BEFORE THE MINISTER FOR THE ENVIRONMENT

IN THE MATTER OF the Resource Management Act 1991 ('the Act')

AND

IN THE MATTER OF of the proposed National Policy Statement for Indigenous Biodiversity

---

EVIDENCE OF WILLIAM BRUCE SHAW ON BEHALF OF THE NEW ZEALAND FOREST OWNERS ASSOCIATION

Date: 13 March 2020

QUALIFICATIONS AND EXPERIENCE

1 I am Principal Ecologist and a Director of Wildland Consultants Ltd, based in Rotorua. I have a Master of Science degree from the University of Canterbury, 1980, and a Bachelor of Science in Earth Sciences and Biology (double major) from the University of Waikato, 1977.

2 My professional memberships include the Royal Society of New Zealand (MRSNZ), the New Zealand Ecological Society, the New Zealand Institute of Forestry (MNZIF), the New Zealand Biosecurity Institute, the Ornithological Society of New Zealand, and the New Zealand Botanical Society.

3 I am the author of 24 conference papers, 25 scientific or technical publications, 39 published articles, and more than 500 ecological reports, species lists, and general ecological accounts.

4 I have been a practising ecologist since 1980, and have lectured in ecology and nature conservation at Lincoln College and the Waiariki Institute of Technology. I previously worked for a consulting firm in Christchurch, and have undertaken ecological survey work and related assessments in urban, rural, and remote back country situations over more than 40 years. From 1986-1990 I was employed as a Scientist by the Forest Research Institute, Rotorua, specialising in forest ecology, threatened plants, vegetation mapping, and the ranking and management of natural areas. From 1990 to 1996 I was a Conservancy Advisory Scientist (1990-1994) and then (1994-1996) Protection, Planning and Use Manager for the Department of Conservation. I also performed national-level roles with the Department.

5 Since 1996 I have been Principal Ecologist and a Director of Wildland Consultants Ltd. I have particular expertise in the evaluation of ecological significance, ecological management, especially ecological restoration, and the assessment of ecological effects of actual and proposed land uses.

6 Ecological evaluation is a discipline in which I have more than 35 years of experience having, in the 1980s, developed an ecological ranking system that was applied regionally and nationally by the Department of Conservation. I have also developed, for Environment Waikato, a technical guideline for application of natural heritage criteria in their Regional Policy Statement, been an advisor to the Ministry for the Environment on criteria for the evaluation of

Section 6(c) of the Resource Management Act, developed ecological evaluation criteria for the previous Bay of Plenty Regional Policy Statement (which became operative in January 2008), and developed (with Dr Kelvin Lloyd) ecological criteria for the Canterbury Regional Policy Statement.

7 My professional experience with the forestry sector in New Zealand spans 35 years and includes many projects, undertaken widely across the North and South Islands, such as the following examples:

- Ecological surveys undertaken for natural areas within plantation forests.
- Provision of advice on management of natural areas in plantation forests.
- Surveys of indigenous fauna within exotic plantation stands, including different-aged stands.
- Post-harvest management of exotic plantation stands back to indigenous forest.
- Management of wilding pines across New Zealand.
- Provision of ecological advice and services to enable Fletcher Challenge Forests to become the first FSC-certified company in New Zealand.
- Ecological audits of forestry companies for Forest Stewardship Council certification.
- Provision of advice on harvesting in difficult situations, such as adjacent to wetlands, on the margins of tall indigenous forest, in steep terrain, and gullies.
- Presentations on the indigenous biodiversity values of plantation stands.
- Development (with Dr Kerry Borkin) of bat management guidelines for plantation forests.
- Development of a threatened species website (two iterations) for the New Zealand Forest Owners Association.

CODE OF CONDUCT

8 I have read the Code of Conduct for Expert Witnesses outlined in the Environment Court's Consolidated Practice Note and have complied with it in preparing this evidence. I also agree to follow the Code when presenting evidence to the Court. I confirm that the issues addressed in this brief of evidence are within my area of expertise and that I have not omitted to consider material facts known to me that might alter or detract from my opinions.

SCOPE OF EVIDENCE

9 I have been engaged to provide a statement of evidence by the New Zealand Forest Owners Association (NZ**FOA**). My evidence forms part of NZFOA's submission on the proposed National Policy Statement for Indigenous Biodiversity (the **NPSIB**). I confirm that I am familiar with the NPSIB.

10 In my evidence I address the following issues:

- Indigenous biodiversity scenarios within exotic plantation forest.
- Exotic plantation forest as habitat for indigenous plants and fauna.
- Habitat connections.
- The proposed NPSIB and exotic plantation forests.
- Management of areas of significant indigenous vegetation and significant habitat of indigenous fauna.
- Should areas of significant indigenous vegetation and significant habitats of indigenous fauna be treated the same?
- Clause 3.10 - managing adverse effects in plantation forests.
- The alternative approach proposed by NZFOA.

INDIGENOUS BIODIVERSITY SCENARIOS WITHIN EXOTIC PLANTATION FOREST

11 Exotic plantations in Aotearoa/New Zealand are primarily radiata pine (*Pinus radiata*) but also include extensive areas of Douglas fir (*Pseudotsuga menziesii*) and lesser areas of macrocarpa (*Cupressus macrocarpa*) and other species.

12 Exotic plantations are well-recognised as providing habitat for a wide range of indigenous biodiversity, in the following scenarios:

- Discrete areas of indigenous vegetation/remnants within the wider forest estate.
- Within the stands of exotic forest.
- Following harvesting of the exotic trees.
- In streams in the forest matrix.

13 Overviews are discussed below for each of these scenarios.

Discrete Patches of Indigenous Vegetation/Remnants Within the Wider Forest Estate

14 This is probably the 'simplest' scenario as these are generally easily-recognised discrete units. Sizes range from less than one hectare to many hundreds of hectares. They are relatively easy to map, and most forestry companies have mapped and evaluated these areas. Some are subject to active monitoring and control of pest plants and animals. Many are also recognised as Significant Natural Areas (SNAs) in district plans.

Within Stands Exotic Plantation Forest

15 Plantation stands - subject to their geographic location, size, species composition, and age - provide habitat for a wide range of indigenous plants (within the understorey of growing trees) and fauna. Most of these are common species but many species, particularly fauna, are classified as At Risk and Threatened and these also utilise exotic plantations on an ongoing basis, as discussed further below.

Harvested Plantation Stands

16 Harvested plantation stands are used by a range of exotic and indigenous passerines, and are commonly used for hunting by kahu/harrier. Long-tailed bats

commonly hunt along plantation margins, along roads through plantations, and across harvested areas. Perhaps the most notable inhabitants of recently-harvested areas is karearea/falcon, which commonly nest in these areas. In Kāingaroa Forest, *c.*40 pairs utilise these areas on an ongoing basis.

17 Indigenous invertebrate detritivores are the main decompositional species in plantation forests and also breaking down woody debris in harvested areas.

Streams

18 Streams pass through exotic plantations and indigenous vegetation, and indigenous fish utilise habitats within all vegetation types. A very diverse range of indigenous fish and invertebrates have been recorded in exotic plantations.

EXOTIC PLANTATION FOREST AS HABITAT FOR INDIGENOUS PLANTS AND FAUNA

19 Habitat occupancy and use of plantation stands can be considered for the following groups:

- Indigenous plants, primarily in forest understoreys, in disturbed/open sites, and on margins.
- Indigenous birds, with various species using every stage of the forest cycle.
- Invertebrates.
- Lizards.
- Bats.
- Aquatic biota.
- Mobile species that range across various habitat types.

These components are discussed further below.

Indigenous Plants

20 Indigenous plants are present in every stage of plantation development and management. They establish in the very earliest stages following harvest, during planting of the tree crop, and are present until harvest, and after harvest.

21 Assemblages of indigenous plants vary over time, and there are published papers on plantation understorey composition and development over time, e.g. Allen *et al.* 1995, Brockerhoff *et al.* 2003, Ogden *et al.* 1997. Proximity to indigenous seed sources is a key contributing factor in terms of the species complements that establish beneath a plantation cover. Indigenous diversity can be very low during early stages of stand development - particularly when the exotic tree canopy is very thick, with heavy shading of the understorey - but can then increase markedly as the stand matures, e.g. Wildland Consultants 2002.

22 Rare indigenous orchids are known to occur within plantation stands (e.g. the Iwitahi Orchid Reserve in Kāingaroa Forest). Pua o te Reinga (*Dactylanthus taylorii*) is known from one site where remnant indigenous host trees persisted within a plantation stand. Otherwise, Threatened or At Risk species don't generally occur within plantations unless they are species that utilise recently-disturbed sites.

Birds

23 Indigenous birds have long been known to utilise exotic plantations as habitat. Jackson (1971), in a review of bird use of exotic forests in New Zealand, noted that: "some birds appear to favour their new home more than their previous ones", and that insectivorous birds are the main group involved. He also noted that "most birds were recorded as early as 1940" in Kāingaroa, and that titipounamu/rifleman (*Acanthisitta chloris granti*), popokatea/whitehead (*Mohoua albicilla*), and toutouwai/ North Island robin (*Petroica longipes*) were recorded in exotic forest in the 1960s.

24 Each indigenous species establishes in exotic stands at different stand ages. Jackson (1971) noted that popokatea/whitehead first use new stands with breast height stem diameters of only 100-125 mm. I have seen toutouwai/robin 'prospecting' in recently-planted plantation stands of even smaller stature.

25 Overall, Jackson (1971) recorded 54 indigenous species utilising exotic forests, although some of these may have been in wetland habitats within the forest matrix.

Invertebrates

26 Up to 1,000 insect species are likely to be present in individual exotic forests, with considerably more species overall in exotic forests (Pawson and Brockerhoff 2005). It has been found that plantations support as many indigenous detritivores as indigenous forest (Parker 2013).

Fungi

27 A diverse range of indigenous fungi are present in plantation forests.

Lizards

28 Little work has been done on lizards in plantation forests, but they have been found on the margins of plantations in the southern North Island (Trent Bell, Wildland Consultants, pers. comm.).

Bats

29 Bats are well-known to utilise plantations for roosts, breeding, and feeding, e.g. Moore (2001), Borkin and Parsons (2009 and 2010).

Aquatic Biota

30 Nearly all plantations have a network of streams running through them, with associated assemblages of indigenous fish, invertebrates, and other aquatic biota.

Mobile Species that Range Across Various Habitat Types

31 Various fauna species move across the landscape, to varying degrees, and utilise both indigenous vegetation and exotic plantations, and other vegetation and habitat types:

- Karearea/falcon.
- Long-tailed bats.
- Kākā.
- Koekoea/long-tailed cuckoo.
- Kiwi.
- Popokatea/whitehead.
- Pīpipi/brown creeper.

HABITAT CONNECTIONS

32 Exotic plantations are known to provide connectivity between indigenous remnants, with records of kōkako, for example, actively using such connections, e.g. Innes *et al.* (1991).

THE PROPOSED NPSIB AND EXOTIC PLANTATION FORESTS

33 There are three key areas of potential interaction between the proposed NPSIB and exotic plantation forests:

- Identification and management of areas of significant indigenous vegetation.
- Identification of significant habitats of indigenous fauna.
- Management of indigenous biodiversity within exotic plantation forest

34 These are discussed further below.

Identification of Areas of Significant Indigenous Vegetation

35 Identification of discrete areas of indigenous vegetation within larger plantation forests is a longstanding practice, and is generally accepted as being a reasonable approach. This is not to say that concerns have not been raised about council processes (for council-related SNA assessments) by forest owners/managers but there is general recognition of the process and why it is undertaken.

36 Many forestry companies have undertaken their own ecological surveys and have evaluated and ranked natural areas within their estate, irrespective of district plan SNA provisions. This has been undertaken very widely across New Zealand, generally to address requirements for Forest Stewardship Council certification. This work has now often extended into ongoing monitoring of ecological condition, assessment of management requirements, and active management (primarily control of pest plants and animals).

37 Some companies have provided data from their ecological inventories to district councils, to avoid unnecessary duplication of effort (and associated costs for the councils).

38 The criteria set provided in Appendix 1 of the proposed NPSIB for the identification of Significant Natural Areas (SNAs) is reasonably broad and potentially all-

encompassing. For example, concerns have been raised about the scope of the Representativeness criterion in particular as it relates to indigenous vegetation or habitat that is "typical or characteristic of the indigenous vegetation of the ecological district". There is debate amongst ecologists about this aspect of representativeness as some ecologists prefer to apply an historic baseline when applying this criterion, and some criteria sets specify an 1840 baseline. The reality, though, is that the criteria set needs to be viewed in its entirety, including relevant definitions.

39 The definition of "indigenous vegetation" in the NPSIB is obviously relevant and is worthy of further consideration:

*"**indigenous vegetation** means vascular and non-vascular plants that, in relation to a particular area, are native to the ecological district in which that area is located."*

40 Indigenous vegetation is, by definition, an assemblage consisting mainly of indigenous plants. When indigenous vegetation is present within exotic plantation forest estates, it will, in most cases, comprise discrete areas that can be mapped and assessed against SNA criteria in the same way as any other indigenous vegetation.

41 There are various problems with the definition in the proposed NPSIB:

- Most definitions of indigenous vegetation state that it is vegetation that is predominantly indigenous species, or is dominated by indigenous species. The reason for this is that extensive areas of indigenous vegetation contain an exotic component, and this is the situation widely across Aotearoa/New Zealand.
- The definition does not refer to an assemblage or grouping of plants, which is generally the situation with vegetation.
- The definition does not refer to a structural element, such as canopy cover.
- The definition as presented is actually a definition of what comprises an indigenous plant species.

42 The following definition is provided, as an example, from the Operative Rotorua District Plan for the Lakes A Zone:

"Indigenous Vegetation : Means any plant community containing indigenous species (which may include a canopy, subcanopy, understorey and ground cover as structural elements). It includes vegetation that has regenerated naturally or

vegetation established with human assistance following disturbance or as mitigation for another activity. (Refer also to the definitions of Indigenous Plant Species, Vegetation Unit and Vegetation Type.)"

43 The current definition in the proposed NPSIB could include any indigenous species, single plants, or assemblages, in any location, in any habitat, at any stage of successional development. It could result in exotic plantations, which commonly have an indigenous understorey (as discussed below), being incorrectly classified as indigenous vegetation.

44 There are also other issues with application of the criteria set in plantation forest estates:

a. Many wetlands within plantation forests are already identified as SNA but the scope of the proposed NPSIB does not include freshwater wetlands, as prescribed in Section 1.5:

"Geographic application

(1) This National Policy Statement applies to indigenous biodiversity throughout New Zealand, other than – a) indigenous biodiversity in the coastal marine area; and b) indigenous biodiversity in waterbodies and freshwater ecosystems (as those terms are defined in the National Policy Statement for Freshwater Management 2019).

(2) Except –

a) provisions relating to restoration and enhancement (Clauses 3.16 and 3.17) do apply to wetlands;

b) the requirements relating to regional biodiversity strategies (Clause 3.18) do apply to indigenous biodiversity in the coastal marine area and in waterbodies and freshwater ecosystems; and c) [geothermal ecosystems – see discussion document ***He Kura Koiora i hokia*** *for options relating to geothermal ecosystems]"*

b. It is notable that identification of wetlands as SNAs is generally outside of the scope of the NPSIB, and wetland identification and protection is to be addressed under the NPS for Freshwater Management (2019). Geothermal wetlands,

however, are excluded from the definition of “natural wetland” in the NPS for Freshwater Management, so they presumably fall within the scope of the NPSIB.

c. The Ecological Context criterion refers to the role of buffers, which is appropriate, but the definition of a buffer is:

“***buffer*** *refers to the space around core areas of ecological value that help to reduce external pressures; and buffering has a corresponding meaning*.”

45 This is a very general definition, for the following reasons:

a. It refers to “space”, with no reference to vegetation in that space. As such, the definition could include air space, or pasture, or exotic plantation forest.

b. Buffers are usually made up of lower quality early successional vegetation, e.g. terrestrial secondary shrubland on a wetland margin; mixtures of indigenous and exotic species on wetland margins; lower stature secondary forest dominated by kānuka on the margins of high quality podocarp/tawa forest or podocarp-dominant forest.

c. The definition refers to the role of a buffer in helping “to reduce external pressures” but there is no indication what those pressures might be.

d. Overall, the definition is overly loose and general.

46 I suggest that an alternative definition for a “buffer” could be along these lines:

“Lower quality indigenous vegetation or a mixture of indigenous vegetation and exotic vegetation, adjacent to an area of indigenous vegetation and/or habitat of indigenous fauna of significant ecological value, and which helps to protect the area from external pressures.”

47 Overall, the criteria set is generally similar to other existing criteria sets and, as such is likely to result in the same or a very similar set of indigenous-dominant SNAs being identified within plantation forest estates. Probably the most important requirement for application of the criteria is set out in the ‘Direction on approach’ in Appendix 1 of the NPSIB:

“5. An assessment under this appendix must be conducted by a suitably qualified ecologist.”

MANAGEMENT OF AREAS OF SIGNIFICANT INDIGENOUS VEGETATION AND SIGNIFICANT HABITAT OF INDIGENOUS FAUNA

What threat does plantation forestry activities present to areas of significant indigenous vegetation?

48 Forestry companies - including their staff and contractors - are generally very aware of the existence and importance of significant indigenous vegetation within their estate. Data on significant natural areas is usually available in their GIS systems and harvest planners and other managers routinely plan to avoid adverse effects on these sites.

49 Protection of the margins/edges of patches of indigenous vegetation is an important requirement and many companies have incurred additional costs by:

- Requiring contractors to fell away from indigenous vegetation (which can be difficult on steep slopes).
- Leaving areas of exotic plantation forest where harvesting will result in unacceptable levels of damage.
- Not replanting sites that were difficult to harvest due to presence of significant indigenous vegetation.

50 In some situations, trees have been hauled across gullies with significant indigenous vegetation, resulting in some damage, but this has involved:

- No replanting.
- Provision of mitigation for damage to the indigenous vegetation.

What is the extent, duration, and degree of effect of edge damage to SNA from harvesting activities?

51 Where damage has occurred to significant vegetation, this has generally been of limited geographic extent and has been addressed in various ways, as discussed above.

Clearance of Secondary Regrowth

52 Indigenous species are often dominant in secondary regrowth that occurs in non-planted areas in an exotic plantation forest, e.g. roads, skid sites, areas where plantings fail, and so on. These areas should not be classified as SNAs as they are subject to clearance in every harvesting cycle.

Clearance of a Former Forestry Vehicle Track in a SNA

53 In some situations, access and harvest roads associated with exotic plantations may pass through SNAs, i.e. these are pre-existing tracks/roads, present when the SNA was identified. These access tracks may be required during each harvest cycle and often require upgrading, and that may involve re-clearance of the road line, and road margins and corners. This scenario may be very problematical under the proposed NPSIB, as discussed below.

54 The ranking system provided in Appendix 2 of the proposed NPSIB, because it is linked to levels of statutory protection (specifically the need to avoid adverse effects on SNAs ranked 'High' - see Section 3.9 in the proposed NPSIB and the effects management hierarchy) is likely to create a very high threshold for the consenting of any works in an SNA with that ranking.

Identification of Significant Habitats of Indigenous Fauna

55 Strict application of Appendix 1 in the proposed NPSIB, as it stands, could potentially result in exotic plantation stands being identified as SNAs. Criterion (c) Rarity and Distinctiveness - specifically C6(a): "provides habitat for an indigenous species that is listed as Threatened or At Risk in the New Zealand Threat Classification System Lists" - would result in large areas of exotic plantations being identified as SNAs. Obvious examples include plantation habitats for karearea/falcon, kiwi, and bats, but also plantations that provide habitats for frogs, invertebrates, and many other Threatened or At Risk taxa known to utilise plantations, e.g. Maunder *et al.* 2005, Pawson *et al.* 2010.

56 To illustrate how all-encompassing this provision is at the moment, exotic plantation forests in Thames-Coromandel provide actual or potential habitat for a range of Threatened or At Risk species as listed by the Department of Conservation under the New Zealand Threat Classification System, including:

- Pekapeka/long-tailed bats

- North Island brown kiwi
- Hochstetter's frog
- Archey's frog
- Karearea/falcon
- Kākā
- Mātātā/fernbird
- Pihoihoi/NZ pipit
- Popokatea/whitehead
- Toutouwai/North Island robin
- Black shag, little black shag and little shag
- Titipoumamu/rifleman
- Fish, including shortjaw kōkopu, lamprey, longfin eel, torrentfish, giant kōkopu, koaro, inanga, and giant bully
- Lizards, both arboreal and terrestrial, including the endemic Coromandel gold stripe gecko and ngahere gecko (green gecko)
- Snails and other invertebrates
- Various indigenous plant species.

57 The above list includes Threatened and At Risk species that are known to be currently present in Thames-Coromandel exotic plantation forests. Note that it does not include species that are under threat solely because of the recent arrival of myrtle rust.

58 Some Threatened or At Risk species, at least for parts of Thames-Coromandel, are known to occur relatively widely in plantations. This includes North Island brown kiwi, kākā, Hochstetter's frog, pekapeka/long-tailed bats, and long-finned eel. There will be other species present that have not been listed, particularly microbiota. I would expect that Threatened and At Risk species will occur relatively widely, although

probably patchily, throughout exotic plantation forests (and associated indigenous vegetation) in the Thames-Coromandel District, and new localities will be discovered over time as further surveys are carried out.

59 Exotic plantation forests provide habitat for a range of indigenous species because it is a forest ecosystem and there are a range of niches available within this ecosystem and on its margins. Overall, the suite of indigenous species listed above may potentially utilise all features of an exotic plantation forest at all stages of forest management. Some species may be resident in the plantation stands while others may range widely across the landscape and utilise plantations as either key or ancillary elements of their habitats and life cycles.

60 The features and stages of the exotic plantation forest that provide suitable habitat for Threatened or At Risk indigenous species are different for each species. For example, pihoihoi/pipit will tend to use skid sites and road margins. Toutouwai/robin, in contrast, will be found within the plantation stands, establishing in younger forests once the canopy closes. They may disappear from more mature 'old growth' plantation forests once the habitat becomes more complex and rat numbers increase.

Management of Significant Habitats of Indigenous Fauna in Exotic Plantation Stands

61 The biggest impacts on indigenous species in exotic plantation stands are associated with harvesting. This includes roading, stream crossings, and hauling across gullies. The level of impact will depend on the scale and timing of harvesting, the habitat preferences of the indigenous species present in the forest, their mobility, and the refugia provided by other vegetation in the wider landscape.

62 If exotic plantation forest remains at the site, or if there are substantial areas of indigenous vegetation nearby, then kiwi, pekapeka/long-tailed bats, karearea/falcon and other relatively mobile species are likely to persist. This is particularly the case if harvesting is timed to avoid vulnerable stages of the life cycles of these more mobile species and if particularly sensitive parts of their habitats, such as nesting sites or maternal roosts, are identified and appropriately managed. Less mobile species are more at risk. Their locations and range will need to be identified and their habitat avoided or managed in an appropriate manner to reduce risk. If an entire plantation forest was to be harvested, particularly in an otherwise largely pastoral landscape, then even the most mobile resident indigenous species are more at risk.

63 In the Thames-Coromandel District, for example, and in many other parts of Aotearoa/New Zealand, there are often habitat refugia adjacent to and/or intermixed with plantation stands. This diverse landscape lessens the risks to these more mobile Threatened and At Risk species when compared with large scale harvesting or conversion of plantation forests to other land uses in other parts of the country that have less diverse landscapes.

64 The most important requirement - to retain habitats of indigenous fauna in exotic forests - is retention of exotic plantation forests in the landscape, rather than allowing uncontrolled or wholesale conversions to non-forest land uses.

65 The following matters need to be taken into account:

a. Maintenance of linkages across landscapes and habitat refuges, including riparian margins.

b. Provision for the sustainability of Threatened or At Risk species that have limited mobility and cannot readily move across landscapes; and

c. A requirement for a planning approval for large scale land use change, i.e. clearance of plantations and conversion to non-forest land uses (conversion to indigenous forest should be considered to be a positive change, although habitat values may be somewhat limited for many years).

66 Overall, requirements to maintain significant indigenous vegetation (and associated fauna habitats) and indigenous fauna habitats in exotic plantation stands are very different.

SHOULD AREAS OF SIGNIFICANT INDIGENOUS VEGETATION AND SIGNIFICANT HABITATS OF INDIGENOUS FAUNA BE TREATED THE SAME?

67 In my view, areas of significant indigenous vegetation and significant habitats of indigenous fauna in exotic plantations should not be treated the same. The reasons for this are discussed below.

68 Note that for ease of reference in the following sections have used the abbreviation “SNA” to refer to areas of significant indigenous vegetation and the abbreviation “SHIF” to refer to significant habitats of indigenous fauna in exotic plantations.

What are the differences in the ecological attributes and management requirements for SNA and SHIF?

69 Key requirements for SNAs include:

a. Retention and protection of indigenous vegetation cover.

b. Monitoring of extent and condition.

c. Active management to maintain ecological values, e.g. exclusion of grazing and control of pest plants and animals.

70 Key requirements for SHIF in exotic plantation forests include:

a. An understanding of the species present.

b. An understanding of how they use the plantation matrix, i.e. at what stages of forest development.

c. An understanding of how they are affected by plantation forest management.

d. Based on the above, development of management strategies to retain viable populations of indigenous species in exotic plantation forests.

What are the differences in identification and mapping (surveying) requirements for SNA and SHIF?

71 There are marked differences in the surveying, identification, and mapping of SNAs and SHIF.

72 SNAs require:

a. Up-to-date aerial photography.

b. Field inspection by a suitably qualified and experienced ecologist.

c. Mapping in a GIS.

d. Documentation of composition, values, and threats.

73 SHIFs potentially require:

a. Targeted fauna surveys.

b. Mapping of SHIFs based on species distributions.

c. An adaptive/flexible approach as ‘boundaries’ will vary subject to the species present, e.g. ‘boundaries’ are likely to be very different, within the same plantation forest, for karearea/falcon, kiwi, bats, and so on.

74 It becomes even more problematical as fauna distributions and habitat use changes over time and subject to habitat availability and suitability for particular indigenous species. For example:

- Karearea/falcon use of plantations for nesting is subject to the availability of harvested compartments.

- Toutouwai/robin use of plantation stands changes over time, and they may not even be present in old-growth stands (although they may have been present during earlier stages of stand development).

75 This means that ongoing surveys would be required, and SHIF ‘boundaries’ would potentially need to change, possibly as frequently as annually.

76 Undertaking ongoing surveys for mobile species - such as kiwi, karearea/falcon, pekapeka/long-tailed bats, for example - would require specialist personnel with experience with the respective species.

77 For bats, even with specialist personnel, it will be difficult, and practically impossible, to cost-effectively pinpoint the exact areas being used for activities such as roosting.

78 This level of ongoing survey work would involve very considerable costs.

<u>What are the differences in threats to SNA and SHIF from plantation forest activities (and the scale of such threats)?</u>

79 Threats to indigenous SNAs and SHIF by plantation forest activities vary markedly.

80 Subject to appropriate management by forest managers, threats to SNA are minimal, largely confined to margins or other sites potentially affected by forest management activities, such as road formation, felling, or over-spraying with herbicide.

81 Threats to indigenous fauna habitat in exotic plantation stands are associated with the harvesting and destruction of the indigenous fauna habitat. The scale of this threat depends on the scale of forest removal, the extent and ages of the remaining

stands, and the use of the remaining stands by the complement of indigenous fauna present in the forest.

Is regulation required to protect SNA and SHIF from such threats or can threats to SHIF be managed without regulation?

82 Because of the significant differences in the types of threats to SNAs and SHIF, different approaches are required.

83 Regulation is appropriate to recognise and retain SNAs in the landscape, and to ensure that adverse effects by external agents are avoided, minimised, or mitigated.

84 On the other hand, SHIFs can be managed to retain fauna populations without regulation relating to specific defined sites within an exotic plantation forest.

85 As addressed in the evidence of Ms Sally Strang, the NZFOA has already implemented measures to provide information on Threatened or At Risk indigenous species to forest owners and managers through their website (the website is now in its second iteration). NZFOA and forestry companies have also funded and/or produced a considerable amount of research and developed best practice guidelines for species such as falcon, bats, and kiwi, for example. These non-regulatory methods have been subject to considerable uptake, and support, across the forestry industry.

CLAUSE 3.10 MANAGING ADVERSE EFFECTS IN PLANTATION FORESTS

86 The provisions of Clause 3.10 of the Proposed NPSIB are set out below:

(1) Clause 3.9 does not apply to managing "plantation forest biodiversity areas".

(2) Within a plantation forest biodiversity area that is a significant habitat for threatened or at-risk indigenous fauna, plantation forestry activities must be managed over the course of consecutive rotations to maintain long-term populations of indigenous fauna species present.

(3) Within a plantation forest biodiversity area that contains threatened or at-risk flora, the adverse effects to these flora from plantation forestry activities must be managed. Information note: The National Environmental Standards for Plantation Forestry has rules for indigenous biodiversity in plantation forests.

87 I can provide the following comments on these proposed provisions:

88 The section title is somewhat negative. As I have summarised above in my evidence, exotic plantation forests provide a range of beneficial values as habitat for a wide range of indigenous biodiversity. The use of exotic forests as habitat for indigenous species has been known, and documented, for at least 80 years. So it is desirable from an ecological perspective to encourage retention of planation forest in the landscape. If exotic plantations were to be converted to pasture, which has occurred across very extensive areas in the central North Island, these habitats and associated biodiversity values would be destroyed.

89 As such, the most important statutory requirement is to establish an appropriate level of statutory control necessary to retain plantation forests in the landscape, i.e. to try and retain (and expand) forest cover.

90 If it is acknowledged that exotic plantations can and do provide important habitat for indigenous species, then perhaps a more appropriate section title would be along the lines of: “Management of plantation forest to maintain indigenous biodiversity values”.

91 Along with this more positive slant, an obvious question is: what should be done to retain and promote the indigenous biodiversity values of plantation forests? A logical approach would be:

a. Establish current values, by undertaking ecological inventories of plantation stands.

b. Identify areas of significant habitat for Threatened or At Risk indigenous fauna.

c. Develop long-term strategies to maintain habitat values over the course of consecutive rotations.

d. Develop measures to identify, protect, and retain populations of Threatened or At Risk plants.

These matters are discussed further below.

Establish Current Biodiversity Values, by Undertaking Inventories of Plantation Stands

92 Subject to geographic location, this could potentially involve surveys for indigenous plants, birds (including specialist surveys for kiwi, for example), bats, fish, lizards,

frogs, and possibly other biota. Some forestry companies have done this to some degree for various groups of biota, but none have done it comprehensively in all forests.

93 As already noted above, this will be a considerable undertaking, involving a reasonable period of time (many years rather than months), and very considerable cost.

Identify Areas of Significant Habitat for Threatened or At Risk Indigenous Fauna

94 This will be reasonably straightforward once the above inventories have been undertaken. Some forestry companies already have very good information on key species, such as karearea/falcon and kiwi.

Develop Long-Term Strategies to Maintain Habitat Values Over the Course of Consecutive Rotations

95 This would need to involve consideration of species records and distributions, particularly significant habitats, and habitat use at particular stages of plantation management. This information would then be overlain with consideration of stand ages, harvest regimes, habitat connectivity, and opportunities to manipulate forest management to optimise habitat availability for key/target species.

96 Strategies to optimise habitats for indigenous fauna in plantation could be developed on a case-by-case basis, subject to the assemblages of indigenous species present in each forest.

97 For small woodlot owners/managers it will not be practical to maintain habitat on an ongoing basis, so this issue will require consideration of the position of the woodlot in the wider landscape.

Develop Measures to Identify, Protect, and Retain Populations of Threatened and At Risk Plants

98 This is undoubtedly the most straightforward requirement, based on the locations of Threatened or At Risk species, and a good understanding of their habitat requirements and threats.

ALTERNATIVE APPROACH PROPOSED BY NZFOA

99 The NZFOA has proposed an alternative approach to provisions currently proposed in the NPSIB, with a clear distinction to be made between SNA for indigenous vegetation and SHIF for significant indigenous fauna habitat in exotic plantations. I am familiar with the NZFOA proposed alternative approach. This approach has considerable merit, for the following reasons:

a. The approach addresses the particular ecological/biodiversity values in the different types of habitat.

b. It recognises the very different management regimes associated with indigenous SNA and plantation forests.

c. It would acknowledge that it has been known for many decades that plantation forests have significant populations of indigenous fauna.

d. It is a practical way to retain indigenous fauna habitat.

e. It recognises that different approaches are required to protect and maintain populations of indigenous species in these systems.

f. It recognises that both SNAs and exotic plantation forests are 'permanent' features in the wider landscape but that plantation forests are subject to cycles of active harvesting and replanting.

g. It would provide clarity for plantation forest managers.

100 Overall, in my view, this type of more targeted approach is much more likely to achieve positive outcomes going forward. Because of this, it is a better approach than what is currently in the proposed NPSIB.

CONCLUSION

101 As noted above, retention of exotic plantations across New Zealand's landscapes will ensure that the current suite of habitats are retained in plantation environments. There is no doubt that management of the plantation matrix can be improved, at a landscape scale, to improve the habitats of indigenous fauna in particular.

102 Current provisions in the proposed NPSIB are not appropriate for exotic plantations and a more habitat-specific approach is required.

103 Many forestry companies have already incurred considerable expenditure to undertake biodiversity inventories, and many are now investing in active management to protect and enhance indigenous biodiversity, at considerable cost. Further consideration now needs to be given to the best approach and associated costs and other requirements to provide the best outcomes for indigenous species in production landscapes across Aotearoa/New Zealand.

REFERENCES

Allen R., Platt K., and Wiser S. 1995: Biodiversity in New Zealand plantations. *New Zealand Forestry*: 26-29.

Beaven B. 1996: Sap feeding behaviour of North Island kākā (*Nestor meridionalis septentrionalis*, Lorenz 1896) in plantation forests. *Unpublished MSc Thesis.* University of Waikato, Hamilton, New Zealand. 92 pp.

Borkin K.M. and Parsons S. 2009: Long-tailed bats' use of a *Pinus radiata* stand in Kinleith Forest: recommendations for monitoring. *New Zealand Journal of Forestry 53*: 38-43.

Borkin K.M. and Parsons S. 2010: The importance of exotic plantation forest for the New Zealand long-tailed bat (*Chalinolobus tuberculatus*). *New Zealand Journal of Zoology 37*: 35-51.

Brockerhoff E., Ecroyd C.E., and Leckie A.C., and Kimberley M.O. 2003: Diversity and succession of adventive and indigenous vascular understorey plants in *Pinus radiata* plantation forests in New Zealand. *Forestry Ecology and Management 185*: 307-326.

Buchanan P.K., Clinton P.W., and Allen R.B. 1999: Dead wood in the forest - alive and dynamic! *New Zealand Journal of Forestry 45*: 40-42.

Clout M.N. and Gaze P.D. 1984: Effects of plantation forestry on birds in New Zealand. *Journal of Applied Ecology 21*: 795-815.

Daniel M. 1981: First record of a colony of long-tailed bats in a *Pinus radiata* forest. *New Zealand Journal of Forestry*: 108-111.

Innes J.G., Calder R.D., and Williams D.S. 1991: Native meets exotic - kōkako and pine forest. *What's New in Forest Research 209*: 1-4.

Jackson R.W. 1971: Birds in exotic forests in New Zealand. *New Zealand Journal of Forestry 16*(1): 61-68.

Maunder C., Shaw W., and Pierce R. 2005: Indigenous biodiversity and land use - what do exotic plantation forests contribute? *New Zealand Journal of Forestry 49*(4): 20-26.

Moore G. 2001: Use of Kinleith Forest by New Zealand bats and effects of forestry. *Unpublished MSc Thesis.* Massey University. 255 pp.

Norton D.A. 1988: Indigenous biodiversity conservation and plantation forestry: options for the future. *New Zealand Forestry 43*: 34-39.

Ogden J., Braggins J., Stretton K.I.M., and Anderson S. 1997: Plant species richness under *Pinus radiata* stands on the central North Island volcanic plateau, New Zealand. *New Zealand Journal of Ecology 21*: 17-29.

Parker A. 2013: Native and adventive detritivores in forests of Manawatū-Wanganui. *Unpublished MSc Thesis*. Massey University. 220 pp.

Pawson S. and Brockerhoff E. 2005: Pine forest natives. *New Zealand Geographic*: 78-93.

Pawson S.M., Brockerhoff E.G., and Didham R.K. 2009: Native forest generalists dominate carabid assemblages along a stand age chronosequence in an exotic *Pinus radiata* plantation. *Forest Ecology and Management 258*: S108-S116.

Pawson S.M., Ecroyd C.E., Seaton R., Shaw W.B., and Brockerhoff E.G. 2010: New Zealand's exotic plantation forests as habitats for threatened indigenous species. *New Zealand Journal of Ecology 34*: 342-355.

Peterson P. and Hayman E. 2018: Conserving indigenous fauna within production forestry landscapes. *Landcare Research Contract Report LC3216*. Prepared for Gisborne District Council. 54 pp.

Seaton R., Minot E.O., and Holland J.D. 2010: Variation in bird species abundance in a commercial pine plantation in New Zealand. *New Zealand Journal of Forestry 54*: 3-11.

Seaton R., Minot E.O., and Holland J.D. 2013: Home range and habitat use of New Zealand falcons (*Falco novaeseelandiae*) in an exotic plantation forest during the breeding season. *Journal of Raptor Research 37*: 223-233.

Sporle W. 2016: Forestry management guidelines - North Island brown kiwi in exotic plantation forests. 23 pp.

Sporle W. 2017: Forestry management guidelines for forests with brown kiwi. *New Zealand Journal of Forestry 61*: 24-27.

Spurr E.B. and Coleman J.D. 2001: Effect of forest management practices on bird populations - a preview. *Landcare Research Contract Report LC0102/006.* 7 pp.

Shaw W.B. and Eades P.A. 2000: Survey, monitoring and management of indigenous biodiversity in Fletcher Challenge Forests central North Island plantation forests. *Wildland Consultants Ltd Contract Report No. 334*.

Wildland Consultants 2002: An assessment of understorey and avifauna biodiversity in old growth and harvest age radiata pine and Douglas fir plantations in central North Island. *Wildland Consultants Ltd Contract Report No. 470*. Prepared for Fletcher Challenge Forests.