SUBMISSION ON THE PROPOSED REGIONAL PEST MANAGEMENT PLAN FOR THE CANTERBURY
REGION
TO: Canterbury Regional Council
SUBMISSION ON: Proposed Regional Pest Management Plan
NAME: Director-General of Conservation
ADDRESS: Address for service:
Department of Conservation
Private Bag 4715
Christchurch Mail Centre
Christchurch 8140
Attn: David Newey
Telephone: 027 706-8795
Email: dnewey@doc.govt.nz
SUBMISSION

STATEMENT OF EVIDENCE OF DEAN CALDER NELSON
On behalf of DIRECTOR-GENERAL OF CONSERVATION
DATED 31 August 2017

INTRODUCTION

1. My name is Dean Calder Nelson. I hold the position of Senior Ranger for Biodiversity Assets and Project River Recovery at the Department of Conservation (DOC) in Twizel. I have been in this position since December 2015.

2. I hold a Diploma in Parks and Recreation Management (with Distinction) from Lincoln University (1982) and a post-graduate Diploma in Wildlife Management (with Distinction) from Otago University (1999).

3. I have worked at the Department of Conservation since it was established in 1987. Prior to that I worked in Lands and Survey as a National Park Ranger at Aoraki Mt Cook from 1983, and have worked from DOC's Twizel base since 2004. I have specialised in threatened species management and pest (plant and animal) control throughout my career.

4. In my current role, I am the local technical specialist for threatened species and I manage Project River Recovery (PRR).

5. PRR is a braided river and wetland ecosystem restoration programme located in the upper Waitaki Basin. It is run by the Department of Conservation (DOC) and funded by Meridian Energy and Genesis Energy under a compensatory agreement that recognises the impacts of hydroelectric power development on these rivers and wetlands.
6. I provide strategic advice and support to DOC's district leadership team, and I specify and plan tasks for ranger staff working on threatened species, animal and plant pest management.

7. I plan the annual budget for PRR and threatened species management in DOC's Te Manahuna/Twizel operations area and I monitor and report on spending and outcomes from the work undertaken.

8. I am a contact person for DOC when we need to liaise with other groups and organisations doing threatened species work and pest control work. Examples include working with researchers from universities and Landcare Research, and key stakeholders such as LINZ, ECan, landowners and community groups undertaking pest control and ecosystem restoration projects.

9. My experience with plant pest control includes seven years at Aoraki Mount Cook when I was responsible for the weed control programme which was focussed primarily on Russell lupin *Lupinus polyphyllus* (hereafter referred to as lupins) control, 15 years in Dunedin where I did some work on coastal weed species, and now more recently as manager of PRR weed control programmes.

SCOPE

10. I have been asked to provide evidence in relation to Russell lupins, their spread and their impact on braided river environments and the species that inhabit them.

Lupin Spread in Braided Rivers

11. Lupins are part of the pea family – Fabaceae. This family includes gorse and broom and typically they produce large numbers of long-lived (at least 20 years), very hard coated seeds.

12. Lupins are seral (invasive) species and as a nitrogen fixer, they are rapid colonisers of bare ground. With their hard seed coat, they can lie dormant in the ground for long periods of time but remain viable.

13. In a riverbed, lupins rely on their hard seed coat being abraded by gravel to enable germination. Often new infestations appear following significant flood events that disturb seed in the gravel and create ideal germination conditions.

14. Seed dispersal from the plant relies on an explosive mechanism. The side of the seedpod facing the sun dries out more quickly than the side in the shade, causing the pod to buckle and pop open. The seedpods then curl up like animal horns, sending the seeds flying. This enables them to spread out from a single point however in rivers and lakes, the seeds can be carried long distances in the water and their distribution typically follows water channels (see figs 6, 7 and 8) and lake shores (see fig 13)

Lupin Spread in the Tasman River

15. There was a long history of lupin spread by mountain guides and others in the Aoraki Mount Cook area and when I arrived in the area, lupins were well established around the village, the Hooker Valley flats and in adjoining riverbeds (Kitchener, Glencoe and Black Birch Streams) as well as several small spots close to the road in the upper Tasman Valley.

16. In the seven years that I was managing weeds in Aoraki/ Mount Cook, I employed a seasonal weed sprayer to control lupins. In the first spring and summer season (1983) that I was involved, I did a low-level search of the Tasman River by helicopter with two other observers. Essentially the riverbed was clear of lupins. We landed and pulled out 12 lupin plants by hand.

17. Thereafter, my strategy was to try to prevent lupin spread into the Tasman River by starting control in the lower reaches of Kitchener, Glencoe and Black Birch Streams and working back up towards the village.

18. Regular inspections of the Tasman River confirmed that we were being reasonably successful however lupins began to appear in the riverbed in the late 1980's, most likely carried down the feeder streams during flood events.

19. I left the area in 1990 but due to funding restrictions, no weed sprayers were employed for a number of years however hand pulling of lupin seedlings in the Tasman riverbed began in 1991.

20. By 2001, my current weed spraying contractor began working on lupins in the Tasman River. At that point, a decade later, he described the riverbed as full of lupins. To control them, he was using two spray units with two spray guns on each plus six staff using backpack sprayers.

21. This illustrates the point that lupins have the capability to invade and take over large braided rivers very quickly.

22. During the last five years, PRR has spent on average $60,000 annually on lupin control in the Tasman River. The contractor feels that we are starting to make a difference and the numbers of lupins are slowly declining due to the constant management that they are receiving.

The values of Braided River ecosystems

23. Braided rivers are a globally rare ecosystem, found on a scale similar to the Canterbury region only in Alaska, Canada, Siberia, Italy and the Himalayas.

24. Due to their dynamic nature, braided rivers have a distinctive biota and numerous threatened species

25. Most prominent are the birds. Kakī, or black stilt, (*Himantopus novaezelandiae*) is a wading bird which was formerly widespread throughout New Zealand but which now only breeds in the Mackenzie Basin. Its threat classification status is Nationally Critical.

26. Kakī live in the Mackenzie basin all year round, but other species which come inland to breed in and around the braided river ecosystems include black-billed gull (*Larus bulleri* – nationally critical), black-fronted tern (*Chlidonias albostriata* – nationally endangered) wrybill (*Anarhyncus frontalis* – nationally vulnerable) and banded dotterel (*Charadrius bicinctus* – nationally vulnerable. (see fig 4)

27. As well as braided rivers, banded dotterel utilise large areas of outwash fans as breeding and feeding habitat. Typical breeding habitat for banded dotterels comprises lightly vegetated edges of riverbeds (see fig 3), outwash fans and herbfields. Riverbeds are favoured if there is plentiful cover of very low growing prostrate shrubs of genera such as *Raoulia, Pimelea, Muehlenbeckia* and *Coprosma*

28. The robust Grasshopper (*Brachaspis robustus* – nationally endangered) is another species that is only found in the Mackenzie Basin. It is always found in rocky areas (stony floodplain terraces, fluvio-glacial outwash, recent fluvial outwash and rocky braided river), and is never found in areas of heavy vegetation.

29. There is a wide diversity of terrestrial and freshwater invertebrates that inhabit braided rivers but much is still to be learnt about what species there are. A recent

unpublished study of invertebrates in the Tasman River found a number of previously undescribed terrestrial invertebrates, including eight new species of Diptera (flies) and two new small wasps. The greatest diversity of species in this river system is in the taxonomic orders Diptera and Hymenoptera (bees and wasps). The most abundant order is the Hemiptera (true bugs, e.g. vegetable bugs and plant hoppers).

30. The Upper Waitaki' s braided rivers and associated wetlands are home to over 250 native plants, 27 mosses and liverworts and 35 lichens. (see fig 5) Over 20 of these species are threatened and many are critical to the survival of specific invertebrates.

31. The runs and riffles in braided rivers and side streams and the spring-fed systems associated with braided rivers are home to several threatened fish. The lowland longjaw galaxias Waitaki River (*Galaxias aff. cobitinis* "Waitaki" – nationally critical) and the bignose galaxias (*Galaxias macronasus* – nationally vulnerable) only exist in the upper Waitaki River.

32. Another nationally vulnerable threatened species, the upland longjaw galaxias Waitaki River (*Galaxias prognathus* "Waitaki") is also only found in the upper Waitaki whereas the naturally uncommon alpine galaxias (*Galaxias paucispondylus)* is found in braided rivers throughout the eastern South Island.

33. A number of lizard species also inhabit braided rivers. McCanns skink (*Oligosoma maccanni*) and the Southern Alps gecko (*Woodworthia "*Southern Alps") can be found in the riverbeds whereas other species such as the nationally vulnerable scree skink (*Oligosome waimatense*), Lakes skink (*Oligosoma* aff. *chloronoton* "West Otago") and the Mackenzie skink (*Oligosoma* aff. *lineocellatum* "Mackenzie basin" are more likely to be found on river terraces and boulder fields associated with riverbeds.

Lupin Threats to braided river, lake and wetland values

34. Lupins form dense, self-replacing stands (see figs 1 and 9) that have a negative effect on riverbed habitat as they stabilise shingle islands, deepen river channels and alter the shape of rivers.

35. Dense stands of lupins remove clear gravel (see fig 2) which are the key breeding areas for kakī, wrybill and black-fronted terns and the modification of river channels decreases the availability of shallow water foraging areas.

36. Lupins increase the risk of predation for these threatened birds as well as lizards and invertebrates by providing cover to mammalian predators.

37. Dense stands of lupins smother existing plant communities and prevent native plants establishing. The increased soil nitrogen that they develop may induce a change in species composition in plant communities from low fertility species to weedy species.

38. Typically, as the islands that lupins are invading become more stable and more resistant to being removed by flood events, broom, gorse and willow are species which establish and further stabilise and alter the riverbed.

39. Channelizing of the river modifies and reduces the number of gentle riffles and braids that provide habitat for upland longjaw galaxias Waitaki River and alpine galaxias and increased vegetation will modify and stabilise the loose gravel of spring-fed systems that lowland longjaw galaxias Waitaki River and bignose galaxias rely on to burrow in to spawn and escape predators. The reduction in fish species in turn reduces the availability of an important prey item for black-fronted tern.

40. Some lakes of the eastern South Island have shoreline turfs that are a specialised community that is adapted to being periodically flooded and dried out due to naturally fluctuating lake levels however hydro-electric development has reduced the extent of these communities due to raised lake levels and modified shorelines.

41. Lake Ohau is nationally significant as it is one of the last large lakes in the eastern South Island that still retains relatively unmodified lake edge ecotones. However, these turf communities, which often contain threatened plants are facing a new threat from the growth of lupins in this lake edge zone.

42. The Lake Tekapo shoreline has been modified by hydro-electric development however at the bottom end of the lake, there are two sites containing the last significant New Zealand populations of the nationally critically threatened fish guts plant (*Chenopodium detestans*). This annual to short-lived perennial prostrate herb manages to grow when lake levels are low however one of these sites is already being invaded by lupins carried down the lake from seed sources at the lake head.

Controlling Lupins

43. Lupin control requires a significant and ongoing input of resources. Due to their seed longevity, any missed season of control will result in another 20+ years of ongoing commitment.

44. The control chemical of choice is Grazon, a broadleaf herbicide containing triclopyr. Grazon has been chosen as it is effective on lupins as well as gorse, broom and willows. If it does accidentally get into waterways, it is broken down rapidly so that it is not detectable 500 metres downstream. It is also non-toxic to humans, birds, stock, bees or fish.

45. DOC invested considerable effort in obtaining a global consent to utilise Grazon in riverbeds and near water.

46. In large, dense infestations, Grazon can be applied by helicopter spraying and in still conditions, the spray can be applied with an accuracy of 1-2 metres.

47. Most control is done by hand using either a vehicle mounted spray unit for larger patches or by back-pack sprayers (see fig 10) for smaller areas or where large areas of riverbed with small infestations need to be searched on foot.

48. Occasionally scattered seedlings are pulled out by hand when staff are undertaking other work in riverbeds.

49. In the upper Waitaki catchment, PRR spends up to $150,000 annually controlling lupins. At least $60,000 is spent in the Tasman and Hooker Valleys, $35,000 in a joint project with ECan and LINZ in the upper Tekapo River, $27,000 in Fork Stream, $20,000 in the Cass/Godley and upper Ahuriri Rivers, and $9,000 in the lower Ohau River.

50. As part of its weed control programmes, DOC spends an additional $30,000 on lupin control in Aoraki Mt Cook National Park.

51. Most of the lupin control is concentrated in the more pristine upper braided riverbeds such as the Godley, Macaulay, Cass, Fork, Tasman and Ahuriri. These areas form the basis of the proposed lupin exclusion zones (see maps) and the emphasis is on protection of the unique biodiversity values of these braided rivers.

52. No control is undertaken in the Hopkins and Dobson Rivers, however these rivers are also relatively free of major weed problems apart from the bottom of the

Dobson. They are both included in the proposed exclusion zones along with Lake Ohau.

53. At times in the past some control work has been undertaken in the lower Ahuriri however due to local opposition and the fact that much of the riverbed has become completely infested, limited or no control work is carried out there.

54. Other areas that have been included in the proposed exclusion zones to protect biodiversity values include the Tekapo Scientific Reserve, Burkes Pass Scenic Reserve, the Tarnbrae Conservation Area and the New Zealand Defence Force land between Lakes Tekapo and Pukaki. All of these sites are being actively monitored for the presence of lupins and control carried out as appropriate.

55. The Tekapo Scientific Reserve allows DOC to monitor the recovery of a degraded area of glacial outwash fan following a history of extensive burning and grazing and it is important to ensure that lupins do not get established.

56. Lupins are controlled in Burkes Pass Scenic Reserve to protect the Canterbury knobbled weevil (*Hadramphus tuberculatus*), a Nationally Endangered invertebrate which was considered extinct until being rediscovered in the reserve in 2004. The 8.3-hectare site currently supports the only known population of this weevil and as it's life cycle is dependent on the golden speargrass (*Aciphylla aurea*), it is essential to ensure that lupins and other weeds do not outcompete the existing native plant community.

57. The 2043-hectare Tarnbrae area was purchased by the Nature Heritage Fund to protect the ecosystems in its wetlands and ephemeral tarns. Despite being farmed previously, Tarnbrae's native plant values were largely intact and it is critical to keep lupins and other weeds from establishing.

58. The New Zealand Defence Force is actively controlling lupins on its training area to protect the relatively intact biodiversity values. The land has extensive areas of wetland ecosystems which feed into Irishman Creek, Mary Burn and Fork Stream and it is important that lupins do not establish in these sensitive areas.

59. Currently there is very little control work being carried out on roadsides where lupins have been deliberately spread by hand over many years. (see fig 14) The one exception is the Lindis Pass where lupins have been controlled to preserve the natural tussock character of this iconic landscape and to prevent lupin spread into the Scenic Reserve which borders the highway.

60. Roadside lupins will persist as perennials but their spread will be relatively slow. The exception is where roads cross waterways and the lupin seeds have been able to get into the streams, enabling downstream spread. Examples of this can be seen all through State Highway 8 including the Burkes Pass and Lindis Pass areas.

Dean Nelson

Attachment A

NEW ZEALAND THREAT CLASSIFICATION SYSTEM

1. The New Zealand Threat Classification System (the System) is a national system led by the Department of Conservation. It is a tool that uses objective criteria and information drawn from a wide range of experts to rigorously assess the risk of extinction faced by New Zealand plants, animals and fungi. Each taxon is placed in a category that reflects the level of risk it faces. The System is specifically designed to be relevant to New Zealand's unusual ecological and geographic conditions.

2. The System is used to assess the status of any plant, animal or fungus that has a wild population established in New Zealand and for which there is sufficient information available. It uses the best available information on the population trend (rate of decline or increase) and the size of the population (or, if population size cannot be measured, the area occupied by the population) to place each taxon into a category that directly reflects the rate of extinction it faces. All listings are reviewed every three years to detect changes in status of taxa over time.

3. The first version of the System was published in 2002. Following rigorous review, a revised manual was published in 2008 (Townsend et al. 2008). This revised System introduced a range of improvements and better reflects the type of management action required for taxa in the different categories. The current System is structured as follows (Figure 1):

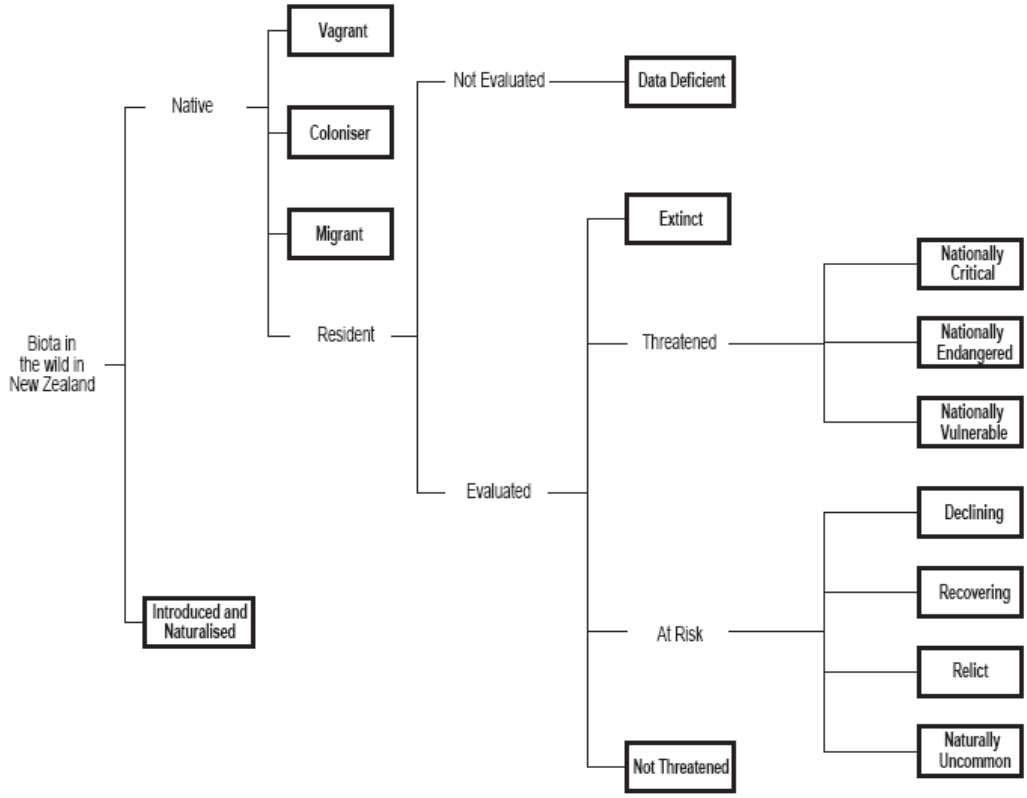

Fig. 1 New Zealand Threat Classification System (after Townsend et al. 2008).

4. Species listed in the super category 'Threatened" are grouped into three categories: 'Nationally Critical', 'Nationally Endangered', and 'Nationally Vulnerable'. Taxa in these three categories are facing a very high risk of extinction in the wild.

5. Species listed in the category 'At Risk' are grouped into four categories: 'Declining', 'Recovering'. 'Relict' and "Naturally Uncommon'. Declining taxa do not qualify as 'Threatened' because they are buffered by a large total population size and/or slower decline rate. However, if the declining trends continue, these taxa may be listed as 'Threatened' in the future. The category 'Naturally Uncommon' is adopted to distinguish between biologically scarce and threatened taxa. 'Recovering' allows for threatened taxa whose status is improving through management action and 'Relict' is used to encompass taxa that have experienced very large historic range reductions and now exist as remnant populations that are not considered unduly threatened.