BEFORE THE INDEPENDENT HEARING PANEL APPOINTED BY THE QUEENSTOWN LAKES DISTRICT COUNCIL

UNDER the Resource Management Act 1991 (RMA)

IN THE MATTER of the Te Pūtahi Ladies Mile Plan Variation in accordance with section 80B and 80C, and Part 5 of Schedule 1 of the Resource Management Act 1991.

STATEMENT OF EVIDENCE OF DAWN ALICE PALMER
29 September 2023

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WYNN WILLIAMS

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Introduction

1 My name is Dawn Alice Palmer.

2 I am a terrestrial ecologist and Director for Natural Solutions for Nature Ltd. I have been in this position since 2002. I am responsible for all elements of my consultancy and for undertaking surveys for and reporting on ecological assessments, monitoring, preparation of the associated reports and provision of ecological advice.

3 In November 2021, to support the Te Pūtahi Ladies Mile Plan Variation (**TPLM Variation**) I was engaged by Queenstown Lakes District Council (**QLDC** or **Council**) to undertake a peer review and provide ecological recommendations regarding the need for bird monitoring on the Shotover River. As part of this work, QLDC requested that I provide a wider context of understanding regarding the cumulative impacts on braided river birds that may arise as a result of the development of the Ladies Mile. My report was attached as Appendix 3A(viii) to the publicly notified Section 32 report for the TPLM Variation application. The title of the notified report is Limited Scope Peer Review of matters contained within an Ecological Report – Ladies Mile Masterplan, dated 31 December 2021. Contract Report NSN 178/21, (**the Peer Review Report**) and is included as Appendix 3A(viii) to the Section 32 Report.

4 In June 2023, I was re-engaged by QLDC to prepare evidence in respect of the ecological impacts of the TPLM Variation.

Qualifications and Experience

5 My qualifications include a Diploma of Applied Science in Natural Resources obtained from Roseworthy Agricultural College, South Australia in 1985; Bachelor of Applied Science, Ecology/ Natural Resources, Canberra College of Advanced Education, 1987. I have been a member of BirdsNZ (the Ornithological Society of New Zealand) since 1998 and was elected as the Regional Representative for Otago for the BirdsNZ Council on 22 August 2023. I have been a member of the New Zealand Ecological Society since 2000; and the New Zealand Plant Conservation Network – since 2009. I have served as a Trustee on the Whakatipu Wildlife Trust since 2020. I am also the project director and ecologist for the Friends of Tucker Beach Wildlife Management Reserve Jobs for Nature project and agreed to become Trustee of the

newly formed Tucker Beach Wildlife Trust on 19 September 2023. I have been a member of the New Zealand Aviation Wildlife Hazard Group since 2021.

6 Prior to starting my Queenstown based ecological consultancy in 2002, I was Program Manager for Biodiversity Assets and a Conservation Officer for the Department of Conservation in Queenstown, New Zealand for 7 years.

7 I have experience in the preparation of ecological assessments for Resource Management Act processes, preparation of ecological evidence and expert witness advice for commercial and private entities, and QLDC at Council/ Commissioner and Environment Court Hearings for a range of projects including adventure tourism, subdivision and residential developments including many of the greenfield developments in the Queenstown Lakes District e.g. Peninsula Bay, Riverside, Three Parks, Kingston, Shotover Country, Gibbston Valley, Hāwea Special Housing Area (**SHA**) – peer review, Coneburn SHA, RCL / Hanley Farms.

8 I have prepared management plans for local reserves e.g. Matakauri Wetlands (2003, 2009, 2019), Whakatipu Islands (1995, 2021), and Tucker Beach Wildlife Management Reserve (2019).

9 I have been monitoring birds in the Shotover Wastewater Treatment Designation Area for Council since 2007, continuously since 2017, and more intermittently monitoring braided river birds on the Lower Shotover since 1993 in both a private and professional capacity. I have also been monitoring birds within the Whakatipu Basin for Queenstown Airport Corporation since 2013. I have monitored crested grebe on Lake Hayes and the broader Whakatipu Area since 1995[1], regularly in 2007 and 2008; I organised the local effort for the national Australasian crested grebe census in 2004, 2009, 2014 and I am coordinating the local effort for the 2024 census. Additionally, I have contributed more than 1000 checklists, mostly in Otago to the New Zealand Bird Atlas scheme, a 5-

[1] Chance, G.R. (2000): The return of the Australasian crested grebe (*Podiceps cristatus australis*) to the Wakatipu region, South Island, New Zealand. Notornis Vol.47(1): 59-62.

year project concluding on 31 May 2024, run by BirdsNZ to update the distribution and abundance of New Zealand birds for the NZ Bird Atlas.[2]

10 I am therefore very familiar with the avifauna of the Queenstown Lakes District (**District**), the braided rivers, Lake Hayes and the Whakatipu Basin.

Code of Conduct

11 I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2023. Accordingly, I have complied with the Code in the preparation of this evidence and will follow it when presenting evidence at the hearing. Unless I state otherwise, this assessment is within my area of expertise, and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

Scope of Evidence

12 My evidence addresses the following:

(a) A brief summary of the ecological values present within the TPLM Variation area (**TPLM Variation Area**) and the wider ecological context;

(b) Key ecological impacts arising in the TPLM Variation Area including:

(i) Matagouri (tumatakuru, *Discaria toumatou*);

(ii) Effects on avifauna.

(c) Responses to submissions raising ecological matters;

(d) Comment on the National Policy Statement for Indigenous Biodiversity (**NPS-IB**).

13 In preparing my evidence, I have reviewed the following documents:

(a) The TPLM Variation (and associated documents);

(b) Chapter 33 of the Proposed District Plan (**PDP**);

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2 https://www.birdsnz.org.nz/schemes/nz-bird-atlas-scheme/

(c) The submissions on the TPLM Variation that are relevant to my area of expertise;

(d) The NPS-IB;

(e) References cited within my evidence.

Executive Summary

14 The TPLM Variation Area is a seasonal habitat for highly mobile species such as black-fronted terns (tarapirohe, *Chlidonias albostriatus*), black-billed gulls (tarāpuka, *Chroicocephalus bulleri*) and South Island pied oystercatchers (tōrea, *Haematopus finschi*) (**SIPO**). These species travel from coastal to inland habitats to breed.

15 The Gulls and Terns breed in the gravel beds of the Shotover River, they are colony nesters; the SIPO have a much wider range of breeding habitat that includes the gravel beds and short, spring farm pastures around the Whakatipu Basin. SIPO breeding territories are scattered throughout the Whakatipu Basin. These species constantly move around the Whakatipu Basin searching for optimal foraging habitat and are aware of the location of sites that provide more reliable foraging rewards.

16 The development of the north side of SH6 in the TPLM Variation Area will remove a small portion of the land that is seasonally investigated as a small component of the broader network of foraging habitat.

17 The amount of time these species spend foraging within the TPLM Variation Area is, based on observations to date, relatively minor or fleeting. The reduction in habitat is more likely to affect SIPO most, as black-billed gulls tend to forage on the Shotover River, Frankton Beach and farm flats south of the Kawarau River, and western area of Speargrass Flat. They also commonly roost and feed in Queenstown Bay and the Frankton Transfer Station. Terns have also been observed foraging at 516 Ladies Mile (**516 Ladies Mile** or **Property 11**) but are seen more frequently closer to the Shotover River.

18 However, terns and gulls respond to land management and rely on the seasonal availability of invertebrates like earthworms and larvae and small fish in the case of terns. If during any season or any part of a breeding season, the birds recognise the TPLM Variation Area land as

temporarily preferential to other foraging sites that they know, they will gravitate to the site until the foraging reward is no longer beneficial. For example, the flocks of SIPO and the small number of terns and gulls recorded on the Open Space Precinct of 516 Ladies Mile in December 2021 (which I describe below), were responding to crop harvest at the end of the breeding season.

19 The incremental loss of foraging habitat from the development of the north side of State Highway 6 (**SH6**) and the TPLM Variation Area represents a cumulative and additional loss following the development of Lake Hayes Estate, Shotover Country, Jacks Point, Hanleys Farm, Coneburn SHA, the Frankton Flats, Quail Rise and Tucker Beach as well as the gradual infilling of the broader Whakatipu Basin. The impact of further loss of the TPLM Variation Area north of SH6 is estimated to be low, with the caveat that we have not been able to observe and confirm bird use of the paddocks north of the dense shelterbelts along the TPLM Variation Area regularly and incidentally. However, we do observe and record the areas where we see these species (indicated in the eBird records shown in Figures 2, 8 and 12) and notice them flying overhead towards foraging areas. These areas tend to be the open areas of the Whakatipu Basin, inferring that more closely subdivided farms enclosed by dense hedges, close shelterbelts, and grazed by stock may be less optimal foraging habitats.

20 Foraging habitats therefore appear to be more associated with openness, vegetation cover, and soil health. It is my understanding that the open space area of the southern half of 516 Ladies Mile will be substantially retained as open space and could therefore be managed to sustain the foraging values.

21 The incorporation of an integrated stormwater system that mimics ephemeral wetlands, may be vegetated in open, short pastures or areas of indigenous sedges, rushes, tussocks and shrub species. This system may create a steppingstone habitat(s) between the Shotover and Kawarau Rivers, the Shotover wetland and Lake Hayes. This would be a beneficial impact, even within the urban setting.

22 The exact size and configuration of the stormwater management unit has not been fully determined, however, the incorporation of indigenous vegetation into the stormwater systems, the smaller open space areas,

and the cycling networks could establish a range of habitats that will benefit small native birds (e.g. fantails, grey warblers, bellbirds and tui) that persist within urban environments. These plantings would be likely to replace exotic shelterbelts and would integrate with habitats on farmland and the Lake Hayes margins surrounding the TPLM Variation Area. The developed area will not be completely devoid of biodiversity.

23 The existing provisions of the PDP and the addition of the amendments to the TPLM Variation that I recommend in response to submissions will improve the ability of decision makers to consider ecosystem function and the TPLM Variation Area relationship to the surrounding environment, along with the incorporation of indigenous biodiversity into the subdivisions enabled by the TPLM Variation Structure Plan (**TPLM Structure Plan**).

24 In the matter of stormwater discharge and associated pollutants, I understand that no discharge of stormwater to Lake Hayes will occur. Mr Gardiner and Ms Prestidge will be addressing matters relating to stormwater in their evidence and as a terrestrial ecologist, I defer to their expertise.

25 In relation to the Director General of Conservation's (**DOC**) submission relating to offsetting or compensation for habitat loss; I acknowledge that the land does contributes to the broader network of foraging habitat.

26 Their use of the habitat is infrequent, and fleeting, but it is part of a broader network of foraging habitat.

27 The loss of known foraging habitat will be on the north side of SH6, towards the northeastern end of the TPLM Variation Area. But, with the establishment of stormwater management units able to act as ephemeral wetlands and the replacement of exotic hedges with more indigenous species, habitat more suited to indigenous fauna will be established. Appropriate management of the open space precinct on 516 Ladies Mile will continue to support foraging in that area.

28 The residual loss of habitat, following these mitigations, while not explicitly calculated, is in my opinion likely to be less than minor.

29 However, while the nature of development is framed by the TPLM Structure Plan and the existing PDP provisions and proposed TPLM

Variation provisions, the detail will not be known until such time that subdivision and development applications are received.

30 If offsetting or compensation for residual incremental loss of foraging habitat is required, this is provided for in the existing provisions of the PDP in Chapter 33. These would be bolstered by the incorporation of the proposed amendments to Rule 49.7.1 (f), Objective 27.3.24, the matters of discretion in Rule 27.7.28.1 and the assessment criteria in Rule 27.9.3.1. The implementation of the NPS-IB may further inform the provisions of the PDP.

31 If future monitoring and assessments to inform subdivision and development applications identify that offsetting or compensation are required, measures such as removal of weeds and reinstatement of habitat, or improved habitat management that optimises the foraging value of large Council and/or DOC administered Reserves could be considered. Sites such as the margins of Lake Hayes, the large reserves below Widgeon Place adjacent to the Kawarau River, the Shotover wetland, the lower Shotover Delta and the Tucker Beach Wildlife Management Reserve are sites that would benefit from management to improve foraging and breeding habitat for these species.

32 In my opinion, these public reserves provide far more important habitat to these species than the TPLM Variation Area.

Summary of Ecological Values of the TPLM Variation Area

33 E3Scientific (**e3**) prepared the Ladies Mile Ecological Assessment for QLDC dated December 2020 (**e3 Report**), provided as Appendix 3A(vii) of the Section 32 Report for the TPLM Zone Variation. The area covered by the e3 Report is shown in the figure below:

Figure 1: Extent of e3 ecological assessment, e3 Report at page 1

34 As noted above, I prepared a Peer Review Report of the e3 Report.

35 I have also undertaken surveys of the broader Whakatipu Basin (from the legal roads of the District) between August and September 2023, some of which have been reported as checklists in the eBird New Zealand Bird Atlas portal (https://ebird.org/atlasnz/effortmap). These observations confirm the patterns of habitat use known to me from decades of incidental observations, some of which have also been recorded as checklists in the eBird NZ Bird Atlas portal.

36 Following the preparation of the e3 Report, the TPLM Masterplan area was reduced with Property 8 and 9 on the eastern boundary withdrawn from the TPLM Variation Area along with Property 10 and 12 on the southern boundary.

37 On 31 July 2023, I undertook a site visit and was able to view the parts of TPLM Variation Area not visited by e3 from the unformed portion of Marshall Avenue, and public roads. I have named the additional properties viewed during my site visit sequentially following on from the numbering system in the e3 ecological report. A description of the additional site values is provided in **Attachment A** of my evidence.

38 The additional properties of the TPLM Variation Area viewed by me but not visited by e3 Scientific are similar in value to the land already described within the proposed TPLM zone by the e3 Report.

39 The land north of SH6 on the Te Pūtahi Ladies Mile terrace is essentially farmland subdivided into small allotments and delineated with shelterbelts of predominantly introduced conifer, poplar and deciduous trees. Introduced, deciduous trees have also been planted into the corners of paddocks and around residential buildings and farm sheds and buildings ancillary to farming. Some existing mature trees and shelterbelts contain invasive and wilding species (e.g. hawthorn and Douglas fir), the removal of these species will support weed control efforts within the broader Whakatipu Basin.

40 The paddocks are variously stocked with sheep, alpaca, horses and occasionally cows (the latter noted by e3, but not observed by me).

41 Land to the south of SH6 is a mixture of open grassed areas, a chestnut orchard, exotic trees and weeds on the southern escarpment of 516 Ladies Mile (Property 11) and pasture grass and native plantings on the Koko Ridge subdivision at the western extent of the TPLM Variation Area.

42 The indigenous vegetation found in the TPLM Variation Area is largely within planted gardens and shelterbelts. A small number of matagouri have been identified within the TPLM Variation Area on Property 11 of the e3 Report[3] (516 Ladies Mile which is Council owned land south of the SH6); and on the toe of Slope Hill in the northern portion of property 13, north of Glen Panel homestead.[4].

43 The ecological values identified and assessed in the e3 Report that are still within land that is the subject of the TPLM Variation, include the ecological values associated with the matagouri and the avifauna species and habitat. These are summarised as follows with my own additional observations:

(a) Matagouri has a conservation status of At Risk – declining. This classification is a result of the loss and continuing decline of this

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3 E3 Report Section 4.1; page 11
4 E3 Report, Section 4.1, page 8

species in the North Island. Matagouri is not threatened for most of its range, however, it has become very uncommon in the North Island, and is now known at only a few sites. In the South Island it is found mainly east of the main divide[5] and is a common species within Otago and the shrublands in the Lakes Ecological Region and Shotover Ecological District.

(b) The At Risk – declining SIPO was observed by the e3 ecologist, but the location was not identified. I can confirm they have been observed foraging on the northern paddock of Property 7 and 516 Ladies Mile.

(c) The At-Risk - declining black billed gull (the Conservation Status of this species was changed from Threatened – Nationally critical following the e3 Report (Robertson, et.al., 2021)). This species was observed by me foraging on 516 Ladies Mile but noted as present but not observed in the e3 Report.

(d) The Threatened – nationally endangered black-fronted tern. This species was observed by me foraging on 516 Ladies Mile but noted as present but not observed in the e3 Report.

44 The e3 Report concluded that the ecological value of the individual Threatened and At-Risk avifauna species range from high to very high and the ecological value of the At-Risk matagouri is high.

45 The overall ecological value of the vegetation and the habitat for avifauna was assessed by e3 as moderate, due to the scattered few specimens of matagouri and the acknowledged contribution to the foraging habitat for avifauna in the Whakatipu Basin.

46 The e3 Report acknowledges the TPLM Variation Area as a corridor between Shotover River (Kimi-ākau) and Lake Hayes (Te Whaka-ata a Haki-te-kura) and as an important foraging and potential breeding habitat for terns, gulls, waders and waterfowl.[6] This recognition has an important bearing on the consideration of the ecological context of the TPLM Variation Area within the surrounding landscapes and the

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5 https://www.nzpcn.org.nz/flora/species/discaria-toumatou/

6 E3 Report. Table 3; page 20; Section 6, page 21, 2nd paragraph

cumulative and indirect impacts arising from the future development of the zone on the tern, SIPO and black-billed gull populations.

47 In my Peer Review Report, I broadly agreed with the e3 Report's conclusions in relation to the value of the vegetation and habitat for avifauna.

48 However, after further consideration of my own observations of the patterns of foraging (movement between regularly used sites and areas) by these species, I have revised my opinion set out in the Peer Review Report on the value of the land for nesting habitat for SIPO. SIPO have a wide range of breeding habitat that includes the gravel beds and short, spring farm pastures around the Whakatipu Basin. Their breeding territories are scattered throughout the farmland and short, spring pastures of the Basin.

49 While the land may provide suitable nesting habitat for SIPO, based on my observations, the current land uses of the TPLM Variation Area are likely to result in a moderate to high probability of nesting failures due to stock trampling, mowing, cultivation, and vehicle use, depending on the awareness of the landowner of any potential nesting activity that may occur.

50 Therefore, while the land does provide potential SIPO nesting habitat, it is in my opinion that it is relatively unlikely to provide successful SIPO nesting habitat. Further monitoring would be required to confirm this.

51 The land is not suitable nesting habitat for black-billed gulls or black-fronted terns because these species nest in the gravel beds of rivers (including the Shotover River). The TPLM Variation Area is used fleetingly during the breeding season when or if foraging opportunities become available following cultivation or crop harvest. It has been my experience that these species are more frequently observed to forage on the pastures south of the Kawarau River, along the Kawarau and Shotover Rivers and the pastures north of Slope Hill.

52 Therefore, on further consideration, I would revise the overall value for vegetation to low in acknowledgement of the localised and scattered presence of a few matagouri on Property 11 and 13.[7]

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[7] E3 Report, Figure 3; Page 8

53 I support the e3 Report assessment of the overall ecological value of the land within the TPLM Variation Area as moderate because the land supports a few matagouri but more importantly, contributes occasionally and fleetingly to the foraging habitat of threatened and at-risk specified highly mobile bird species.

54 I will discuss additional matters resulting from further consideration of the likely or potential impacts and matters raised by submitters later in my evidence.

Ecological effects of development

55 As noted in the e3 Report, the TPLM Variation will not itself result in impacts, however it will enable development of the area though the TPLM Structure Plan, Objectives, Policies and Rules and assessment matters in effect at the time of an application to develop, including those determined by this application process.

Impacts on matagouri

56 As set out above, only a small number of matagouri have been identified within the TPLM Variation Area; three on Council owned land [8](516 Ladies Mile); although I observed only one on this property during my site visit and the e3 ecologist recorded "scattered matagouri" on the toe of Slope Hill in the northern portion of property 13.[9]

57 The e3 Report provided recommendations to avoid impacts on matagouri (i.e. avoid removal) where possible. I support this recommendation along with its replanting and the use of other indigenous species in the landscaping of open spaces, and their margins such as on the terrace escarpments between the TPLM Zone and Lake Hayes Estate and the toe of Slope Hill and the blue-green networks of the TPLM Structure Plan where appropriate. Where these outcomes can be achieved, the impacts of development on matagouri will be less than minor and would result in a net gain for this species.

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8 Section 4.1; page 11 of the e3 Report
9 Section 4.1, page 8 of the e3 report

South Island Pied Oystercatcher (SIPO)

58 The e3 Report recorded SIPO within their observations in the TPLM Variation Srea but did not specify where in the TPLM Variation Area they were seen.

59 However, I have observed SIPO foraging on the northern paddock of Property 7 and 516 Ladies Mile. I have also incidentally and occasionally observed SIPO outside but near the TPLM Variation Area foraging on Property 8 and on the road verge between the Queenstown Country Club (**QCC**) and SH6. The latter were then observed to have been killed, presumably struck by a vehicle on SH6. This occurred prior to the commencement of construction at the QCC but after the timber post and rail fence was established.

Figure 2: South Island pied oystercatchers (SIPO): 10 years of sightings Aug-Feb; Public sightings are influenced by access, use of the eBird database which is a relatively recent tool used for recording observations. Checklist points provide an indicative location only.

Source: ebird.org/map using Google Earth map data Imagery ©2023 and TerraMetrics ©2023 eBird is a project of the Cornell Lab of Ornithology; accessed 3/8/2023

60 In December 2021, I recorded a sighting of forty-five SIPO at 516 Ladies Mile. The SIPO were foraging along with three black-fronted terns, eight black-billed gulls and other native birds after the Council had harvested its lucerne/ legume paddock. At this time of year, SIPO are preparing to migrate back to their coastal wintering (non-breeding) habitats.

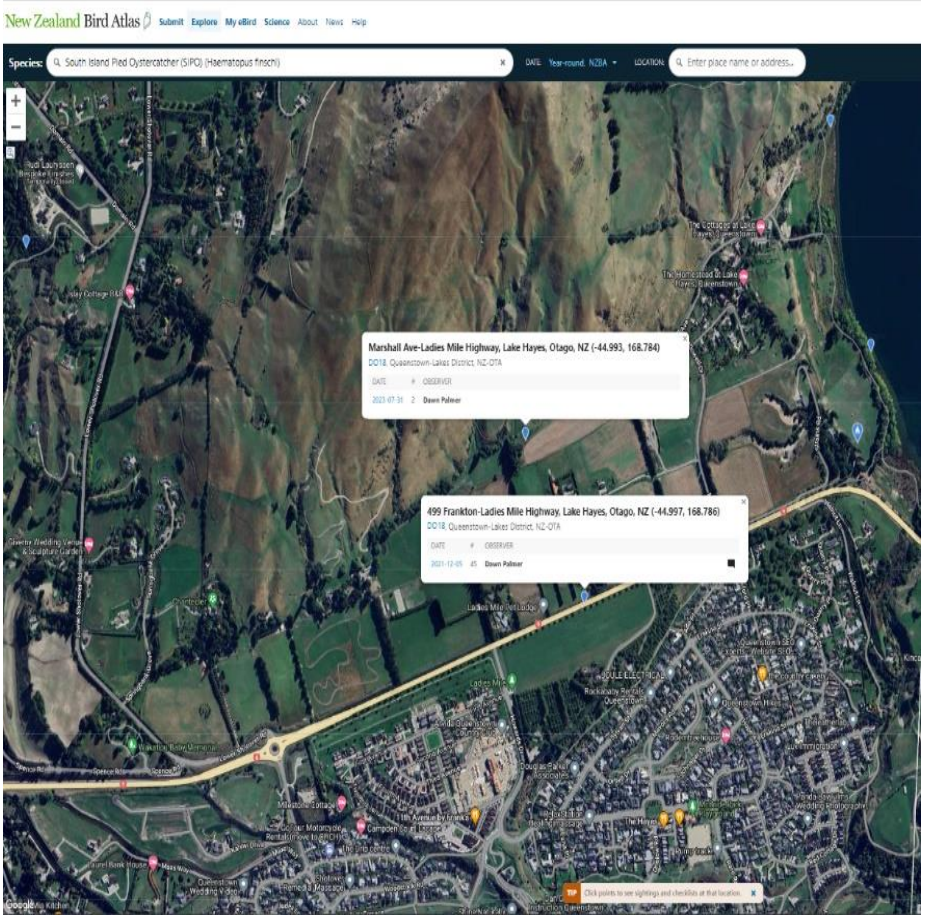

Figure 3: eBird checklist; Dawn Palmer; 5 December 2021 for SIPO in the TPLM Variation Area; 516 Ladies Mile. The record was given for 499 Frankton-Ladies Mile, but it related to area of the Open Space Precinct, 516 Ladies Mile; the northern record was for SIPO observed on 31/7/2023.

61 No SIPO nesting has been confirmed within the TPLM Variation Area. I also note that no SIPO chicks or fledglings have been recorded in public databases for the TPLM Variation Area and I have no personal records or observations of these in this area.

62 The dense shelterbelts screen the other paddocks from view from SH6 so we have no way of knowing whether SIPO, gulls and terns have historically used the other paddocks and the extent to which that use may have occurred.

63 If the land use was to remain unchanged, spring grass growth kept short and the land was not disturbed by stock, cultivation, mowing, and vehicle use, SIPO may nest there. However, as indicated above, in my opinion, the likelihood of SIPO being able to nest successfully (fledge young) in this location is low, or put another way, reasonably vulnerable to failure.

64 This said, SIPO are absolutely protected under section 3 of the Wildlife Act 1953 and disturbance of nests constitutes an offence under section 56(7) of the Wildlife Act. However, avoidance of nests requires the ability to detect them.

65 I understand that even the current zoning of the land allows for development of the TPLM Variation Area on the northern side of SH6.

66 I also note that SIPO, terns and black-billed gulls are widespread in at least three other regions of New Zealand with the species migrating between coastal and inland habitats to breed.

67 SIPO breed in Southland, Otago, Canterbury, Nelson/ Marlborough and to a lesser extent, the West Coast, Northland and Bay of Plenty. On 23 August 2023 I recorded a banded SIPO on the paddocks of the Remarkables QEII site below the Stoney Creek Road. I understand the SIPO was banded[10] in or near the Firth of Thames, in the Coromandel area of the North Island in May of 2021[11]. Figures 4 and 5 below illustrate the changes in distribution of the species during breeding and non-breeding seasons using data obtained through the Cornell Lab of Ornithology eBird website and database. Threats to SIPO throughout their range include conversion of farmland breeding sites to dairy pastures. The decline in SIPO populations is estimated to be 12% over three generations, more recent but incomplete trend data suggests a 41% decline over three generations (40 years).[12]

68 The most recent conservation status review (Robertson, et.al., 2021) included the qualifier 'Climate Impact' to the assessment criteria to reflect the new pressures from changing environments and acknowledge taxa that are or will be affected by long-term climate trends/ extreme

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10 SIPO carrying a red plastic leg band.
11 Personal communication B McKinlay, President, BirdsNZ, 23/8/2023.
12 https://nztcs.org.nz/assessments/118959 NZ Threat Classification System – Assessment Details

events.[13] The Climate Impact qualifier has been added to the threat classification of SIPO and all riverbed specialist species.[14] This criterion has also therefore been applied to black-billed gulls and black-fronted terns.

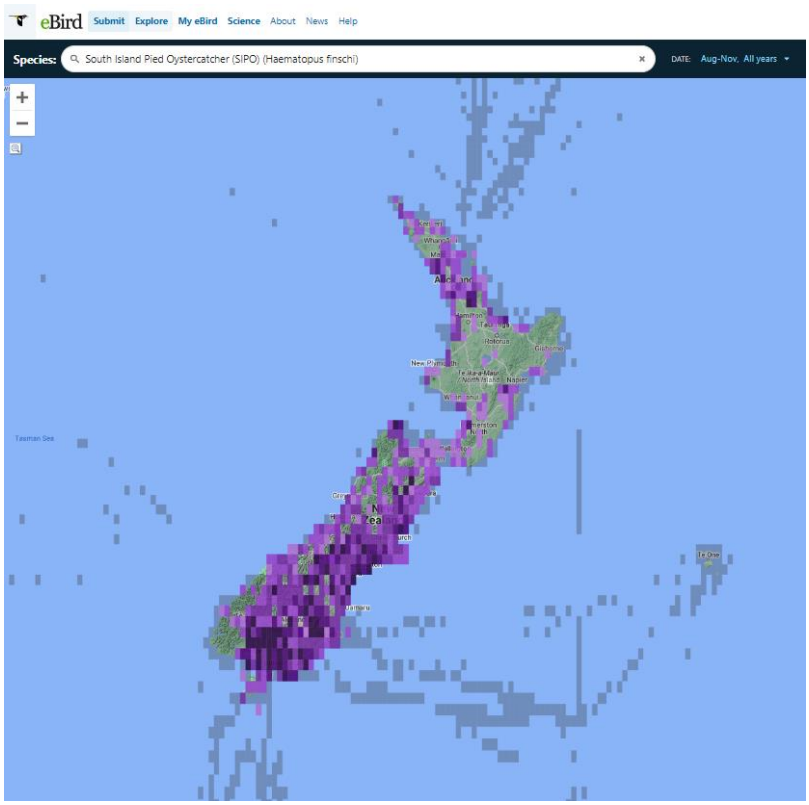

Figure 4: The distribution of SIPO during the breeding season between August – November from all Years of data; https://ebird.org/map

[13] https://www.doc.govt.nz/globalassets/documents/science-and-technical/nztcs36entire.pdf Section 1.0; page 2.
[14] https://www.doc.govt.nz/globalassets/documents/science-and-technical/nztcs36entire.pdf Section 2.5.2; page 16.

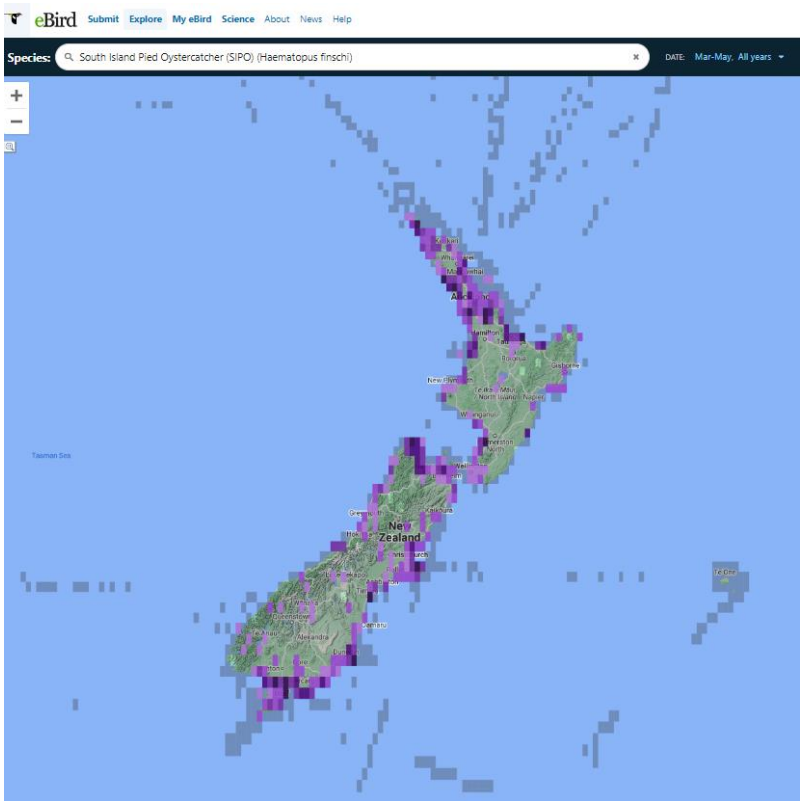

Figure 5: SIPO migrate back to coastal habitats, their distribution during the non-breeding season March-May. Source of data eBird.org database https://ebird.org/map

69 Recapping from my Peer Review Report, SIPO are known to breed and forage on the open, short, turfy spring farmland pastures and river margin Reserves of the Whakatipu Basin. No local data (other than incidental observations) on the cumulative effects of residential / greenfield development is available for this species. SIPO are however able to breed over a much wider variety of habitats in the Whakatipu Basin than terns and gulls.

70 On 6 August 2023 after a partial survey of the Whakatipu Basin that included TPLM, Slope Hill Road, Malaghans Road, Hunter Road, Hawthorne Drive, Kawarau Falls – Kingston Road (SH6) to the Coneburn / Woolshed Road roundabout at total of 77 SIPO were counted; none were recorded in TPLM. It is my opinion that this count represents a good indication of the size of the Whakatipu Basin population.

Black-fronted Tern (Terns)

71 Black-fronted terns are a South Island species. They are classified as a threatened – nationally endangered bird. Terns are present in the District between July and February and so would have been present in

the District at the time of the 3e surveys. They were not seen by the e3 ecologist during their visits in October 2020 or February 2021, however, the e3 ecologist correctly noted that they have been sighted along TPLM previously.

72 In December 2021, I recorded a sighting of three black fronted terns at 516 Ladies Mile on the southern side of SH6 – Figure 6 and 7 below. This was just after the Council's lucerne/ legume paddock had been harvested. Figure 8 below illustrates the distribution of tern sightings across the Whakatipu Basin during the breeding season (July to February) over the past 10 years. The maps illustrate where terns are seen *and reported* into the Cornell Lab of Ornithology eBird citizen scientist database.

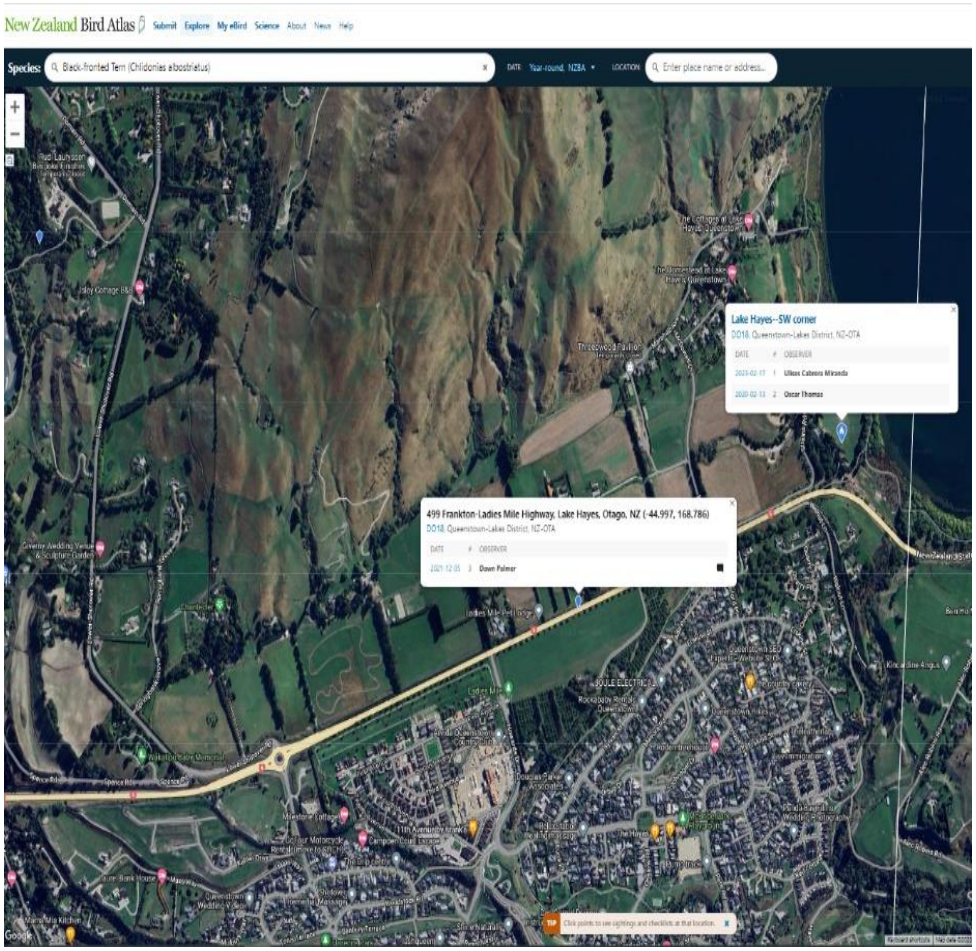

Figure 6: eBird records for black-fronted terns in the TPLM Zone (5 December 2021); my checklist record related to 516 Ladies Mile.

Figure 7: One of three black-fronted tern seen foraging on and over the "Laurel Bank" paddock/ 516 Ladies Mile on 5th December 2021 following the cutting and baling of the crop on the paddock.

Figure 8: Black-fronted tern: 10 years of sightings Aug-Feb;
Red lines indicate areas where I have observed nesting or attempts to nest.
Public sightings are determined by access, use of the eBird database which is a relatively recent tool used for recording observations. Survey points provide an indicative location only.

Source: ebird.org/map using Google Earth map data Imagery ©2023 and TerraMetrics ©2023 eBird is a project of the Cornell Lab of Ornithology; accessed 3/8/2023

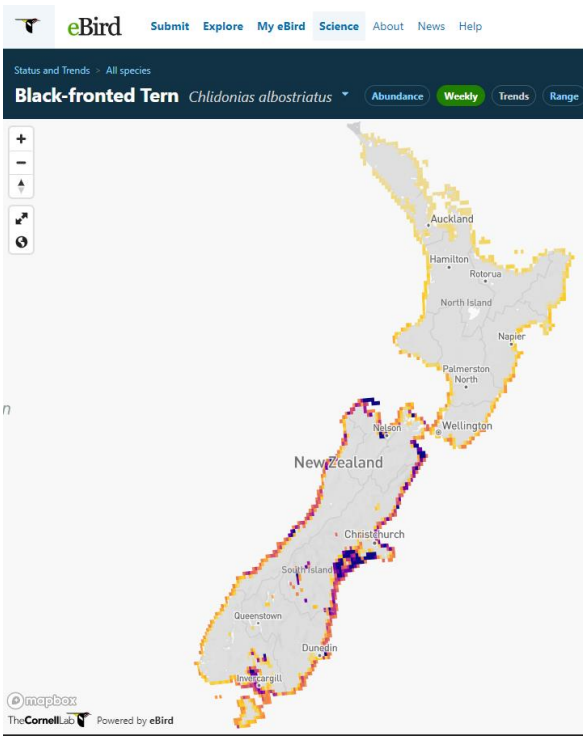

Figure 10: Black-fronted terns – Abundance in mid-April (non-breeding season), dark blue = weekly relative abundance 3; light yellow = weekly relative abundance 0.23

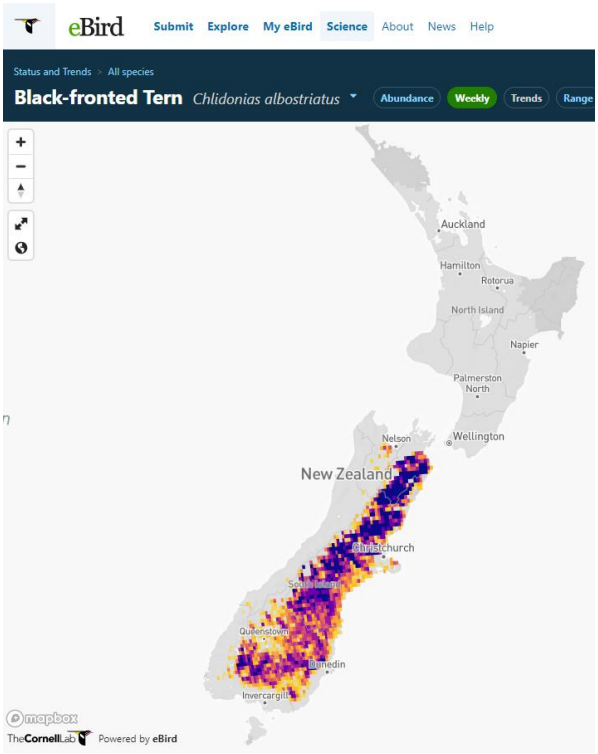

Figure 11: Black-fronted terns – Abundance in mid-October (breeding season), dark blue = weekly relative abundance 3; light yellow = weekly relative abundance 0.23

Source: ebird.org, Cornell Lab of Ornithology

73 There is currently no data available on the eBird database regarding the roost sites or migratory flyways for the small Whakatipu Basin black-fronted tern colony/ population. Knowledge of local foraging and nesting sites rely on a limited number of observations; however, the records shown in Figure 8 above provide a good indication of their primary nesting (along the Shotover River) and foraging habitat – from Jacks Point to Arrowtown and Arthurs Point, the Kawarau River and the valleys, lakes and terraces of the Whakatipu Basin in between.

74 The development of knowledge in relation to the foraging behaviour and biological needs of local populations is essential to inform integrated and sustainable management strategies for this endangered species along with other threatened and at-risk mobile fauna within the context of the Lower Shotover populations. This knowledge will likely be provided through the implementation of the NPS-IB which has to be given effect to by 2031.

75 Terns breed in the gravel beds of the Shotover River in the Whakatipu Basin. On the 18 January 2023 myself and volunteers at the Tucker Beach Wildlife Management Reserve counted 24 adults, 17 fledged juveniles and 3 chicks. However, to date this breeding season, the maximum count at any one time in the Tucker Beach Reserve, across the Basin or along the Shotover River at of 24 September 2023 is just 10. A systematic survey may reveal more.

76 On 22 December 2022, I incidentally recorded the time interval between adult black-fronted terns leaving and returning with food for their chicks at the tern colony in the Tucker Beach Wildlife Management Reserve. They flew northeast and southwest from the Reserve. Return visits with adults carrying worms and or small fish took about 3 minutes. This suggests the availability of food was reasonably close to the colony on the day of the observation, at the colony site chosen for the 2022/23 breeding season.[15] As noted in my Peer Review Report, the colony nesting location may be between years based on a number of dynamic factors also discussed in my Peer Review Report including changes in the height of gravel beaches, disturbance events – river flows, human activity, predators, pets (cats and dogs), and the incursion of weeds. In

[15] This single observation should not be used to represent an understanding of the foraging times of the nesting colony. It was an incidental and opportunistic observation.

the 2020/2021 breeding season, the terns nested in the lower Shotover Delta, and I received reports from Shotover Primary School staff that they were seen foraging over the school grounds and nearby wetland.

77 Black-fronted terns have also been observed to fly about 4.5 km from the 2022/23 Shotover river breeding habitat to feed on small fish rising on Lake Hayes, (personal communication, email from Richard Bowman, 26/12/2022 who observed about 10 terns and about 50 Australasian crested grebe feeding in a concentrated area of the lake on what was assumed to be rising small fish).

78 Terns are known to fly more than 7km to forage along the Clarence River and even change sub-catchments where the pressure of land development is not present.[16] It can therefore be expected that they would forage across the Whakatipu Basin between the Arrow River and Woolshed Bay south of Jacks Point and the Mill Creek catchment. Therefore, it is my opinion that terns forage occasionally and fleetingly over the TPLM Variation Area as part of a much broader foraging network.

79 The fishery of Lake Hayes also appears to be an important component of their habitat. The development of the TPLM Variation areas should therefore avoid contributing to a deterioration of vegetation in the marginal habitats or the water quality and fishery of Lake Hayes.

80 I understand that the measures to manage stormwater will avoid impacts on the water quality of Lake Hayes and therefore will not adversely impact on the vegetation or mudflats of the southwestern margins of the Lake.

Black-billed Gulls (Gulls)

81 The Black-billed Gull is an At-Risk – declining, highly mobile bird species; they nest on gravel riverbeds. Gulls are present in the District between July and March and so would have been present in the district at the time of the e3 surveys. They were not seen by the e3 ecologist during their visits in October 2020 or February 2021, however, the e3

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[16] Gurney, F.E. (2022): Breeding movements and post-breeding dispersal of Black-fronted terns/ Tarapirohe (Chlidonias albostriatus) in the Mackenzie Basin. MSc Thesis, Lincoln University, 2022.

ecologist correctly noted that they have been sighted along Ladies Mile previously.

82 In December 2021, I recorded a sighting of eight Gulls at 516 Ladies Mile. This was after the lucerne/legume paddock had been harvested. There has been a 50 to 60 percent increase in the Lower Shotover River black-billed gull population this year following a very successful breeding season last year. In December 2021 the population count estimated 240 gulls in the local population; in 2022, the returning gull flock was 230. I counted 375 in the returning gull flock on 6 August 2023 during one of the surveys referred to in paragraph 35 of my evidence. I have a high level of confidence in this estimate based on my monitoring observations of this population and the results of a survey of the Lower Shotover River on 3 December 2021 performed by a team of people I coordinated under the Tucker Beach Wildlife Management Reserve Jobs for Nature project.

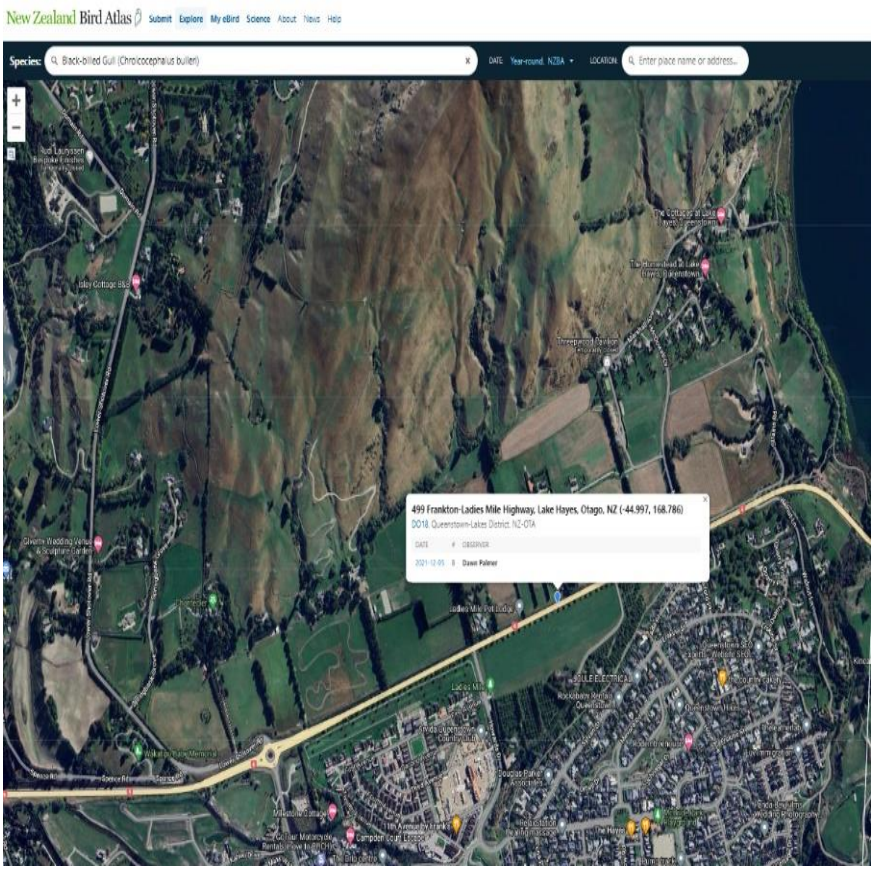

Figure 11: eBird records 5 December 2021 for black-billed gulls in the TPLM Zone. The record was given for SH6 but it related to 516 Ladies Mile.

83 Figure 12 below illustrates the distribution of gull sightings for the Whakatipu Basin reported into the Cornell Lab of Ornithology eBird

database. The sightings confirm my own observations and understanding of their habitat use. They breed on the Shotover River, they feed and roost in Queenstown Bay, Frankton Beach, the Lower Shotover below the State Highway bridge, Tucker Beach Wildlife Management Reserve, the oxidation ponds and transfer station as well as farm paddocks when foraging conditions are suitable.

84 It is my opinion that the TPLM Variation Area, in its current condition, makes a relatively minor and fleeting contribution to the network of foraging habitat used by black-billed gulls in the Whakatipu Basin.

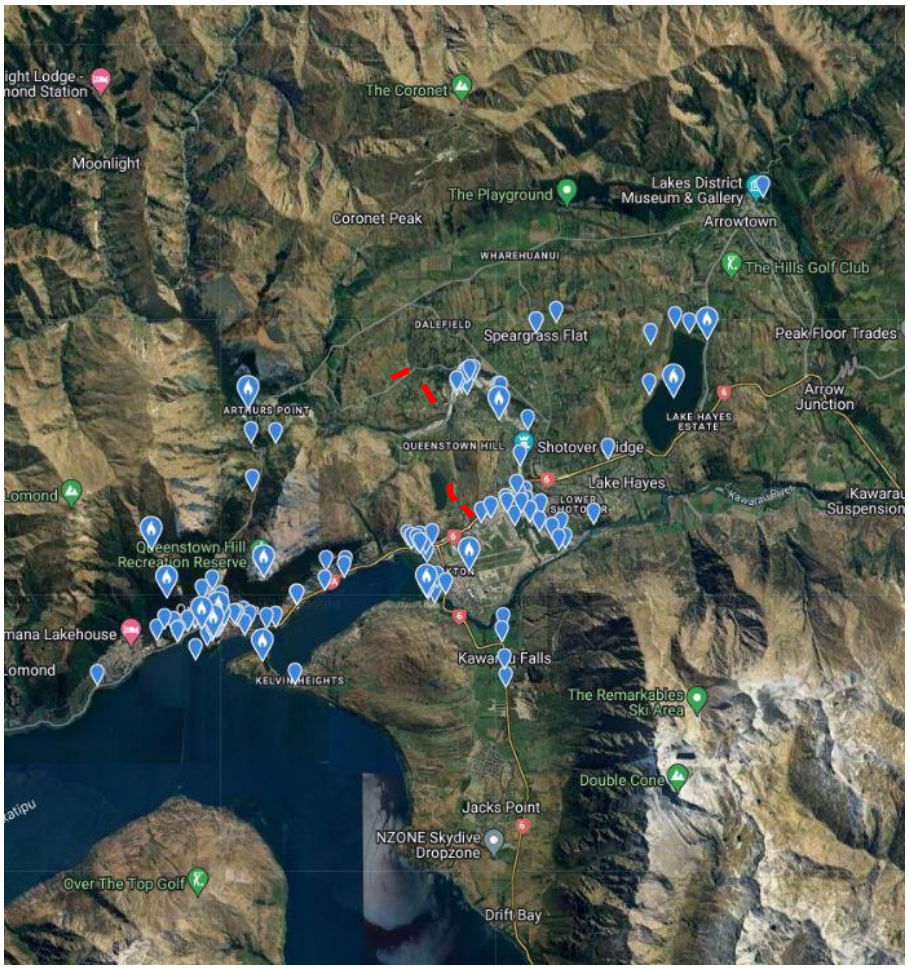

Figure 12: Black-billed gulls: 10 years of sightings Aug-Feb;
Red lines indicate areas where I have observed nesting or attempts to nest.
Public sightings are determined by access, use of the eBird database which is a relatively recent tool used for recording observations. Survey points provide an indicative location only.

Source: ebird.org/map using Google Earth map data Imagery ©2023 and TerraMetrics ©2023 eBird is a project of the Cornell Lab of Ornithology; accessed 3/8/2023

Summary of Impacts on foraging habitat of SIPO, Terns and Gulls

85 We currently have a limited indication of the foraging habitats important to SIPO, terns and gulls in the Whakatipu Basin. Based on my observations, and the eBird records of these species in the broader Whakatipu Basin, the contribution of the TPLM Variation Area is in my opinion likely to be fleeting, and comparatively minor, such that the incremental loss of the habitat north of SH6, coupled with the retention of relatively open space in 516 Ladies Mile, is unlikely to result in the loss of any of these species from the Whakatipu Basin. I have only moderate confidence in this assessment in relation to black-fronted terns. Monitoring would be needed to determine the value of the TPLM Variation Area for black-fronted terns with higher confidence.

86 The existing habitat of the TPLM Variation Area consists of pastures that have been subdivided by shelterbelts, are variously cropped, grazed (sheep, alpaca, horses, cows). Some land may be mown, cultivated or cropped from time to time. Property 13 has a vehicle track winding across the paddock suggesting it is used for driving, riding or perhaps karting.

87 Cultivated, cropped, and or saturated soils with worms and other invertebrates (e.g., beetle larvae) attract foraging birds e.g. blackbirds, song thrush, starlings (introduced) as well as gulls (black-backed and black-billed), waders (SIPO, spur-winged plovers) and terns when invertebrates are brought to the surface or flushed and exposed by cropping and cultivation.

88 I note that the historical vegetation of the TPLM Variation Area was described by e3 as tussock grassland, shrubland and scrub, with the southern slopes of Slope Hill being matagouri, kowhai, Coprosmas, native broom, Olearias and lianes such as Muehlenbeckia (pohuehue) and Rubus (bush lawyer).[17] Historical vegetation clearance, conversion to farming and the introduction of mammalian predators and weeds (along the Shotover and Kawarau River corridors and Lake Hayes) have also impacted on the quality of the current foraging and potential nesting habitat. However, my assessment and opinion is based on the quality of the habitat as it currently exists.

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17 E3 Scientific Ecological Assessment Section 2.1.2; page 5.

89 Status quo land management plays key a role in the value of the TPLM Variation Area as foraging habitat for gulls, waders and terns and potentially nesting habitat for SIPO. The maintenance of healthy soil and the occasional cultivation or crop harvest are management actions that attract foraging gulls, terns and waders (i.e., SIPO). This management sometimes occurs but is not guaranteed under the status quo. It would no longer occur following development of medium to high-density residential and commercial precincts on the north side of SH6.

90 However, the Open Space Precinct on the south side of SH6 (516 Ladies Mile) will be substantially retained as open space, although buildings or structures ancillary to recreational or community use may also be located there.

91 If soils of the large Open Space Precinct south of SH6 are managed to maintain healthy invertebrate fauna continued foraging options for these highly mobile species could be sustained.

92 The configuration of the stormwater management system has not yet been confirmed, but as I understand it, stormwater swales and/or detention basins will be able to contribute to the network of foraging opportunities.

93 I base my opinions on my own observations of foraging by SIPO on the Wakatipu High School sports fields, and observations of terns foraging over the Shotover School rugby field reported by school staff.[18] The continued use of an urban ephemeral wetland (stormwater management unit) is not unprecedented; these areas will continue to form part of a wider network of foraging areas.

94 As SIPO tend to reclaim the same nesting territory each year[19], it is my opinion, based on my own observations of the distribution of SIPO within the Whakatipu Basin, that the TPLM Variation Area under the current land management is unlikely to support successful nesting by SIPO and in event that the TPLM Variation Area was occupied by reproductively

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[18] Per. Comm. Emma Watts, November 2021; who also submitted an eBird record of this observation on 1/11/2021.

[19] Sagar, P.M.; Geddes, D.; Banks, J.; Howden, P. 2000. Breeding of South Island pied oystercatchers (Haematopus ostrulegus finschi) on farmland in mid-Canterbury, New Zealand. Notornis 47 (2): 71-81.

mature SIPO, is likely to support only one, possibly two pairs if they were undisturbed.

Figure 13: A post-breeding flock of 45 SIPO foraging on the 516 Ladies Mile paddock on 5th December 2021. SIPO form post breeding flocks before leaving inland habitats and returning to coastal habitats for the summer, and on returning in July/ August for the breeding season. Black-fronted terns (3) and black-billed gulls (8) were also seen foraging over the paddock but were more difficult to photograph. Photo: D Palmer 5/12/22

95 In the broader, landscape context, development of the TPLM Variation Area north of SH6 will result in another incremental loss of foraging habitat within the Whakatipu Basin. The northern part of the TPLM Variation Area represents a cumulative and additional loss following the development of Lake Hayes Estate, Shotover Country, Jacks Point, Hanleys Farm, the Frankton Flats, Quail Rise and Tucker Beach as well as the gradual infilling of the broader Whakatipu Basin. However, for reasons stated in my evidence above, it is my opinion that under the current land management, the use of the TPLM land by these species for foraging, is likely to be relatively minor and fleeting compared to the pastures south of the Kawarau River, the Whakatipu Basin north of Slope Hill, along the Shotover and Kawarau River corridors and the fisheries of Lake Hayes and possibly Lake Johnson where urban development pressure is lower.

96 There is no precise data available on the extent to which the cumulative effects of progressive subdivision and development of the farmland and terraces surrounding the braided river breeding habitat of the black-fronted tern and black-billed gulls are impacting on these local (Whakatipu Basin) populations. As noted above, SIPO can breed in a

much wider range of habitats that include the riverbeds and surrounding short pastures.

97 Cumulative impacts on these species and their habitat are part of a much broader and dynamic landscape scale ecosystem impact described in my Peer Review Report. As stated in my Peer Review Report, and in my evidence above, work is required to more clearly understand the areas in the Whakatipu Basin that are most important to retain these mobile species, including their roosting, foraging and nesting sites.

98 The e3 Report recommended active discouragement of breeding by gulls and terns (and presumably waders like oystercatchers) by limiting open spaces, and actively managing open spaces to retain short grass. The e3 Report raised concerns that open spaces would become a "sink" for these native birds where they would be predated if permitted to breed within them. However, I reiterate, the TPLM Variation Area does not provide breeding habitat for gulls and terns and under the current management regime, provides only the potential for breeding by SIPO if the land was managed to minimise potential disturbance to any attempted nesting effort.

99 Again, it is my opinion that management of open spaces – the blue-green networks (including stormwater) and cycling networks could still provide some limited habitat for smaller indigenous birds, such as fantails, silvereyes, grey warblers, tui, and bellbird, species which have persisted within urban habitats despite current levels of predation,[20] an impact that may be further reduced by predator control and responsible pet ownership.

100 The high-density development proposed on the north side of SH6 is not compatible with continued use as a foraging habitat by gulls, terns and SIPO, but as mentioned above, may support smaller indigenous birds where indigenous vegetation can be incorporated into landscape planting in blue-green networks. SIPO, waders and waterfowl may also use the areas developed for stormwater management.

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[20] Noe, E.E. et.al., (2022): Habitat provision is a major driver of native bird communities in restored urban forests. J Animal Ecology 2022;91:1444-1457

101 Overall impact of further loss of the TPLM Variation Area north of SH6 is estimated to be low, with the caveat that I have not been able to observe and confirm bird use of the paddocks north of the dense shelterbelts along the Ladies Mile regularly and incidentally. However, I do notice the areas where I see these species and notice them flying overhead towards foraging areas. These areas tend to be the open areas of the Whakatipu Basin, inferring that more closely subdivided farms enclosed by dense tall hedges and shelterbelts grazed by stock (such as the TPLM Variation Area north of SH6) are less optimal foraging habitats.

102 The viability of foraging habitats is related to openness, vegetation cover, and soil health. The open portion of the land on 516 Ladies Mile will be substantially retained as foraging habitat and can therefore be managed to sustain the foraging values with only minor loss following the development of that site.

Ecological Context - Additional Ecological Values

103 In my evidence above, I have discussed the importance of the habitat of Lake Hayes, both as a fishery and the habitats of the southwestern Lake margins. Understanding the ecological context for potential indirect impacts of the TPLM Variation, requires an understanding of the surrounding habitats for threatened, at-risk and not threatened but protected species in the habitat in the southwestern margins of Lake Hayes in particular.

Lake Hayes

104 Lake Hayes and its margins are not included in the TPLM Variation area. The land straddling and east of McDowell Drive provides a buffer between the margins of Lake Hayes and the TPLM Variation area outside of the TPLM Variation area.

105 Submissions by Mr Noskov (submitter 16), Threepwood Farm Residents Association and the Threepwood Custodians Ltd (submitter 33), Friends of Lake Hayes Society Incorporated (submitter 39), Ms Spary (submitter 43), DOC (submitter 44), Mr and Mrs Anderson (submitter 48), Otago Regional Council (**ORC**) (submitter 83), Mr Sydney (submitter 110), Mr and Mrs Lee (submitter 112), Mr Griffin (submitter 114), Mr and Mrs Crane (submitter 115), recognised and highlighted the regional significance of the values of Lake Hayes along with the issues relating to

the water quality of the Lake. I will address submissions directly later in my evidence and for thoroughness, I will address the potential direct or indirect impacts on species found in the habitat of the southwestern corner of Lake Hayes that may occur following residential development of the TPLM Variation Area.

106 The e3 Report did not discuss in detail the significance of Lake Hayes as a Wildlife Refuge[21] and a Regionally Significant Wetland listed in Schedule 9 of the Otago Regional Plan: Water as an area of high diversity for indigenous flora and fauna and habitat (including breeding habitat) for endemic bird species. My Peer Review Report mentions Lake Hayes only peripherally in section 2, page 4 as the land and habitat is not within the TPLM Variation Area. However, on further consideration, it is my opinion that indirect and cumulative impacts on the avifauna of the southwestern margin of Lake Hayes should be considered. These may be impacted by unaccompanied pets and an increase in visitor activity around the Lake.

107 I have prepared a species list identifying birds observed within the TPLM Variation Area and the habitat in the southwestern margin of Lake Hayes. I have relied on my personal observations along with a desktop review and checklist data obtained from the Cornell Lab of Ornithology New Zealand eBird portal database.[22] The species list is provided as Table 1 in **Attachment B** to my evidence for information. Species listed as highly mobile are also indicated in Table 1. [23]

108 Referring to Table 1 in Attachment B of my evidence, twenty-five species were recorded in the TPLM Variation Area by the e3 ecologist and I. The three species that are Threatened or At-Risk have been discussed extensively within our reports and my evidence above. Five species recorded in the TPLM Variation Area are endemic to New Zealand (bellbird, grey warbler, kereru, paradise shelduck and tui). Four species are native to New Zealand but also found in Australia (Australasian harrier, silvereye, southern black-backed gull, spur-winged plover). Paradise shelduck are a game species (Schedule 1 of the Wildlife Act

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21 https://www.orc.govt.nz/managing-our-environment/water/wetlands-and-estuaries/queenstown-lakes-district/lake-hayes-margins

22 https://ebird.org/hotspot/L1034382?yr=all

23 https://environment.govt.nz/assets/publications/biodiversity/National-Policy-Statement-for-Indigenous-Biodiversity.pdf (Appendix 2)

1953), silvereye are partially protected (Schedule 2), harrier may be hunted or killed subject to conditions (Schedule 3, Part 1); the remaining thirteen introduced and naturalised species (excluding Coot) are not protected (Schedule 5).[24]

109 As already addressed above, the endemic, not threatened species and silvereyes as noted above are commonly found within urban areas and are likely to continue to be found in and around the area following development of the TPLM Variation Area. I have also outlined my conclusions in relation to the other avifauna within the TPLM Variation Area above.

110 Forty-seven species are known to be present at least on a seasonal basis in the habitat in the southwestern corner of Lake Hayes. Of these, twenty-four species nest on or very close to the ground; black-fronted terns, black-backed gulls and eastern falcon are not likely to nest on the ground in the southwest corner of Lake Hayes although they have been recorded in that area.

111 Species nesting on or very close to the ground are more vulnerable to disturbance by unaccompanied or uncontrolled dogs and free roaming cats.

112 The density of the TPLM Zone is recognised as a "steep change" for the District with potential to bring an increase in the number of free roaming or unaccompanied pets (dogs and cats). Management of increased risk of predation or disturbance of nesting species by pets (cats and dogs) is an indirect impact of the residential development of the TPLM Variation Area.

113 In my opinion, enforcement of the local Dog Control Bylaws, and public education on responsible cat ownership are measures that can manage

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[24] Australasian Bittern (*Botaurus poiciloptilus)* is a Threatened - Nationally Critical highly mobile species not included in the list in Attachment B because it has not been recorded recently at Lake Hayes. This species was observed on the western shore by me and over the northern area of Lake Hayes (by Fish and Game staff) nearly twenty years ago (2005). There have been recent sightings of bittern within the Whakatipu Basin (August 2019) suggesting that the habitat of the southwestern corner of Lake Hayes should, and so will, be monitored under a joint project undertaken by BirdsNZ with the sponsoring support of Otago Regional Council. The habitat available in the southwestern corner of Lake Hayes is suitable and likely habitat for this highly mobile species, I therefore support ongoing initiatives to support this population.

these risks on the fauna in the southwest margins of Lake Hayes associated with the development enabled by the TPLM Variation.

114 While beyond the scope of the TPLM Variation, I recommend that Council explore the early adoption of measures to promote responsible cat ownership to minimise risk to indigenous fauna. Council is also recommended to support a public advocacy campaign regarding responsible pet ownership (cats and dogs) and the discouragement of free roaming pet cats (noting the existing requirements of Dog Control Act 1996), within habitats supporting nesting native birds, significant habitats of indigenous fauna; particularly Regionally Significant wetlands, braided rivers, open spaces adjacent to indigenous shrublands and areas which support short spring pastures where wader nesting may occur.

115 This measure and/or other support for the restoration and habitat protection of Lakes Hayes coupled with improved pet control measures would be ecologically beneficial.

Response to Submissions

116 I have reviewed the submissions that raise matters relevant to my area of expertise. I respond to the key matters raised below.

117 For completeness, subject to the recommendations in response to submissions that I make below, from an ecological point of view I support the notified provisions of the TPLM Variation, including Objective 49.2.7.13, which requires the use of indigenous planting to increase ecological values, preferring vegetation that naturally occurs and/or previously occurred in the area.

Environmental Degradation - Impacts on natural habitats of Lake Hayes

118 The habitat supporting bird fauna in the southwestern area of Lake Hayes includes the raupo beds, sedgeland, shallow, areas of ephemeral, shallow water, mudflats, pasture and mature willows.

119 As noted in paragraph 105 of my evidence, submissions by Mr Noskov (submitter 16), Threepwood Farm Residents Association and the Threepwood Custodians Ltd (submitter 33), Friends of Lake Hayes Society Incorporated (submitter 39), Ms Spary (submitter 43), DOC (submitter 44), Mr and Mrs Anderson (submitter 48), ORC (submitter

83), Mr Sydney (submitter 110), Mr and Mrs Lee (submitter 112), Mr Griffin (submitter 114), Mr and Mrs Crane (submitter 115), recognised and highlighted the regional significance of the values of Lake Hayes along with the issues relating to the water quality of the Lake. I interpret the concerns raised as extending to the habitat briefly described above. The submission by Mr Vladimir Noskov (submitter 16) raised most directly concerns about the degradation of natural habitats, pollution and environmental degradation that could harm the surrounding area.

120 I understand the primary issues of concern are the potential for pollution, sedimentation and erosion arising from stormwater discharge into the Lake Hayes Catchment, Hayes Creek, the Kawarau or Shotover Rivers. The submitters raised concerns in relation to the change in volume of water shed from the land, the quality of the water, the retention and infiltration of the water into the aquifer, the potential for property damage, and degradation of the water quality of Lake Hayes.

121 Submissions by Friends of Lake Hayes Society Incorporated (submitter 39), and Ms Spary (submitter 43) acknowledge the efforts of restoration and rehabilitation within the Lake Hayes catchment and the potential for this work to be undermined by polluting discharges near the outlet of the Lake. Mr John Gardiner and Ms Amy Prestidge address stormwater matters in their evidence. However, it is my understanding that these effects will be avoided by the proposed stormwater management systems.

Submissions on the Blue-Green Network and the Incorporation of Stormwater into Amenity Areas.

122 Te Rūnanga o Ngāi Tahu, Aukaha and Te Ao Marama Incorporated (**Kāi Tahu**) (submitter 100), has sought amendments to the Zone Purpose (49.1), the Structure Plan (49.8), Objective 49.2.7 and Policy 49.2.1.1 with both Kāi Tahu and DOC referring to Assessment Matters 49.7.1.f and 49.7.1.f (ii). The Kāi Tahu submission specifically seeks wording to reflecting the enhancement of ecological values through integration of blue-green networks with stormwater management, and the prevention of polluting discharges to Lake Hayes, the Shotover and Kawarau Rivers.

123 I support the submission by DOC that Rule 49.7.1(f) be retained as notified at the very minimum and further I support the submission of Kāi

Tahu on Assessment Matter 49.7.1.f (ii) which seeks an amendment to include consideration of the form and functioning of ecological corridors in order to ensure the use of indigenous vegetation in the TPLM Zone landscaping is promoted and more ecologically functional.

124 I support the intent of the Kāi Tahu and DOC submissions on these matters and also consider the stormwater solution would as I currently understand it, enable outcomes to facilitate the integration and incorporation of ecological values sought within the context of the TPLM Variation Area's development.

125 The adoption of an integrated system that enables stormwater to be managed with collection areas to enable retention and infiltration at natural low points will mimic to some degree the natural hydrological patterns of the land.

126 If these treatments allow for enhancement planting with species such as sedges, flax, and or indigenous shrub species suited to ephemeral wetlands this will increase the potential for use of the areas as habitat (foraging or nesting) by species tolerant of urban wetland environments.

127 If these treatment areas are managed as open spaces with short grass, SIPO may be able to forage within them if large enough.

128 As set out above, there is ecological value and benefit in incorporating integrated stormwater management into the urban design elements of the blue-green corridors.

129 The water retention and infiltration areas could be positioned at the toe of Slope Hill land on the northern boundary of the TPLM Variation Area and or as an area more central between the toe of the slope and SH6 linked by blue-green corridors.

130 Kāi Tahu (submitter 100) regarding Rule 49.5.12, 49.5.25, 49.5.47 raised concerns that blue-green network lighting may affect fauna, and discretionary matters should also consider ecological impacts of lighting. The submission seeks an amendment to the discretion restricted to the effects of light and glare on amenity values so that it includes ecological health.

131 Within the TPLM Variation Area, nocturnally active species currently present are most likely to be little owl, spur-winged plover, paradise

shelduck, and mallards feeding where or when grain or seeds from pasture grasses or crop harvest may be available. These species will likely be substantially displaced by urban development within the TPLM Variation Area north of SH6 and so the issue would be somewhat mute. However, there may be some light spill towards Lake Hayes, that may impact on bird fauna that are active at night, on that basis, there is merit in the inclusion of the amendments sought by Kāi Tahu that enables consideration of ecological health (which will include impacts on nocturnal species in the surrounding habitat of the Regionally Significant wetland).

Submissions seeking amendments to PDP Chapter 27 Subdivision and Development in relation to the TPLM Zone

132 Kāi Tahu (submitter 100) also referred to the amended provisions of the PDP Chapter 27 – Subdivision and Development Location Specific objectives and policies. Objective 27.3.24 and Policies 27.3.24.1, 27.3.24.3 and Matters of Discretion 27.7.28.1. The submission by the DOC (submitter 44) also referred to matter of discretion 27.7.28.1.

133 Kāi Tahu sought in their submission on Objective 27.3.24 that the range of functions that parks and open spaces will achieve should also include stormwater management and ecological functions; contribute to ecological corridors. I support the intention of this submission where integration can be practically achieved and noting the functional purpose of the site as a space for either biodiversity enhancement or recreational use and organised sports.

134 I support the submission of DOC (submitter 44) requesting the insertion of an additional matter of discretion to 27.7.28.1 to include "l. *ecological and natural values*" in the rules relating to subdivision to enable the effects on bird and lizard habitat to be assessed and considered as a discretionary matter.

135 The submission of Kāi Tahu (submitter 100) to 27.7.28.1.b.(ii) sought the inclusion of ***blue-green or ecological corridors*** in open spaces and the TPLM Structure Plan indicative parks and any additional open spaces.

136 I support amended wording to both of these provisions that gives effect to the intent of submissions by DOC and Kāi Tahu on this matter.

Submissions concerning inconsistency with PDP Policy 24.2.4.2 development of land within Lake Hayes catchment

137 PDP Objective 24.2.4 (which is an existing Objective in the PDP) expects subdivision and development, and use of land, to maintain or enhance water quality, ecological quality, and recreation values while ensuring the efficient provision of infrastructure.

138 Submissions by Threepwood Farm Residents Association and the Threepwood Custodians Ltd (submitter 33), Friends of Lake Hayes Society Incorporated (submitter 39), Mr and Mrs Anderson (submitter 48), Mr Sydney (submitter 110), Mr and Mrs Lee (submitter 112), and Mr and Mrs Crane (submitter 115), address a perceived inconsistency between the provisions of the TPLM Variation and the PDP Policy 24.2.4.2 which restricts the subdivision, development and use of land, in the Lake Hayes catchment unless it can contribute to water quality improvement in the catchment commensurate with the nature, scale and location of the proposal.

139 I note the submission of ORC (submitter 83) and their role in delivering on work to monitor and rehabilitate Lake Hayes, and to support the function of the existing culvert at the outlet of the Lake and the role of Mana Tāhuna Charitable Trust in the restoration of the catchment of Te Wai Whakaata Lake Hayes. The Jobs for Nature project being undertaken by Mana Tāhuna has limited funding, however I also note the winter 2023 update[25] announcement of the recipients of the Council Climate and Biodiversity Project Grants Fund allocates $20,000 to each of the Mana Tāhuna Charitable Trust and the Whakatipu Reforestation Trust for revegetation on Council managed reserves within the Whakatipu Basin. This may include planting in the Lake Hayes catchment. The work required to rehabilitate the Lake Hayes catchment is extensive and long term in its focus.

140 Policy 27.3.24.7 (which is in the TPLM Variation provisions) requires the design of stormwater management systems to avoid stormwater discharges to Lake Hayes and avoid the adverse effects of discharges to the Shotover and Kawarau Rivers, the State Highway network, and groundwater resources.

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25 https://createsend.com/t/d-09485F802AC6837F2540EF23F30FEDED

141 As the exact stormwater solution has not yet been defined, I cannot yet comment on the level of their ecological benefit or efficacy. However, the Policy addresses my concerns regarding the need to protect the lower Lake Hayes catchment from adverse effects associated with stormwater discharges but I will defer to Mr John Gardiner and Ms Amy Prestidge's evidence on this matter.

DOC submission seeking offsetting / compensation

142 DOC has submitted in opposition to the TPLM Variation unless off-site monitoring and effects management measures to address the loss of black-fronted tern, black-billed gull and SIPO habitat have been developed and confirmed. The DOC submission states that monitoring and management measures could be stand-alone and/ or a collaboration with, or support for, existing community initiatives.

143 It is Policy 33.2.1.6 of the PDP that refers to the management of adverse effects on indigenous biodiversity through a hierarchy of avoidance, minimisation, remediation, mitigation, offsetting and compensation. The PDP Framework for the use of biodiversity offsets is set out in Chapter 33.10. These policies are expanded by the effects management hierarchy set out in the Clause 1.6 - Interpretation and Appendices 3 and 4 of the NPS-IB. I note that Policy 33.2.1.6 requires any residual adverse effects on *significant* indigenous vegetation or indigenous fauna to be offset and under clause 3.16 (indigenous biodiversity outside SNAs) of the NPS-IB that is it only *significant* adverse effects that must be managed by applying the effects management hierarchy.

144 As already explained above, the development of the TPLM Variation Area would result in an incremental reduction in available foraging habitat with respect to the northern side of SH6. As previously discussed in my evidence, SIPO nesting has not been confirmed on the paddocks north or south of SH6 within the TPLM Variation Area.

145 SIPO foraging has been observed on the northern portion of Property 7 (about 2 hectares) and 516 Ladies Mile (about 7 hectares), while gulls and terns have only been reported on the open portion of 516 Ladies Mile on the area identified as an open space precinct. Although some structures are anticipated in the open space precinct, the site already has a large structure and a large chestnut orchard on 7 hectares of the 14 hectares rendering those areas unavailable for foraging at this time.

146 The net change in foraging habitat for the TPLM Variation Area has not yet been defined. However, I anticipate that the stormwater management units may be able to contribute to the available foraging habitat for one or more of these (and other) species.

147 The recorded observations of terns indicate that they may forage on a sort of circuit around the Whakatipu Basin moving up and down the rivers, across the farmland over to Lake Hayes and across to other wetlands of the Whakatipu Basin, e.g. on the north side of Slope Hill on Slope Hill Road or down over the paddocks south of the Kawarau River towards Lake Tewa, refer to Figures 2, 8 and 12. The TPLM Variation Area appears to be a foraging site that is investigated along that circuit.

148 Therefore, in my opinion, development of the TPLM Variation Area will likely result in the loss of a relatively small area of comparatively low value foraging habitat on the north side of SH6 of which we know at least 2 hectares has been used by SIPO.

149 It is my understanding that most of the existing open 7 hectares on 516 Ladies Mile land will remain as open space and therefore available for foraging.

150 It is my opinion that, use is fleeting and is both dependent upon and vulnerable to management under the current and future land use.

151 Overall, I have concluded that the residual loss of habitat, following these mitigations, while not explicitly calculated, is in my opinion likely to be less than minor.

152 If offsetting or compensation were to be required a calculation of the unavoidable net loss of that habitat would need to be informed by monitoring of the relative use of the remaining suitable habitat.

153 This monitoring is a workstream that may arise through the implementation of the NPS-IB, but as discussed in my Peer Review Report, it is in my opinion, work that needs to address the scope, scale and speed of development that has occurred throughout the broader Whakatipu Basin.

154 The development of some of the subdivisions (e.g. Hanleys Farm, Shotover Country, Lake Hayes Estate) have each occurred within a single life span of these species requiring their rapid adjustment to

foraging habitat availability. The monitoring workstream should also acknowledge the impacts of gravel extraction and risks associated with climate change or extreme weather events.

155 QLDC and ORC have joint responsibilities to deliver on the National Policy Statements. The timing of the TPLM Zone Variation process has preceded some of the impending requirements. However, efforts to support terns, gulls and waders, by weed clearance, restoration planting, predator control and management of gravel extraction can be strategically supported through Council's Biodiversity and Climate Change Action Plan rather than specifically tied to the development of the TPLM Zone as the next incremental area of development.

156 Any calculation of net habitat change resulting from development of the TPLM Variation Area would be needed to conclusively determine whether there would be more than minor residual adverse effects after impacts are addressed through the TPLM Structure Plan and the confirmation of open space and blue-green networks.

157 Once, calculated, if measures to offset or compensate were required, they might include the removal of weeds and appropriate reinstatement of habitats on the margins of Lake Hayes or along the Shotover or Kawarau River corridors e.g. the Widgeon Place river flats (c.18 hectares), the Shotover Country wetland (6.7 hectares) or a portion of the Tucker Beach Wildlife Management Reserve, to support a diverse bird fauna including terns, gulls and waders (e.g. SIPO and stilts) in those areas; and/ or the management of the open space areas both within the TPLM Variation Area and other open spaces near the Kawarau and Shotover River habitats, to ensure healthy soils that support invertebrate fauna known to be in the diet of terns, gulls and SIPO.

158 The broader landscape scale assessments to identify and assess the relative importance of habitat throughout the Whakatipu Basin will need to occur to implement the NPS-IB and I acknowledge that this is likely to be outside the scope of the TPLM Variation.

159 I also note Policy 33.2.1.9 which requires Council to "*Recognise opportunities for subdivision, use and development to enhance biodiversity values",* and Policy 33.2.1.10 which requires Council to *"Facilitate and support restoration of degraded natural ecosystems and*

indigenous habitats using indigenous species that naturally occur and / or previously occurred in the area".

160 Further relief is sought by DOC to amend the criteria 27.9.3.1.c for Restricted Discretionary Activity for Rule 27.5.7 (Subdivision) to the effect that effects on indigenous biodiversity, loss of habitats and ecological effects of stormwater are assessed.

161 DOC also requests the insertion of an additional assessment matter:

> "x. the extent to which the subdivision protects, maintains or enhances indigenous biodiversity, including through offsetting or compensation measures."

162 I note that the matters of discretion in Rule 27.7.28 refer to the matters in Rule 27.5.7. This provides discretion to consider "ecological and natural values".

163 However, the assessment criteria 27.9.3.1 for Subdivision Activities (which are referenced in Rule 27.9.8.1) are more focused on vegetation than the broader consideration of biodiversity. The amendment sought by DOC is broader in scope and therefore I support the need for it from an ecological point of view. The amendment is sought in order to implement to Objective 33.2.1 of the PDP "*The District's indigenous biodiversity is protected, maintained or enhanced".*

164 If the amendment to 27.9.3.1 sought by DOC is accepted, the trigger for compensation or offsetting would occur when the land is developed rather than by the TPLM Variation per se (and also noting that the effects management hierarchy only requires offsetting and compensation to be considered, including under the NPS-IB where there is a significant adverse effect). Details of the scale and staging of development are currently unknown and are dependent upon many landowners with divergent aspirations for the use of the land. Accordingly, the need for an appropriate level of any offsetting/compensation would be determined at the time of application.

165 The amendments sought to Rule 27.7.28.1, and Assessment Criteria 27.9.3.1 by DOC and Kāi Tahu will enable broader consideration and assessment of subdivision effects on biodiversity and therefore the development of appropriate and commensurate measures to manage potential adverse impacts and achieve outcomes that maintain or enhance diversity or enable commensurate offsetting or compensation

where appropriate and defined. In the context of the TPLM Variation Area, these amendments would encourage biodiversity reinstatement and enable consideration of further information regarding highly mobile bird fauna that may be available at the time of subdivision.

166 I also acknowledge the concentration of urban development, will as indicated in the Options analysis of the Section 32 Report (page 42), minimise the burden of expansion of residential development across a wider area of the Whakatipu Basin's highly productive soils by concentrating development into the TPLM Zone. This will help minimise (contain) the impacts of further habitat loss for terns, gulls and SIPO.

167 It is therefore my opinion that the existing provisions of the PDP, along with the proposed amendments of Kai Tahu and the amendments sought by DOC in relation to Rules 27.7.28.1 and 27.9.3.1 will be sufficient to enable impacts on biodiversity, in particular bird fauna and their habitats to be sufficiently addressed by applications to develop within the TPLM Variation Area.

168 It is my opinion that the TPLM Variation Area is of relatively low habitat value for gulls, terns and SIPO; but the broader landscape scale assessments to identify and assess the relative importance of foraging, roosting and nesting habitat throughout the Basin will need to occur to implement the NPS-IB.

Further comment on the NPS-IB

169 The NPS-IB came into force on 4 August 2023 (**Commencement Date**).

170 The objective of the NPS-IB (at cl 2.1) is to maintain indigenous biodiversity across Aotearoa New Zealand so that there is at least no overall loss in indigenous biodiversity after the Commencement Date.

171 The NPS-IB achieves this by protecting areas that are:

(a) Significant natural area (**SNA**); or

(b) Areas outside of a SNA that are used by highly mobile fauna.

172 Clause 4.1 provides that every local authority must give effect to the NPS-IB as soon as reasonably possible. However, specific timeframes are also provided:

(a) Clause 4.1(2) provides that local authorities must publicly notify any changes to their policy statements and plans that are necessary to give effect to the NPS-IB within eight years after the Commencement Date; and

(b) Clause 4.2(1) provides that local authorities must publicly notify any policy statement or plan or changes necessary to give effect to assessing, identifying and managing adverse effects on SNAs within five years after the Commencement Date.

173 To give effect to the NPS, clause 3.8 provides that every territorial authority must undertake a district-wide assessment of the land in its district to identify areas that qualify as SNAs. Of relevance to the TPLM Variation, clause 3.8(6) states:

> (6) **If a territorial authority becomes aware** (as a result of a resource consent application, notice of requirement **or any other means**) that an area may be an area of significant indigenous vegetation or significant habitat of indigenous fauna that qualifies as an SNA, the territorial authority must:
>
> (a) conduct an assessment of the area in accordance with subclause (2) as soon as practicable; and
> (b) **if a new SNA is identified as a result, include it in the next appropriate plan or plan change notified** by the territorial authority.
>
> [**Emphasis added**]

174 Under clause 3.8(6), if the TPLM Variation Area (or part of it) may be a SNA, this area must be assessed and if it qualifies as an SNA, must be identified as an SNA in the "next appropriate plan change". It is likely this does not mean the TPLM Variation (i.e., current variation) as there is unlikely to be scope to identify the SNA in this variation.

175 Whether or not the TPLM Variation Area is caught under the NPS-IB as a SNA or an area used by specified highly mobile fauna is discussed below.

Criteria for identifying SNAs

176 Appendix 1 of the NPS-IB provides the criteria for identifying areas that qualify as SNAs.

177 Under clause 1 of Appendix 1, an area qualifies as an SNA if it meets any one of the attributes in the following four criteria:

(a) **representativeness**: is the extent to which the indigenous vegetation or habitat of indigenous fauna in an area is typical or characteristic of the indigenous biodiversity of the relevant ecological district;

(b) **diversity and pattern**: is the extent to which the expected range of diversity and pattern of biological and physical components within the relevant ecological district is present in an area;

(c) **rarity and distinctiveness**: is the presence of rare or distinctive indigenous taxa, habitats of indigenous fauna, indigenous vegetation or ecosystems;

(d) **ecological context**: is the extent to which the size, shape, and configuration of an area within the wider surrounding landscape contributes to its ability to maintain indigenous biodiversity or affects the ability of the surrounding landscape to maintain its indigenous biodiversity.

178 While the NPS-IB was only recently gazetted, before this the above qualifying attributes for SNAs have been used as a matter of best practice to identify SNAs (and are set out in QLDC's PDP).

179 The NPS-IB Appendix 1 assessment criteria for whether an area is a SNA on the basis of rarity and distinctiveness is the only relevant criteria for the TPLM Variation, being:

> **C Rarity and distinctiveness criterion**
>
> 1. Rarity and distinctiveness is the presence of rare or distinctive indigenous taxa, habitats of indigenous fauna, indigenous vegetation or ecosystems.
>
> *Key assessment principles*
>
> 2. Rarity is the scarcity (natural or induced) of indigenous elements: species, habitats, vegetation, or ecosystems. Rarity includes elements that are uncommon or threatened.
>
> 3. The list of Threatened and At Risk species is regularly updated by the Department of Conservation. Rarity at a regional or ecological district scale is defined by regional or district lists or determined by expert ecological advice. The significance of nationally listed Threatened and At Risk species should not be downgraded just because they are common within a region or ecological district.
>
> …
>
> *Attributes of rarity and distinctiveness*

> 6. An area that qualifies as an SNA under this criterion has at least one of the following attributes:
>
> a. **Provides habitat** for an indigenous **species that is listed as Threatened or At Risk (declining)** in the New Zealand Threat Classification System lists:
>
> …
> (**emphasis added**)

180 Relevant definitions under the interpretation section of the NPS-IB are:

> **Threatened or At Risk, and Threatened or At Risk (declining)** have, at any time, the meanings given in the New Zealand Threat Classification System Manual;
>
> **Habitat** means the area or environment where an organism or ecological community lives or occurs naturally for some or all of its life cycle, or as part of its seasonal feeding or breeding pattern; but does not include built structures or an area or environment where an organism is present only fleetingly.

181 Accordingly, under the Rarity and Distinctiveness criteria it is my opinion that the TPLM Variation Area is not a SNA because:

(a) While there are SIPO, Terns and Gulls that have been observed in the TPLM Variation Area, the area does not provide a “habitat” for these birds as it is defined in the NPS-IB because there is currently no evidence to suggest their use is anything but fleeting.

(b) There is insufficient information available to determine the relative importance of the subdivided farmland to SIPO, gulls and terns. Observations to date indicate the use is for intermittent or occasional foraging. No nest records are known for the land.

(c) The potential value of the land for SIPO nesting under the status quo management is subject to the avoidance of losses to stock trampling, mowing, cultivation, vehicle use and free roaming pets. Therefore, the land is likely to be high risk nesting habitat with a high probability of nest failure.

(d) Matagouri does not meet the criteria for an SNA in Appendix 1 on the basis of clause 1(3) of Appendix 1 of the NPS-IB. Matagouri is secure in the South Island and is a common species within Otago and shrublands in the Lakes Ecological Region.

Dawn Alice Palmer

29 September 2023

Attachment A
Additional Property Descriptions
Properties Viewed by Dawn Palmer on 31 July 2023

The following descriptions apply to properties within the TPLM Variation area not previously described in the e3 Scientific or NSN reports. They are provided for completeness.

1 The properties were viewed by walking along the unformed portion of Marshall Avenue and the margins of SH6.

2 The property numbers continue from the numbering system used in the e3 Scientific Ecological Assessment, Attachment d) iii of the notified application and Section 32 Report.

Figure 1: Property numbers viewed during the NSN (Dawn Palmer) 31/7/2023 site visit.

3 Property 14 – 28 Strains Road, RD1, Queenstown 9371 – Part Lot 1 DP 368875

The southern boundary of this property extends across a farm track formed along the toe of the southern slopes of Slope Hill. The track is aligned on the northern boundary of the zone that extends south onto flat cultivated land and down to the unformed portion of Marshall Avenue which has been fenced on its southern side but otherwise incorporated into the farmed paddocks.

Figure 2: Marshall Avenue has been incorporated into the farmland of Property 7 and 14. Hay bales identify the southern boundary of the legal road. Photo taken on 31/7/2023 by D Palmer

4 On the southwestern corner of this Lot, the proposed zone boundary traverses through a large retention dam positioned at the base of a large gully system. The western gully tributaries of this system extend into Part Lot 1 DP 368875 and Lot 1 DP 568820.

5 The gullies draining the southern slopes of Slope Hill, are outside the TPLM Variation area but flow across the farmed flats within the TPLM Zone. The site hydrology has been discussed in in Mr Gardiner's evidence and I will not repeat a description in my evidence.

6 The Unformed portion of Marshall Avenue then turns to the south and extends to form an intersection with Howard Drive. The portion of Marshall Avenue extending north of the Howards Drive intersection is vegetated by mature Douglas fir with a sparse and occasional ground cover of stinging nettle and some hemlock on the open margins towards the northern margin.

7 Property 15 – 208B Lower Shotover Road, RD1 Queenstown – Lot 7 and 463532.

This property includes flat farmland pasture included within the TPLM Variation area and extends onto the southern slopes of Slope Hill outside the TPLM Variation area. Introduced trees (conifers, elder, willows, cypress etc) line the toe of the escarpment along the boundary.

8 Property 16 – 208B Lower Shotover Road, RD1 Queenstown – Lot 4 DP 463532, Section 42 and 43 Block III Shotover SD and Section 4 and 5 SO 573810.

Three rectangular Lots (Lot 4, Sections 42 and 43) and a further subdivided fourth Section, Sections 4 and 5) extend between flat paddocks on the northern boundary and SH6 to the south. Farm buildings, sheds and exotic shelterbelts (cypress, poplars, oaks, and deciduous exotic trees) are present on the four Lots.

9 Property 17 – BPH Trust 14 Lower Shotover Road, Lake Hayes – Lot 3 DP 438514 and Section 8 SO 485598

Viewed from the elevated berms and road margin of Lower Shotover Road, the residential buildings on the northern boundary of the site are surrounded by mature conifers, larch, poplar and number of introduced trees described on the website[26] for the private garden "Chantecler". Beech trees have been planted on the road reserve. The open paddocks across the farm flats were grazed by horses (Section 8) and alpaca at the time of the site visit.

10 Property 18 – 6 and 8 Layton Lane, Lower Shotover – Lot 1 DP 431492 and Lot 2 DP 325561 respectively have been further subdivided within the Koko Ridge subdivision with access gained off Kahiwi Drive. The land is now serviced grass paddocks with native grasses, toetoe and broadleaf and Pittosporum plantings along the section boundaries.

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26 https://gardenstovisit.co.nz/private-gardens/chantecler/#mapsection

ATTACHMENT B

ATTACHMENT B

Table 1 Species List in the TPLM Variation Area and Surrounds

Common Name	**Species Name**	**NZ Threat Classification System; specified highly mobile species (NPS-IB App. 2) - SHM**	**Within the TPLM Variation Area (NSN/ e3)**	**SW Corner of Lake Hayes (SWC); ground or near ground nester (GN)**
Australasian Harrier	*Circus approximans*	Native, NT	NSN, e3	* SWC, GN
Australasian Shoveler	*Spatula rhynchotis*	Native, NT		* SWC, GN
Australian Coot	*Fulica atra australis*	Native, naturally uncommon		* SWC, GN
Australian Magpie	*Gymnorhina tibicen*	Introduced & Naturalised	NSN, e3	* SWC
Australiasian Crested Grebe	*Podiceps cristatus*	Threatened, Nationally Vulnerable - **SHM**		* SWC,
Bellbird	*Anthornis melanura*	Endemic, NT	NSN	* SWC
Black Shag	*Phalacrocorax carbo novaehollandiae*	At-Risk - relict		* SWC
Black Swan	*Cygnus atratus*	Introduced & Naturalised		* SWC; GN

Black-billed Gull	*Chroicocephalus bulleri*	At-Risk – declining - **SHM**	NSN	GN
Black-fronted Tern	*Chlidonias albostriatus*	Threatened, Nationally Endangered - **SHM**	NSN	* SWC, GN
California Quail	*Callipepla californica*	Introduced & Naturalised	NSN, e3	* SWC, GN
Canada Goose	*Branta canadensis*	Introduced & Naturalised		* SWC; GN
Chaffinch	*Fringilla coelebs*	Introduced & Naturalised	NSN, e3	* SWC
Dunnock	*Prunella modularis*	Introduced & Naturalised	NSN	* SWC
Eurasian Blackbird	*Turdus merula*	Introduced & Naturalised	NSN, e3	* SWC
European Goldfinch	*Carduelis carduelis*	Introduced & Naturalised	NSN, e3	* SWC
European Greenfinch	*Carduelis chloris*	Introduced & Naturalised	NSN, e3	* SWC
European Starling	*Sturnus vulgaris*	Introduced & Naturalised	NSN, e3	* SWC
Grey Duck x Mallard hybrid	*Anas superciliosa x platyrhynchos*	Introduced, NT		* SWC; GN
Grey Teal	*Anas gracilis*	Native, NT		* SWC; GN
Grey warbler	*Gerygone igata*	Endemic, NT	NSN	* SWC

Common Name	**Species Name**	**NZ Threat Classification System**	**Within the TPLM Variation Area (NSN/ e3)**	**Lake Hayes (LH) – SW Corner (SWC)**
Greylag Goose	*Anser anser*	Introduced & Naturalised		* SWC; GN
House Sparrow	*Passer domesticus*	Introduced & Naturalised	NSN, e3	* SWC
Kereru	*Hemiphaga novaeseelandiae*	Endemic, NT	NSN	* SWC
Lesser Redpoll	*Acanthis cabaret*	Introduced & Naturalised	NSN, e3	* SWC
Little Shag	*Phalacrocorax melanoleucos brevirostris*	AT-Risk - relict		* SWC
Mallard	*Anas platyrhynchos*	Introduced & Naturalised		* SWC; GN
Marsh Crake	*Porzana pusilla*	AT-Risk – declining - **SHM**		* SWC; GN
New Zealand falcon - eastern	*Falco novaeseelandiae*	Threatened, Nationally Vulnerable - **SHM**		* SWC; GN
New Zealand kingfisher	*Todiramphus sanctus vagans*	Native, NT		* SWC; GN
New Zealand Scaup	*Aythya novaeseelandiae*	Endemic, NT		* SWC; GN

NZ Fantail	*Rhipidura f. fuliginosa*	Native, NT		* SWC
Paradise Shelduck	*Tadorna variegata*	Endemic, NT	NSN, e3	* SWC; GN
Pied stilt	*Himantopus leucocephalus*	Native, NT		* SWC; GN
Pukeko	*Porphyrio melanotus*	Native, NT		* SWC; GN
Rock Pigeon	*Columba livia*	Introduced & Naturalised		* SWC
Silvereye	*Zosterops lateralis*	Native, NT	e3	* SWC
Skylark	*Alauda arvensis*	Introduced & Naturalised	NSN, e3	* SWC, GN
Song Thrush	*Turdus philomelos*	Introduced & Naturalised	NSN, e3	* SWC
South Island Pied Oystercatcher (SIPO)	*Haematopus finschi*	At-Risk – declining - **SHM**	NSN, e3	* SWC; GN
Southern Black Backed Gull	*Larus d. dominicanus*	Native, NT	NSN, e3	* SWC; GN
Spur-winged Plover	*Vanellus miles novaehollandiae*	Native, NT	NSN, e3	* SWC; GN
Tomtit	*Petroica macrocephala*	Endemic, NT		* SWC
Tui	*Prosthemadera novaeseelandiae*	Endemic, NT	NSN, e3	* SWC
Welcome swallow	*Hirundo n. neoxena*	Native, NT		* SWC

Common Name	**Species Name**	**NZ Threat Classification System**	**Within the TPLM Variation Area (NSN/ e3)**	**Lake Hayes (LH) – SW Corner (SWC)**
White-faced heron	*Egretta novaehollandiae*	Native, NT		* SWC
Yellowhammer	*Emberiza citrinella*	Introduced & Naturalised	NSN, e3	* SWC; GN

Notes

Threat Classifications published on the NZ Threat Classification System database https://nztcs.org.nz/home . NT = Not Threatened;

Species in the habitats on and surrounding Lake Hayes and the surrounding area are identified using personal knowledge and the checklist is the eBird database of the Cornell Lab of Ornithology New Zealand portal.

SHM = Specified Highly Mobile species – National Policy Statement – Indigenous Biodiversity – Appendix 2

Common names are those used by the NZ Threat Classification System and New Zealand Birds Online https://nzbirdsonline.org.nz/ The digital encyclopaedia of New Zealand birds curated by Te Papa, BirdsNZ and the Department of Conservation.

Endemic = only lives and breeds in New Zealand; Native = naturally present in New Zealand and overseas.