat quality. It will still provide a substrate surface for periphyton communities and grazing macroinvertebrates so will not be devoid of life, rather reduced in quality and quality on the weir.

Tarn 3

32. Dr Kavazos refers to Tarn 3 in paragraphs 51 and Figure 2 as an intermittently dry tarn of very high value. I have viewed all the images of the tarn I can find on Google Earth and while its size certainly fluctuates, there is always some water present. Therefore, I would consider the tarn to be permanently wetted but with a large ephemeral margin and but not a fully ephemeral tarn that dries completely. Furthermore, this means the tarn retains aquatic habitat and can continuously support aquatic life.

33. I have reviewed the zooplankton sampling data, eDNA data collected by E3 Scientific and previous zooplankton data (collected by Dr Marc Schallenberg and reported in Ryder (2012). Ryder (2012) reports one cladoceran species *Ceriodaphnia dubia* and one calanoid copepod species *Boeckella dilatata* were present in three tarns in the basin, but Tarn 3 was probably not one of the tarns sampled, rather the larger tarns were sampled.

34. *Boeckella dilatata* is incorrectly called *Bosmina dilatata* in the Ecological Assessment (E3 *S*cientific 2026B) and in discussion with Drs Ryder and Schellenberg I have confirmed this error.

35. The zooplankton sampling by E3 Scientific (April 2026, Appendix A) in Tarn 3 found a calanoid copepod was abundant, but this was not identified to species level. *Ceriodaphnia* was rare and no *Bosmina* were located. *Ceriodaphnia* was not detected in Tarn 2 and was rare to common in samples from Tarn 1. E3 Scientific also report cladocerans from the Aloninae subfamily present in Tarns 1 and 2. Chapman et al (2011) note two useful facts about Alonids; the subfamily requires further taxonomic attention, and the taxa are dwellers on leaf material and in sediments. This will make them less likely to be sampled in open water plankton tows and may explain their absence from the Schallenberg sampling. The zooplankton sampling, aside from not identifying the calanoid copepod species present, matches the previous 2002 sampling.

36. eDNA sampling of the Doolans tarns was undertaken to provide further information on the species present. Three samples were collected in Tarn 1 and four samples in both Tarns 2 and 3. In all three tarns the most common crustacean eDNA collected has been assigned to the genus *Leptodiaptomus*, a genus of calanoid copepod not known to exist in New Zealand. Chapman et al (2011) report there

are three indigenous genera of calanoid copepods, *Calamoecia, Boeckella,* and *Gladioferens*. Two introduced species *Skistodiaptomus pallidus* and *Sinodiaptomos valkanovi* have been reported in the Auckland area (Duggan et al 2006). As of 2011 there were no reports of any species in the *Leptodiaptomus* genus being present in New Zealand.

37. I have reviewed eDNA data for calanoid copepods in New Zealand and DNA data for the genus *Leptodiaptomus.* Wilderlab have indicated that there are no species specific DNA sequences available for *Boeckella dilatata*, the copepod previously identified in the tarns. Therefore, eDNA sampling will only detect this species at the genus level – *Boeckella.* When reviewing this data, it appears that at least some genus level DNA sequences from Boeckella individuals match the sequences for *Leptodiaptomus* and the result have reported the latter taxa- *Leptodiaptomus.*

38. Therefore, the eDNA data collected from Tarns 1-3 has an identification error and I would recommend that the copepod identity information is ignored and the species present is *Boeckella dilatata* as reported in previous studies. The sequence abundance data is still useful for an indication of abundance of calanoid copepods in the tarns.

39. For Tarn 3, the eDNA analysis only detected calanoid copepod DNA, and no other crustacean taxa were detected. Five insect species, a fungus gnat, two diving beetles and the midge genus *Chironomus* were detected in the eDNA. There was also an observation of crane fly egg laying in January 2026 at the tarn although were not detected by the later eDNA sampling. No molluscs were detected in the eDNA.

40. Therefore, the plankton sampling, the onsite observations and the eDNA data indicate that the dominant taxon in Tarn 3 is the calanoid copepod, *Boeckella dilatata*. There is also a low diversity, low abundance community of native insect species in the tarn.

41. The eDNA and plankton sampling also detected calanoid copepods (eDNA samples) and calanoid copepods (plankton sampling) in both Tarn 1 and Tarn 2 indicating that all the tarns share these copepods. Tarns 1 and 2, from the eDNA sampling, also have an ostracod fauna and the caddisfly *Hudsonema alienum* that is a common resident of slow and still waters, that are not present in Tarn 3. Further insect taxa where detected, especially in Tarn 2 but as mentioned in above (paragraph 14) I expect the Tarn 2 eDNA samples include eDNA from the tarn tributary.

42. For the assessment of ecological value for Tarn 3 I would conclude that the physical habitat is unmodified, and the tarn is a naturally uncommon, but not a

threatened habitat. The ephemeral margins of Tarn 3 make it distinctive from the other tarns in the Doolans Basin. Therefore, the tarn is representative of a tarn with a high proportion of ephemeral habitat. However, the tarn retains some wetted habitat year-round so is not fully ephemeral.

43. The beetle, midge and crustacean taxa reported in Tarn 3 are not threatened and all are species widespread in New Zealand and common in more complex lacustrine ecosystems including the other tarns in the Doolans Basin. I would give the tarn ecosystem a low score for rarity and moderate score for distinctiveness as this depurate community is rare and the species present are usually part of more complex ecosystems.

44. Tarn 3 has low diversity with five aquatic insect taxa and two crustacean taxa. The eDNA detected no aquatic plants and habitat assessment noted that there were small areas of stunted macrophytes. For tarns in general this would mean the diversity and pattern is low, but it is harder to classify as no other partially ephemeral tarn examples have been sampled. Therefore, I would suggest diversity is moderate in the context of the alpine tarn ecosystem type.

45. For ecological context, E3 Scientific data has shown the Doolans Basin streams and tarns are largely intact with no invasive species. The habitat appears, to date to, be resilient to change and provides some balance and high score would still be appropriate.

46. Dr Kavazos discusses the assessment of the loss of Tarn 3 and raises the issue of scale. He correctly notes that at larger scales the effect of any habitat change or loss appears to be minimised. The terrestrial assessment has used a larger area than just the Doolans Basin area. When the area of ecosystem types were determined (E3 Scientific 2006a) the tarn area was estimated at 1115.6 ha within the terrestrial assessment area. This is due to the upper elevations of the Remarkables Range having numerous tarns (Figure 2). Using this area of for the assessment of loss of Tarn 3 habitat (0.445 ha) does indicate the habitat loss is 0.04 % of the Remarkables area tarn habitat. However, if the loss is assessed at the smallest scale - just Tarn 3 - then the loss is 100%. In my opinion, neither extreme scale is appropriate. I would recommend that the assessment be undertaken at the scale of the Doolans Basin. The reason for this is that the decision to use the Tarn 3 area has been made within the context of the habitat and features of the Doolans Basin and to not underestimate the loss of a natural uncommon habitat type. The within Doolans Basin percentage tarn loss was estimated as 13.5% of the tarn habitat (E3 Scientific 2006b)

47. I would agree with Dr Kavazos that the proposed water storage development at Tarn 3 will lead to the loss of the tarn and he concludes this has a very high effect.

I would give this a high effect due to the physical habitat loss of the tarn. However, as all the species detected in the tarn are present in other tarns in the basin, there is a very depurate community with no threatened species present in the tarn and no species will be lost from Doolans Basin.If the tarn is removed the ecological community effect is moderate. Therefore, the combined effect of the habitat and community loss at Tarn 3 would be, at worst, a high effect.

48. Mr Dale (paragraph 16) concludes that the loss of Tarn 3 will dimmish the natural range of habitats in the basin. I would agree the loss of Tarn 3 will reduce the range of tarn habitat as the smallest tarn would be lost. However, Mr Dale also contends that this will have implications for ecological resilience. The fluctuating water level in Tarn 3 has been recognised by all parties and already makes this tarn the most vulnerable to drying events. The larger tarns in the basin provide more stable and larger tarn habitat than Tarn 3. The present-day small size and fluctuating water level in Tarn 3 means this tarn can be expected to be the first lost in the event of longer duration drying events. It does not provide resilience, rather it is the least resilient to drying events and I consider Tarn 3 to be the least resilient to climate change. As all the freshwater species detected in Tarn 3 are reported in the other tarns so I would consider Tarn 3 not the most critical tarn for habitat provision and protection of freshwater fauna in the Doolans Basin.

49. The water storage pond that replaces Tarn 3 can be inoculated with plankton from Tarn 1 and 2 to re-establish the zooplankton community. This is likely to happen naturally as algal cells in Doolans Creek will be entrained in the water intake and pumped to the storage pond. Plankton fauna from the tarns 1 and 2 can disperse downstream and then also be entrained in the pumping system. Resting eggs of copepods can also be dispersed by wind to colonise new habitat. The adult Dytiscid beetles can also fly between aquatic habitats to colonise new areas. Therefore, while the storage pond will not fully replicate the habitat of Tarn 3 it will still provide some habitat for aquatic species that can disperse to the pond.

50. When considering other options for water storage, I can only consider the tarns in the Doolans Basin. In that context, Tarns 1 and 2 are the more complex tarn ecosystems present in the basin and, in the basin context, removing either of Tarns 1 and 2 would cause the loss of higher value tarn systems. The choice of Tarn 3 as a water storage area avoids impacts on the larger, more complex tarn ecosystems that would occur if they were selected for the water storage sites. The retention of the larger tarns also provides the best climate change resilience that Mr Dale seeks for the Basin.

51. I would conclude that the loss of Tarn 3 does represent a habitat loss that does have significant effects that will need to be addressed. However, as discussed

above the loss centres on habitat loss. None of the species occupying the tarn are rare or restricted to the tarn and the Tarn 3 species are capable of colonising the water storage pond.

CONCLUSION

52. My evidence in response to comment is as follows:

(a) The streams and tarns in the Doolans Basin area are fishless. The invertebrate fauna present has no threatened species.

(b) The water abstraction from Doolans Creek with the proposed residual flow of 33.5 L/s will have a low and short duration effect on instream habitat with little or no effect on the instream community.

(c) The water abstraction from Doolans Creek with the residual and rate of take consent conditions provides protection from any climate change induced reductions in flow.

(d) The weir construction shall avoid allowing wet concrete to enter Doolans Creek and the post-construction monitoring will ensure bank restoration occurs to prevent fine sediment inputs into Doolans Creek.

(e) Post construction the weir will provide some low-quality aquatic habitat.

(f) For additional protection of the fishless state of the Doolans Basin streams, I recommend that the water intake weir does not provide fish passage.

(g) Tarn 3 contains a simple invertebrate fauna with five insect species and two micro-crustaceans detected. All the species present in Tarn 3 are found in other tarns in the Doolans Basin and are widely distributed outside of the Basin.

(h) In the event that the Tarn 3 area is developed for a water storage pond there will be a loss of a small tarn with high-quality habitat. The tarn fauna, which is a low-density, low diversity community will also be, at least temporarily lost, until it colonises or is reintroduced to the water storage pond.

(i) The Doolans Basin will retain high-quality tarn habitat and more complex ecosystems in the larger Tarns 1 and 2.

(j) The use of Tarn 3 as a water storage area leaves Tarns 1 and 2 intact and providing the best climate change resilience for the tarn ecosystems.



Dr Richard Mark Allibone

3 November 2026

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Figures

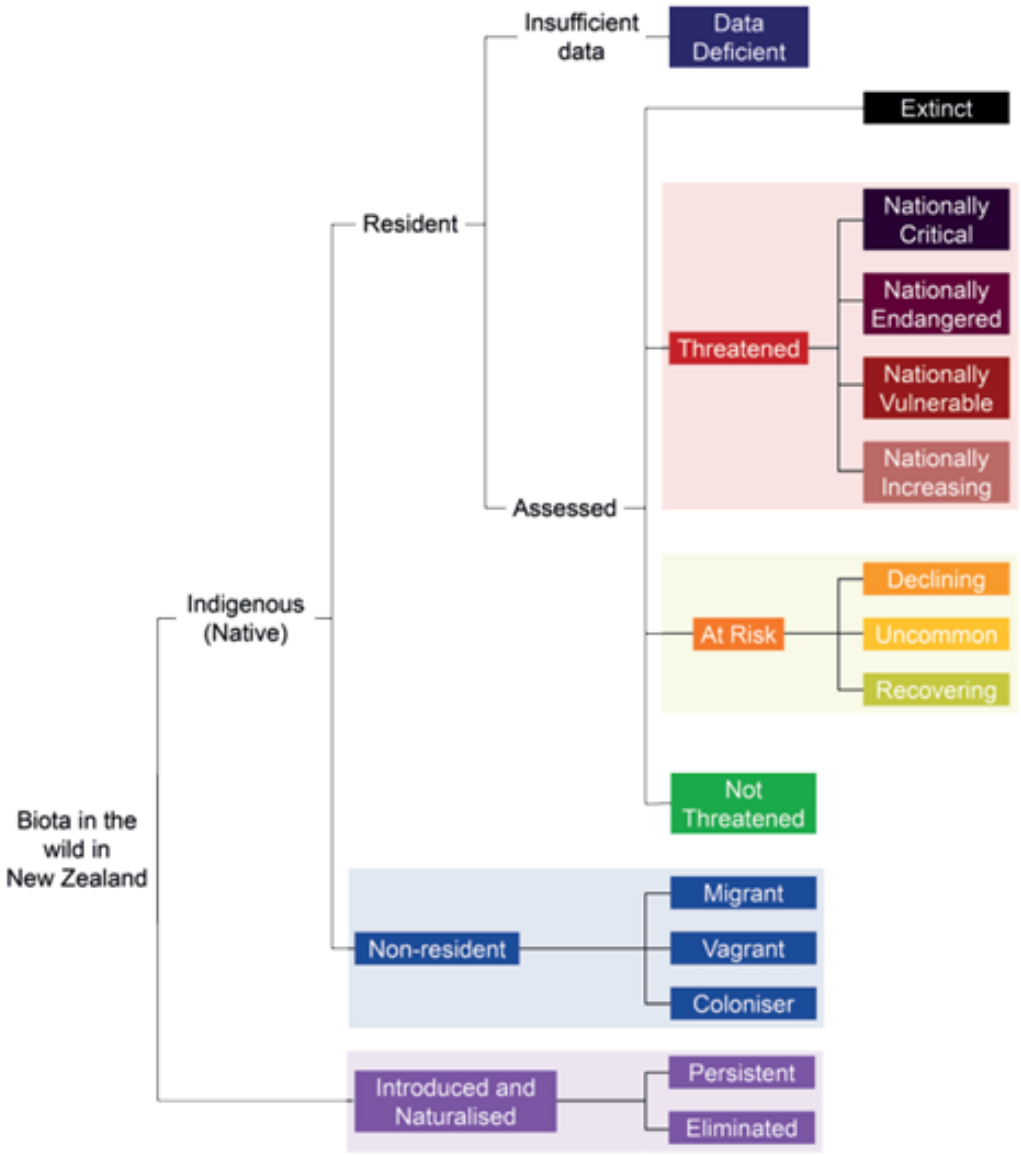


Figure 2. Revised (2022) structure of the New Zealand Threat Classification System.

Figure 1> The New Zealand Threat ranking structure from Rolfe et al (2022)

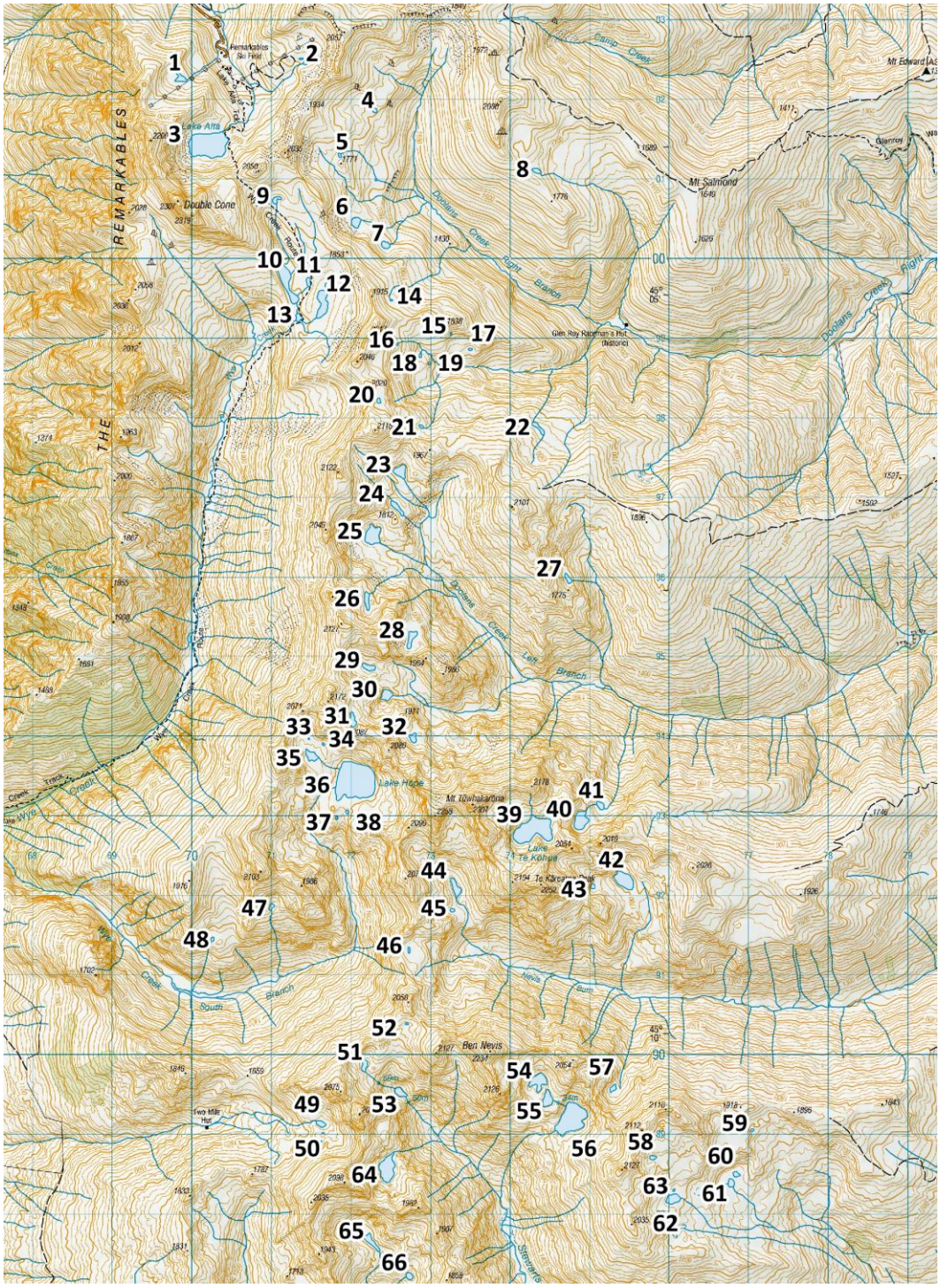


Figure 2. Tarns on the Remarkables, Tarns numbered 5, 6, 7 are Tarns 3, 2 and 1 in the Doolans Basin.

Appendix A – eDNA results from Tarns

Scientific Name	Rank	Common Name	Tarn 1A	Tarn 1B	Tarn 1C	Tarn 2A	Tarn 2B	Tarn 2C	Tarn 2D	Tarn 3A	Tarn 3B	Tarn 3C	Tarn 3D
Hudsonema alienum	species	Caddisfly	71	56	43	346	676	43	211	0	0	0	0
Cratyna nobilis	species	Fungus Gnat	41	64	8	733	55	10	19	0	5	7	0
Deleatidium sp. DI_S78_07	species	Mayfly	14	0	5	0	0	0	0	0	0	0	0
Liodessus plicatus	species	Diving beetle	21	34	12	18	213	52	49	37	49	96	23
Antiporus uncifer	species	Diving beetle	0	0	0	107	128	181	76	0	0	32	0
Zelandobius macburneyi	species	Stonefly	0	0	0	51	102	60	66	0	0	0	0
Zelandoperla tillyardi	species	Stonefly	0	0	0	35	0	0	28	0	0	0	0
Rhantus suturalis	species	Beetle	0	0	0	0	90	0	0	0	0	0	0
Paratanytarsus grimmii	species	Chironomid	0	0	0	14	0	6	30	0	0	0	0
Zelandoperla tillyardi	species	stonefly	21	0	0	0	0	0	0	0	0	0	0
Nannochorista philpotti	species	Scorpionfly	13	6	0	0	0	0	0	0	0	0	0
Tiphobiosis montana	species	Caddisfly	0	11	5	0	0	0	0	0	0	0	0
Zelandoperla tillyardi	species	Stonefly	0	0	0	0	0	12	0	0	0	0	0
Chironomus	genus	Midges	275	138	397	44	143	90	88	629	81	356	809
Leptodiaptomus	genus	Copepod	7076	87	249	0	0	0	3788	5913	0	14444	45939
Eucyclops	genus	Copepod	5	0	0	0	0	0	0	0	0	0	0
Sphaeriidae	genus	Bivalve	0	135	474	0	0	0	0	0	0	0	0
Gieysztoria	genus	Flatworms	9	8	0	106	172	62	115	0	0	0	0
Stenostomum	genus	Flatworms	0	8	8	9	0	0	0	0	0	0	0