

Assessment of proposed land exchange between Ruahine Forest Park revocation land and proposed Smedley Exchange Block in relation to Ruataniwha Water Storage Scheme

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Executive Summary

This report was produced following a request to undertake a comprehensive gathering and evaluation of relevant conservation values including biological data and other technical information applicable to Ruahine Forest Park revocation land and the Smedley Exchange Block, and to provide the Convenor with a report detailing the conservation values of each, as well as a comparative analysis of the two sets of values (refer to Appendix 1).

The Ruahine Forest Park revocation land comprises two distinct parcels, the 8 ha Makaroro River parcel and the 14 ha Dutch Creek parcel that are separated by approximately 600 m of pine forest. The Makaroro River parcel is located on an alluvial plain next to the Makaroro River. Such alluvial plains are rare in the landscape. Three point three (3.3) ha of an Acutely Threatened land environment occurs on this site. Approximately 92 ha of this habitat occurs on public conservation land elsewhere in the district. The vegetation comprises about 1.6 ha of black beech forest, 1.9 ha of broadleaf forest, and 3 ha of secondary shrub/treeland. The area has been heavily logged and used for firewood when a mill was operating on the opposite bank, and a Forest Service house used to be on the site. Woody weeds, including shade-tolerant Darwin's barberry, will impact on the succession of this block. No emergent podocarps remain, but there are some podocarps present. This parcel is therefore in a poor condition.

The Dutch Creek parcel comprises about 9 ha of black beech forest and 5 ha of broadleaf small-leaved monocot scrub/treeland. This secondary successional scrub was probably clearfelled and burnt during logging operations. The black beech forest has had the emergent podocarps logged, and they are no longer part of the canopy. However, the black beech forest has an intact understorey. There is also a small oxbow wetland which could be considered significant. This parcel is similar to the surrounding Ruahine Forest Park, other than that further up Dutch Creek it hasn't been logged.

The 146 ha Smedley Exchange Block that has been offered in exchange comprises 122 ha of indigenous vegetation interspersed with 24 ha of pasture. There is 33 ha of black beech forest, including one patch of 4.4 ha that is in similar condition to that of the Dutch Creek parcel, other than that it has some emergent podocarps present. Although the Smedley Exchange Block has been logged, it has retained scattered emergent podocarps throughout the black beech forest. The rest of the vegetation comprises broadleaf and small-leaved scrub and treeland, and includes naturally occurring dry west-facing slopes dominated by small-leaved broadleaf scrub. There are also two significant wetlands present.

The underlying geology of Smedley Exchange Block is different from the rest of the Ruahine ranges, it covers an altitudinal range of over 300 m, and complements the Gwavas Conservation Area, which does not include black beech forest with emergent podocarps down to the altitudes represented by the Smedley Exchange Block.

We have considered the relevant information that's available as part of the Ruataniwha Water Storage System RMA application process and as part of the land exchange hearings process. We have

also assessed other pertinent literature, and undertaken two site assessments of the Ruahine Forest Park revocation land and the Smedley Exchange Block.

Based on this information and our own site assessments we conclude that, from an ecological and biological point of view, exchanging the 146 ha Smedley Exchange Block for the 22 ha Ruahine Forest Park Revocation Land would enhance the conservation values of land managed by the Department.

The main reasons for reaching this conclusion were:

The Ruahine Forest Park revocation land and its immediate surroundings have been heavily logged in the past, with virtually no emergent podocarps left. Although Smedley Exchange Block has been logged it has some emergent podocarps.

The Makaroro River parcel of Ruahine Forest Park revocation land has been heavily logged, is infested with woody weeds, including shade-tolerant species, has an old house site, and is in a generally degraded state. It requires a higher level of management input than the other two sites.

Smedley Exchange Block is larger than Ruahine Forest Park revocation land (146 ha compared to 22 ha), and covers an altitudinal range of almost 300 m. However, some of the 146ha has been cleared for grazing and the understorey of some forested areas is currently degraded due to grazing. With grazing removed the block will regenerate over time.

Smedley Exchange Block forms part of the Wakarara Range, which has a different underlying geology when compared to the rest of the Ruahine Range, including the Ruahine Forest Park revocation land.

This different geology and greater altitudinal range also support ecosystems that are not present in Ruahine Forest Park revocation land, such as the naturally occurring dry west-facing slopes dominated by small-leaved broadleaf scrub.

The Smedley Exchange Block extends the altitudinal range of Gwavas Conservation Area, and contains habitats and vegetation that are not present on the adjoining Gwavas Conservation area. The two sites complement each other.

The Makaroro River parcel of Ruahine Forest Park revocation land includes 3.3 ha of an Acutely Threatened land environment. Approximately 92.3 ha of this land environment is on public conservation land elsewhere in the district. The designers of this threatened environment classification system (Walker et al 2007) pointed out that their system is not a replacement for field work, did not see it as a replacement for the biogeographic planning framework of ecological regions and districts, did not see it as a fine-scale tool, and did not see it as a reserve planning tool. Based on our assessment the site is in a degraded condition, and does not rate highly when assessed against ecological significance criteria.

While the possible loss of the seven migratory fish species, including four of the five At Risk-Declining species, within the Makaroro River catchment upstream of the proposed dam would restrict the geographic range of these species within the wider Tukituki catchment, the loss of the upper Makaroro River catchment populations of these species is not expected to result in a significant increase to their threat of extinction from elsewhere in the catchment.

Dutch Creek has more suitable habitat for the seven migratory fish than Smedley Exchange Block, and so may have more of the migratory or threatened fish species present. Trap and transfer has been recognised by the fish experts as the best mitigation method for moving

migratory fish above and below the dam. They have also identified that a management plan is needed for each species. This initiative is supported.

We found additional wetland habitats on Smedley Exchange Block that were not included in the applicant's and submitters' reports and submissions. The wetlands on Smedley Exchange Block and the oxbow wetland on Ruahine Forest Park revocation land were all considered significant in terms of the second National Priority for Protecting Rare and Threatened Biodiversity on Private Land (MfE & DOC 2007). The oxbow was also considered significant for its distinctiveness, whereas the wetlands on Smedley Exchange Block were not considered distinctive.

The two land parcels were deemed similar for providing suitable habitat for wildlife species known to be present in the area, except for fernbird, two birds being recorded from the oxbow wetland. Should the Ruataniwha Water Storage Scheme proceed and the fernbirds be displaced, the secondary successional scrub immediately above Dutch Creek is considered suitable habitat for them. Fernbirds were also recorded at the nearby PanPac wetland which suggests that fernbirds are present within the surrounding area where suitable habitat is available.

The loss of kowhai as a food source for birds is not considered a potential problem, because there is a large amount of kowhai in the district that will not be inundated should the Ruataniwha Water Storage Scheme go ahead.

Smedley Exchange Block had promising habitat for skinks and geckos.

There were similar levels of bat activity recorded at the two sites during times of recording. There was no evidence of maternity roosts in either parcel of the Ruahine Forest Park revocation land. Both Dutch Creek and Smedley Exchange Block appeared to provide suitable roost trees, including emergent podocarps in the case of Smedley Exchange Block, and either site might well have roosts at times outside of the survey period.

Other than one red mistletoe found in the Dutch Creek parcel no threatened plant species were recorded from Ruahine forest Park revocation land or Smedley Exchange Block. Red mistletoe are widespread in the district, as well as in Ruahine Forest Park, and it is feasible to translocate mistletoe through careful placement of seed on host trees, therefore the presence of this one red mistletoe is not considered significant.

Therefore from an ecological and biological point of view we believe that the proposed exchange offers an enhancement to conservation values. Given that Smedley Exchange Block is underpinned by a different geology from that in Ruahine Forest Park, and thereby supports different ecosystems not currently present in the Park, we believe it complements the current values of, and would be a worthy addition to, Ruahine Forest Park.

We believe that this enhancement would be further improved by redesigning the boundaries of Smedley Exchange Block to include some areas of pasture and Donovan Gully. A more coherent design would reduce the length of the boundary and associated edge effects and fencing costs, and consolidate some of the wetland systems that would be split under the current design. Nonetheless, there is still an enhancement of conservation values under the current design.

Purpose

The purpose of this study was to undertake a more comprehensive gathering and evaluation of all relevant conservation values including biological data and other technical information applicable to Ruahine Forest Park revocation land and the Smedley Exchange Block, and to provide the Convenor (Director-General's delegate) with a report detailing the conservation values of each, as well as a comparative analysis of the two sets of values to assist the Convenor with his task under s 49(2) of the Conservation Act.

The report sought was an assessment of ecological and biological values at both sites, including, but not limited to:

- Ecosystems and habitat values
- Freshwater and hydrological values (including the oxbow)
- Flora and fauna values
- Status of endangered and threatened species and ecosystems
- An assessment of the sites' contributions to conservation over the longer term
- An assessment placing the Ruahine Forest Park revocation land and Smedley Exchange Block in context with their surroundings

The full task assignment is included as Appendix 1.

A map of the sites is included (Figure 1). We've followed the format of Townsend et al. (2008) for referring to the threat status of species.

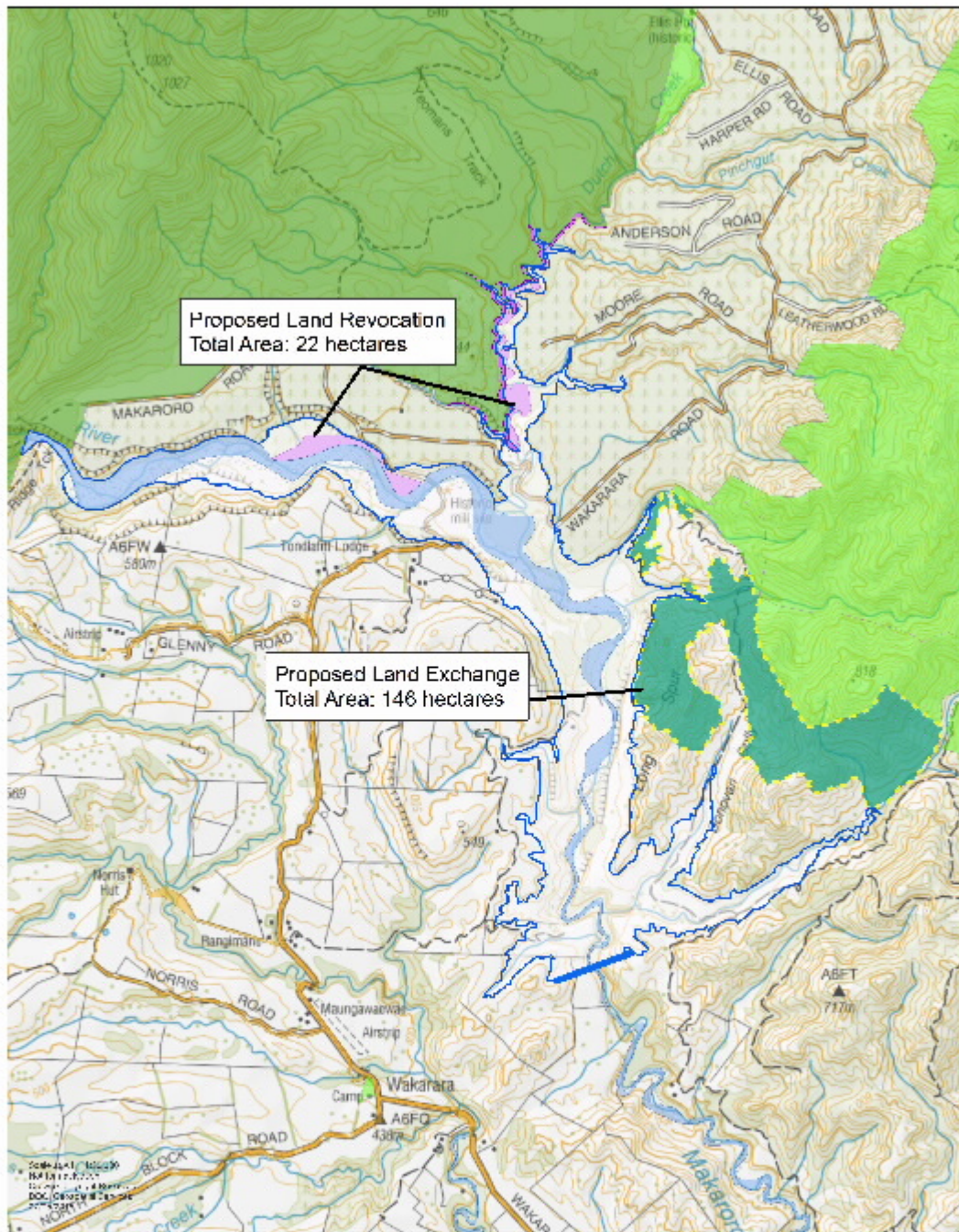
Ecological issues raised by submitters Forest & Bird and Te Taiao Environment Forum

As the chief purpose of this report is to assess the conservation values associated with the Ruahine Forest Park revocation land and the Smedley Exchange Block from an ecological and biological perspective, we've restricted our consideration of issues raised by submitters to those of an ecological and biological nature.

These issues fell into several themes:

- Freshwater fish
- Threatened land environments
- Wetlands
- Threatened species
- Smedley Exchange Land not identified as an RAP (Recommended Area for Protection)

Detailed transcripts of these issues are contained in Appendix 2.



Ruahine Forest Park Land Revocation and Exchange

0 200 400 600 800 1000 Metres

- Indicated Dam Crest
- Tekeohu Farm plot
- Smedley Exchange Block
- Ruahine Forest Park Revocation Land
- Legal Hydro
- Legal Hoods
- Forest Block
- Outwash/Gravel Area

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Figure 1: Map showing the Ruahine Forest Park Revocation Land and Smedley Exchange Block, as well as roads and rivers referred to in the text and the level of the proposed dam.

Site assessments

Two site assessments were undertaken to gain an ecological perspective of the Ruahine Forest Park revocation land and the Smedley Exchange Block in the context of their surroundings and adjacent land, taking into consideration the information contained and issues raised in the ecological reports prepared for HBRIC and the objections and submissions on the Ruataniwha Water Storage Scheme and the proposed land exchange between Ruahine Forest Park revocation land and the Smedley Exchange Block. The issues raised in the objections are set out in appendix 2.

Site assessment 1: G La Cock, C West, A Lee - 8 April 2015:

On 8 April the team assessed the two sites as well as their surroundings from the air, and visited the Ruahine Forest Park Makaroro River site block on foot. Specific objectives of this flight and ground visit were to:

- gain an overview of the Ruahine Forest Park revocation land and Smedley Exchange Block;
 - place the specific habitats, including the oxbow wetland, in context with their surroundings
 - improve our knowledge of the state of vegetation in the Ruahine Forest Park Makaroro block, and
 - identify any threatened species that may have been missed in site visits during the original surveys or a subsequent visit by Kelvin Lloyd;
- Assess whether there are areas of kowhai in the vicinity of Ruahine Forest Park revocation land to replace the kowhai food source that could be lost in Ruahine Forest Park revocation land should the Ruataniwha Water Storage Scheme proceed, in order to gauge how significant that loss might be;
- Assess whether there are similar areas to those that occur in the Dutch Creek stream and in the Makaroro River gravels.

During this visit a wetland was spotted amongst the pines in the PanPac forest located between Ruahine Forest Park and Gwavas Conservation Area. An assessment of this site was included in the brief for the second trip, because of its potential to provide some insight into the wetlands in the vicinity. However, it was not taken into consideration in our recommendations.

Site Assessment 2: G La Cock, G Rogers, P Gerbeaux, J Scrimgeour, A Lee -13 to 15 April 2015

Specific objectives of this trip were to:

- Assess each parcel of land against the information provided during the Ruataniwha Water Storage Scheme processes;
- Classify and compare the values of the wetlands on Ruahine Forest Park revocation land, PanPac and Smedley Exchange Block;
- Identify threatened species of plants that may have been missed during site visits by consultants acting for the applicant and by submitters and their consultants, and attempt to improve the knowledge on distribution and population size of threatened birds and plants;
- Assess habitat in the vicinity of Ruahine Forest Park revocation land for its potential to accommodate threatened species that may be displaced from Ruahine Forest Park revocation land should the Ruataniwha Water Storage Scheme proceed, in order to gauge how significant the loss of the habitat currently occupied by the threatened species might be;
- Assess whether the seepage areas adjacent to Dutch Creek contain threatened plants.

On 13 April G La Cock, G Rogers and J Scrimgeour attempted to access the Makaroro Block by approaching from the south and crossing the Makaroro River. Heavy rain in the Ruahines meant that the Makaroro River was swollen and too dangerous to cross. This trip, however, allowed us to gain an overview of the district to the south of Ruahine Forest Park revocation land and Smedley Exchange Block.

On 14 April the full team visited the PanPac wetland and the two parcels on Ruahine Forest Park revocation land (Makaroro River and Dutch Creek). For the Makaroro River parcel we viewed the entire site from the top of the ridge above the central part of the site, and visited the eastern end near the old house site. For the Dutch Creek parcel we viewed the site from above the oxbow wetland, and walked up Dutch Creek. Three of us assessed the wetland, and two of us (G Rogers and J Scrimgeour) continued to the main block of black beech forest. Steep seepage areas next to the stream were searched for anything unusual botanically. We then entered the forest on the opposite bank from Moore's Rd, and gained an overview of some of the steep sided gullies that will be inundated should the proposed Ruataniwha Water Storage Scheme go ahead.

On 15 April the full team visited Smedley Exchange Block. We did not have time to visit the whole block, so we visited the wetland near the forest in the NW, and did a walk through survey of the property up to Donovan Gully. Two of us (A Lee and G Rogers) went down Long Spur to view the southern end of the block, and one of us (J Scrimgeour) visited the broadleaf small-leaved shrubland to the east of Donovan Gully to assess a scree slope and rock outcrops as potential habitat for lizards. P Gerbeaux and G La Cock assessed the Donovan Gully wetlands.

We had copies of the plant lists from Kessels & Associates (2013a, c) and Lloyd (2013a, b) for comparative purposes as we assessed the sites.

Advice on freshwater issues was also sought from Ben Woodward, who processed the Resource Consent application for the disruption of fish passage on behalf of the Department.

Overall assessment of the terrestrial ecology reports by the applicant and submitters

Te Taiao Environment Forum, Forest and Bird (Central Hawke's Bay, Napier, Hastings) and DOC district office staff had rated a draft of Kessels & Associates (2013a) as "Overall a very good report which identifies the ecological impact of the dam and reservoir" (Cheyne 2012). Although we found many of the aspects of the reports to be well done, from our perspective we found the following to be issues that could have been considered in the main reports, submissions and joint expert witness statement on terrestrial ecology (Kessels & Associates 2013a, b, c; Kessels et al. 2013; Lloyd 2013a, b), and would have improved them:

- the major impact that previous logging and human influences have had and are currently having on Ruahine Forest Park revocation land and Smedley Exchange Block;
- the underlying geology of the sites;
- the context of vegetation and habitats on Ruahine Forest Park revocation land and Smedley Exchange Block in relation to surrounding vegetation and habitats.

In addition, neither the terrestrial ecology reports nor the freshwater reports and submissions (e.g. Young et al. 2013, Death 2013; Joy 2013, Ausseil et al. 2013) placed the wetlands in a national or regional context, other than to point out the value of the oxbow (Forest & Bird Inc et al. 2015, Lloyd 2013a, McQueen 2015).

Kessels & Associates (2013c) included kanuka in their plant list, but not manuka. We only found manuka. We also found red beech, which wasn't listed. However, both red beech and manuka were referred to in the vegetation descriptions, as was kanuka.

We didn't find kanuka at either site, and it isn't known from the region (A Lee pers comm.). Lloyd (2013a) also didn't list kanuka in his plant list. The dominant vegetation at Gwavas Conservation Area is described as "scrub and low forest dominated by manuka and kanuka" (Department of Conservation, 1994). Even though Lloyd (2013a) and we didn't find kanuka in the areas we visited, it may be elsewhere on the properties.

Improved knowledge gained from site assessments

Dutch Creek habitat

The aerial assessment of the Dutch Creek parcel revealed that similar habitat to that which will be inundated should the proposed Ruataniwha Water Storage Scheme go ahead was present for approximately another 5km to the north. This stretch will not be inundated should the Ruataniwha Water Storage Scheme go ahead.

The long lasting impact of logging of the podocarps in the region (e.g. Bickler & Clough 2013, Elder 1965, Fromont 1991, Masters et al. 1957, New Zealand Forest Service 1977) was evident from the differences in structure and appearance between black beech forest with and without podocarps and clear-felled forest (that might have also been burnt) that has now succeeded to scrub or low forest. The loss of emergent podocarps from the Dutch Creek black beech forest contrasts with the unmodified black beech-podocarp forest further up the Makaroro River catchment.

Makaroro River braided river habitat

Braided river stretched for several kilometres above the proposed dam site and the Ruahine Forest Park revocation land Makaroro River parcel, and for several kilometres into Ruahine Forest Park. This stretch of river will not be inundated should the proposed Ruataniwha Water Storage Scheme proceed.

Concerns have been raised about the loss of kowhai as a food source for birds, should the Ruataniwha Water Storage Scheme proceed. Our aerial assessment revealed kowhai to be present on the banks of the Makaroro River well into Ruahine Forest Park, with a kowhai dominated face on the bank opposite the western end of the Makaroro River parcel of Ruahine Forest Park revocation land. This face will be above the footprint of the dam, should the Ruataniwha Water Storage Scheme proceed.

The high level of woody weed infestation, including shade-tolerant species such as Darwin's barberry, raised concerns about the future functioning and recovery of this site in the absence of intensive management.



Photo 1: Secondary successional scrub immediately above Dutch Creek, apparent here as the steep-sided treed creek to the right of the photo. (Photo: Carol West)

Threatened species

During the field work no additional threatened plant species were discovered, despite specific searches in some habitats, especially wetlands, cliffs and seepage areas, as suggested by Lloyd (2013a, b). In addition, we didn't record any new threatened birds or herpetofauna, although we acknowledge that this was unlikely given the short visit. However, two fernbirds were heard at the PanPac wetland, and we heard two fernbirds at the oxbow site. This was an improvement on the previous recordings of one fernbird at the oxbow on two separate occasions.

Scrimgeour (Appendix 4) has provided a report on the fauna values at all sites, and the potential habitat of each site to sustain these species. More detail on her findings is included under the "Review of relevant information" section below.



Photo 2: Oblique aerial view, looking west towards the Ruahine Range in the distance Dutch Creek is located between the main pine plantation in the foreground and the triangular patch of secondary successional scrub (centre left of photo) and beech forest in Ruahine Forest Park. The Dutch Creek parcel of Ruahine Forest Park revocation land is located below the secondary successional scrub. Makaroro River is on the left. (Photo: Carol West)

Wetlands

Philippe Gerbeaux (Appendix 3) has provided a report on the wetlands we visited, including future management scenarios.

The wetland on Smedley Exchange Block was in better condition than photos in the Smedley Exchange Block report (Kessels & Associates 2013c) suggest, and we found significant areas of wetlands in Donovan Gully. Some of these areas were within the proposed Smedley Exchange Block boundary, and some were excluded. These Donovan Gully wetlands were not identified in the Smedley Exchange Block ecological report (Kessels & Associates 2013c).

The oxbow wetland on the Dutch Creek Ruahine Forest Park revocation land may have been created artificially, because it is about two metres above the level of Dutch Creek, and has a ridge running between the two arms of the wetland. There is a steep cut face on the opposite bank. The existing confluence between Dutch Creek and Makaroro River was created artificially by bulldozing a new route for Dutch Creek to simplify the dragging of logs down the river. Based on the tightness of the bends on the oxbow lake it would have been very difficult to drag logs around it. The area of black

beech to the north had the podocarps logged, so there is a possibility that the river was straightened out at this site as well, to facilitate removal of logs. However, decades since logging ended the wetlands are functioning as wetlands, and we have opted to treat them as an oxbow wetland for the purposes of this exercise.

Review of relevant information

The following responses are based on our observations during the field trips, the relevant reports that formed part of the Ruataniwha Water Storage Scheme RMA process (see “list of evidence and background information consulted”), and other relevant literature and information on the area.

Freshwater fish

There is a vast amount of information and evidence related to the Ruataniwha Water Storage Scheme on potential effects on freshwater fish (e.g. Death 2013, Joy 2013, Young 2013, Young et al. 2013). The fish experts in the expert conferencing (Ausseil et al. 2013) representing the applicant and submitters all agreed that the effects of the dam are as reported in Young et al. (2013).

Up to five At Risk-Declining native fish species, including long fin eel, torrent fish, redfin bullies and dwarf Galaxias, possibly occur at the Dutch Creek parcel of Ruahine Forest Park and on Smedley Exchange Block. Species lists are included in Young et al. (2013), and maps of predicted distribution appear as appendices (Young et al. 2013). Four of these five At-Risk-Declining species are migratory (cf Kessels & Associates 2013a, c). There is a greater chance of more species being in Dutch Creek than the first order streams on Smedley Exchange Block, because of its greater size and length.

Four of these five At Risk-Declining species are amongst the seven migratory fish that may occur at both sites.

The seven migratory native fish species, including four of the five At Risk-Declining species (Kessels & Associates 2013c) are unlikely to maintain self-supporting populations above the dam unless fish passage is provided (Ausseil et al 2013, Young 2013, Young et al. 2013). Nonetheless, landlocked populations of fish have established in other areas, so this is a possibility, albeit it uncommon (B Woodward pers comm.).

Should the Ruataniwha Water Storage Scheme proceed it will impede movement of fish between Dutch Creek and Makaroro River below the dam. There is at least another 5 km of Dutch Creek habitat above the upper limits of the reservoir, so fish habitat will remain. Similarly the upper Makaroro River will remain as a natural fast-flowing stream for several kilometres above the upper extent of the dam, should the Ruataniwha Water Storage Scheme go ahead. Should the scheme proceed the impoundment would not inundate streams on Smedley Exchange Block. However, it would still block streams below Smedley Exchange Block, thereby impeding fish access to Makaroro River below the dam.

Should the Ruataniwha Water Storage Scheme proceed migratory fish on Smedley Exchange Block will have short steep reaches to live in, compared to the 5 km or more in Dutch Creek that won't be

inundated, thereby resulting in increasing pressures on these Smedley Exchange Block populations. However, there is the possibility that a greater number of species may be affected in Dutch Creek.

The fish experts (Ausseil et al. 2013) agreed that, while the possible loss of the seven migratory fish species, including four of the five At-Risk-Declining species, within the Makaroro River upstream of the proposed dam would restrict the geographic range of these species within the wider Tukituki catchment, the loss of the upper Makaroro River populations of these species would not be expected to result in a significant increase to their threat of extinction from elsewhere in the catchment (Young 2013, Young et al. 2013).

The fish experts (Ausseil et al. 2013) agreed that trap and transfer was the best available mitigation option, but that trap and transfer would not fully mitigate the effects of the dam on fish passage, and that there was considerable uncertainty about the efficacy of the trap and transfer approach. However, it was the best approach. The fish experts (Ausseil et al. 2013) further agreed on additional mitigation, being a management plan focused on each species of fish and including, but not limited to, enhancing fish habitat and enabling fish access to areas they currently cannot access. They noted that it was important that these fish management plans were not restricted solely to the dam site. This dedicated approach is supported, and should extend to streams on Smedley Exchange Block.

Threatened land environments.

There are 3.65 ha of Acutely Threatened land environment on the Ruahine Forest Park revocation land, but none on Smedley Exchange Block.

Kessels & Associates (2013a, b, c) used LENZ Level IV environments (Leathwick et al. 2002). The Acutely Threatened land environment on the Ruahine Forest Park revocation land is LENZ Environment B2.1d (Leathwick et al. 2002). It includes 3.30ha on the Makaroro River and 0.35 ha up Dutch Creek. This land environment occupies 95.6 ha of public conservation land in the vicinity including parcels elsewhere on Dutch Creek and Makaroro River, as well as nearby on Waipawa River and Tukituki River. It occupies 2286 ha overall in Hawke's Bay.

The following details on LENZ B2.1d are from Leathwick et al. (2002) pg 60.

Environment B2

This environment occurs on inland areas of the southern Hawke's Bay plains on gently sloping alluvial surfaces. The climate is mild, with high solar radiation and low annual water deficits. Soils are imperfectly drained and have low natural fertility mainly due to the parent material consisting of rhyolitic tephra, loess and mixed alluvium.

Level III & IV Descriptions

Level III

Area: 70,188 ha

Elevation: 310 m

Location: Southern Hawke's Bay

Climate: Mild temperatures, high solar radiation, low annual water deficits and very low monthly water balance ratios

Landform: Gently undulating plains

Soils: Imperfectly drained soils of low fertility from a mixture of rhyolitic tephra, loess and mixed alluvium

Level IV

B2.1 – No Subdivision at Level III

d. lower annual water deficits, well-drained soils of loess and very high fertility

Several authors (e.g. Norton & Roper-Lindsay 2004, Walker et al. 2007, Davis in press) have outlined the issues with the way the threatened land environment classification is being applied by practitioners. Norton & Roper-Lindsay (2004) described the LENZ system as being a classification based on computer modelling of a range of climatic, substrate and landform attributes to generate a series of land units. They saw these land units as an approximation of potential ecosystem character. Walker et al. (2007) reiterated that their threatened environment classification, based on LENZ and Land Cover Database 2 (LCDB2), is not a substitute for field survey, did not see their system as a replacement for the biogeographic planning framework of ecological regions and districts, did not see it as a fine-scale tool, and did not see it as a reserve planning tool. Davis (in press) pointed out that LENZ is not a classification of ecosystems and vegetation, but should rather be seen as part of a wider toolkit that complements field survey and other information.

We could not pick obvious differences that would have distinguished LENZ B2.1d from a neighbouring LENZ on Ruahine Forest Park revocation land, and have relied on the field assessments undertaken by Kessels & Associates (2013a, b, c), Lloyd (2013a, b) and ourselves in our assessment of the Ruahine Forest Park revocation land and Smedley Exchange Block.

The consultant reports pay particular attention to unusual vegetation types in relation to the dominant forest cover. Scrub communities are a case in point. Ecologically, the Dutch Creek small-leaved communities are driven by factors such as high water tables, frosts and disturbance. The Smedley Exchange Block communities are driven by different stress factors such as steep-slope rock outcrops with thin, drought-prone soils. They are also much larger than the small-leaved communities on Ruahine Forest Park revocation land, and provide habitat for a different suite of animals, such as skinks and geckos. These ecosystems are not present on the Ruahine Forest Park revocation land, and represent a different and complementary component from a conservation perspective.

Wetlands

Gerbeaux (Appendix 3) assessed the oxbow wetland in Dutch Creek and the two wetlands on Smedley Exchange Block according to a process that had been applied on the West Coast (Maseyk & Gerbeaux 2015). He also commented on the PanPac wetland, but that is not pertinent to this section.

In summary, he found the oxbow wetland to be significant for representativeness, rarity, distinctiveness and ecological context. He assessed two wetlands on Smedley Exchange Block, although Kessels & Associates (2013c), Forest & Bird and Te Taiao Environment Forum only referred to one. They did not refer to or appear to know about the Donovan Gully site, possibly because it was not in the original report (Kessels & Associates 2013c). These two wetlands were assessed as being significant for representativeness, distinctiveness and ecological context. Once grazing has been

removed these wetlands and their surrounding vegetation will start to recover within ten to twenty years.

Gerbeaux (Appendix 3) considered that the oxbow as well as the two wetlands on Smedley Exchange Block would trigger the second National Priority for Protecting Rare and Threatened Biodiversity on Private Land (MfE & DOC 2007). Forest & Bird only considered that the oxbow lake met these criteria. Based on the description of the wetland on Smedley Exchange Block (Kessels & Associates 2013c) this is understandable. We relied on our own site assessments to identify the extent of wetlands on Smedley Exchange Block, and their significance.

Threatened species

Neither Lloyd (2013a) nor we found additional threatened plant species during our surveys, despite searching habitats suggested by Lloyd.

Scrimgeour (Appendix 4) addresses issues around fauna, including threatened fauna. Long-tailed bats have been recorded throughout the landscape (Kessels & Associates 2013a). Based on recorded passes/night at Dutch Creek and on the margins of Smedley Exchange Block it was apparent that both sites were suitable for activity/foraging, but were not being used for roosting at the time of recording. However, both sites appeared suitable for bat roosts with large beech trees and in the case of Smedley Exchange Block, some emergent podocarps. Kessels & Associates (2013a) identified the confluence of the Makaroro River and Dutch Creek as the possible location of roost sites in the area, based on intensive sampling on 22-30 November 2011, 2-9 February 2012, 11-22 January 2013 and 2-10 February 2013 (Kessels & Associates 2013c). These surveys found no evidence to support the presence of long-tailed bat maternity roosts on Ruahine Forest Park revocation land, as claimed by Forest & Bird and Te Taiao Environment Forum in their submissions (Appendix 2).

Cheyne (2012), on behalf of Te Taiao Environment Forum, Forest & Bird and DOC, accepted that New Zealand falcon are scattered along the eastern Ruahine Forest Park boundary and therefore not uncommon. We concur with this observation.

We didn't record North Island fernbirds on Smedley Exchange Block. The regenerating secondary successional scrub immediately west of Dutch Creek is considered to be good habitat for fernbird that may be displaced if the oxbow wetland is inundated should the proposed Ruataniwha Water Storage Scheme go ahead. They were present at the PanPac wetland between the two sites, which suggests that fernbirds are present throughout the area where suitable habitat is available. This is supported by the fact that only small numbers of birds were recorded at each site (i.e. not enough to be self-sustaining at that site), which means they have to be part of a larger population that can disperse between sites.

Scrimgeour (Appendix 4) also noted potential habitat on Smedley Exchange Block for skinks and geckos. Overall Smedley Exchange Block has the potential to provide enhancement of conservation values, which would be further enhanced when grazing is excluded (as it would be) and greater enhancement of conservation values if the current shape of the proposed exchange was altered to a more coherent design that would also minimise edge effects (Scrimgeour Appendix 4).

Although one red mistletoe was found on Ruahine Forest Park revocation land in Dutch Creek, none have been observed on Smedley Exchange Block. However, they are widespread within the Ruahines, with around 300 records (BioWeb). There's a population of at least 25 on Sunrise Track about 10 km south of Dutch Creek. They can be translocated to black beech on Smedley Exchange Block by placing seed on small branches, so their apparent absence from Smedley Exchange Block should not be of concern.

Smedley Exchange land not identified as an RAP (Recommended Area for Protection)

Smedley Exchange Block falls in the Ruahine Ecological District. Fromont (1991) produced a Protected Natural Areas Survey report for the Ruahine Lowlands. In this she did not identify specific sites as is common practice. Instead she identified botanical features listed by Elder (1965) as future sites worthy of study to advance their protection. This list included lowland black beech forest, although not specifically Smedley Exchange Block.

Assessment of the significance of the ecological values for Ruahine Forest Park Revocation Land and Smedley Exchange Block, and a comparison of these values

The two parcels of Ruahine Forest Park Revocation Land are separated by at least 600 m of pine forest, and therefore will be assessed separately for the purposes of this comparison. Treating the Ruahine Forest Park revocation land parcels as one entity would lead to lower assessment ratings for criteria such as naturalness/intactness and size shape and buffering, and no assessment criteria would have an improved rating, hence the decision to assess the two parcels separately. For the purposes of this exercise we've accepted that Dutch Creek is part of Ruahine Forest Park revocation land where it borders Ruahine Forest Park revocation land.

Smedley Exchange Block comprises more or less uniform valley or hillslope physiography. The proposed reserve design encompasses areas set aside for pasture or forestry, resulting in one 4.4 ha patch of black beech forest being isolated from the rest of the Smedley Exchange Block by about 150 m. Should the Ruataniwha Water Storage Scheme proceed proposed riparian planting will connect these two blocks (Figure 1). We chose to treat Smedley Exchange block as one parcel because of its uniform physiography, with the understanding that this separation of the two main blocks will be taken into account in the assessment, particularly for the long term viability and size, shape and buffering criteria.

For comparative purposes with Ruataniwha Water Storage Scheme documents we've applied the habitat types used by Kessels & Associates (2013b; c). However, the habitat criteria used by Kessels & Associates (2013a, b, c) are equivalent to vegetation communities and by definition do not engage with the full ecosystem context of the Ruahine Forest Park revocation land and Smedley Exchange Block, that is the land's underlying physiography (climate landforms and soils) that select for the habitat, or vegetation communities, thereon. By this measure the Ruahine Forest Park revocation land alluvial riparian terraces with their predominantly soft mudstone and overlying outwash gravel

landforms strongly contrast with the drier colluvial greywacke hill country of the Wakarara Range and hence Smedley Exchange Block (Kingma 1958). We note these differences, but for consistency and convenience we've adopted the habitat criteria of Kessels & Associates (2013b, c).

Maseyk & Gerbeaux (2015) argue for the use of four (sometimes distilled to three) criteria for the assessment of significance as recently endorsed by the Environment Court and upheld by the High Court (in the case of the West Coast Regional Council's Land and Water Plan). These criteria were representativeness, rarity, distinctiveness, and ecological context. Others have debated the application of significance criteria in New Zealand (e.g. Norton & Roper-Lindsay 2004, 2008, Walker et al. 2008). However, as a rule these authors have focussed on identifying significant sites at a district or regional scale, rather than the application of the assessment criteria to comparing two sites which may or may not meet significance thresholds. Our preference therefore is to adopt the seven criteria of Davis (2010, in press) predominantly because of their comprehensiveness, their convincing use applied to a proposed land exchange in Canterbury (Davis 2010), and their further promulgation by the Department (Davis in press). This approach also differs from the assessment of significance by Kessels & Associates (2013b; c), whereby they evaluated the significance of their habitat classes in the context of the Hawke's Bay Regional Policy Statement (Appendix XII in Kessels & Associates 2013a) or the Central Hawke's Bay District Plan (Appendix XIII in Kessels & Associates 2013a). Both Ruahine Forest Park revocation land and Smedley Exchange Block would be considered significant under these processes, but they don't allow for a robust comparison of ecological values. Keesing (Appendix XV in Kessels & Associates 2013a) also noted the simplicity of the significance criteria under the Hawke's Bay Regional Policy Statement and the Central Hawke's Bay District Plan.

The assessment criteria we have used follow those used by Davis (2010, in press). This assessment method includes five criteria on ecology and two management criteria on long term viability and fragility, threat and management. From an ecological perspective this requires us to consider the impact of flooding on adjacent areas, e.g. impact of flooding Dutch Creek on fish, and the impacts of management and mitigation, e.g. impacts of removing grazing from Smedley Exchange Block and impact of the reservoir on fish in Smedley Exchange Block streams. This is also in keeping with the objections by Forest & Bird and Te Taiao Environment Forum which raised issues with the way sites were assessed.

Davis (2010, in press) used the following five ecological criteria (brief description from Davis in press):

Representativeness : The extent to which indigenous biodiversity is typical of the natural diversity of the relevant Ecological District.

Diversity and pattern: The extent to which the expected range of diversity and pattern is present for the relevant Ecological District.

Rarity and special features: Rarity is the natural or induced scarcity of biological, physical and ecological features within an area; special features identify unusual or distinctive features of an area.

Naturalness: The relative absence of human disturbance or modification within an Ecological District.

Size and shape, buffering/surrounding landscape and boundaries: The extent to which the size and configuration of an area, and its degree of buffering from a surrounding landscape affects its ability to maintain its indigenous biodiversity.

There are also two management related criteria (Davis in press). These are not used to assess ecological significance:

Long-term ecological viability: The ability of an area of indigenous biodiversity to retain its ecological health and values over time with minimal management input.

Fragility and threat and management input: A site's inherent vulnerability to environmental change by virtue of the nature of its ecological components and its position in the landscape.

Ruahine Forest Park revocation land Makaroro River parcel

Representativeness

This 7.896 ha area comprises an alluvial plain next to the Makaroro River. Such plains are rare in the landscape. The habitats were described as black beech forest, broadleaf forest, podocarp/broadleaf, broadleaf and black beech treeland, exotic forest, and braided riverbed (0.424 ha). The site has been logged, and no large podocarps were recorded. It was used for firewood to fire furnaces and run a sawmill, includes an old house site, and is heavily infested by woody weeds. However, some elements of indigenous vegetation are present, particularly some black beech. There is a small stretch of braided river typical of the Makororo River above the site.

Diversity and pattern

The site is a fairly uniform alluvial plain, with little variation in habitat, except for some braided river bed. Variations in vegetation patterns are largely as a result of previous human influences. It has low plant species diversity, and few podocarps and broadleaf trees.

Rarity and special features

Long-tailed bats (Threatened-Nationally Vulnerable) have been recorded at the site, and New Zealand bush falcon (Threatened – Nationally Vulnerable) would in all likelihood overfly the area as part of their home range, as pairs of falcon are accepted as being scattered along the eastern Ruahine Forest Park boundary and therefore not uncommon (Cheyne 2012). No Threatened or At Risk plants have been recorded by any of the parties visiting the site. The braided river is not recognised as a significant area for indigenous fauna, and is not recognised as being regionally, nationally or internationally important for its assemblage of indigenous river birds (Kessels et al. 2013).

However, this site includes 3.30 ha of Acutely Threatened LENZ B2.1.d (see pg 14 for description). This land environment occupies 95.6 ha of public conservation land in the vicinity (25 km radius), and

2286 ha overall in New Zealand. This stretch of river appeared to be typical of the Makaroro River for several kilometres above the proposed reservoir, and into Ruahine Forest Park.

Naturalness/intactness

The vegetation has been heavily modified by man. It's been logged, used for firewood, and was the site of a Forest Service hut. Weeds, including woody weeds such as Darwin's barberry, are widespread. This weediness would inhibit successional rebuilding of the vegetation.

Size, shape and buffering

The site is small, long and narrow, ranging in width from 50 to 150m. It is separated from the rest of Ruahine Forest Park by a pine plantation over 500 m wide.

Long term viability

The site is ephemeral and, given its current degraded state, is unlikely to recover to a viable indigenous forest without significant levels of management. It is not included in one of the Department's Ecological Management Units.

Fragility, threat and management

The site is fragile, degraded, and under threat from woody weeds that would inhibit future successional rebuilding of the vegetation. Human activities continue to impact on the site, and it is prone to flooding. It requires high levels of management input if it is to be restored. Given other DOC priorities in the district and country this is unlikely to occur.

Ruahine Forest Park revocation land Dutch Creek parcel

Representativeness

This 14.335 ha parcel of land is mainly comprised of 8.883 ha black beech forest (Photo 3) and 5.154 ha of broadleaf-small leaved monocot scrub/treeland (Photo 4). The black beech forest has had all the large podocarps logged, and the broadleaf-small leaved monocot scrub/treeland is part of a much larger patch of secondary successional scrub that is very evident from the air. The black beech forest has a good understorey. There is a 0.293 ha wetland which is significant as a wetland, and Dutch Creek which is a second order stream.

Diversity and pattern

This site has a stream, wetland, and intact black beech forest that has had podocarps logged, and includes some seepage areas and cliff habitat, leading to the area of secondary successional scrub on the escarpment above (see Photo 1). These diverse habitats contribute to a moderate plant species diversity.

Rarity and special features

Long-tailed bats (Threatened-Nationally Vulnerable) and North Island fernbird (At Risk-Declining) have been recorded at the site, and New Zealand bush falcon (Threatened – Nationally Vulnerable) would in all likelihood overfly the area as part of their home range, as pairs of falcon are accepted as being scattered along the eastern Ruahine Forest Park boundary and therefore not uncommon

(Cheyne 2012). One plant of red mistletoe (At Risk-declining) was observed. Up to 5 At Risk-Declining fish species may use this stretch of Dutch Creek.

This site includes 0.39 ha of Acutely Threatened LENZ B2.1.d (see pg 14 for description). This land environment occupies 95.6 ha of public conservation land in the vicinity (25 km radius), and 2286 ha overall. Dutch Creek stretches for several kilometres above the land parcel. This stretch will not be inundated should the Ruataniwha Water Storage Scheme should it proceed.



Photo 3. Black beech forest in Dutch Creek, taken from opposite bank. (Photo: Geoff Rogers)



Photo 4. Broadleaf-small leaved monocot scrub/treeland in Dutch Creek.(Photo: Geoff Rogers)

Naturalness/intactness

The vegetation has been modified by man, with podocarps missing from the black beech forest. Another area on the escarpment is secondary successional scrub that appears to have been clearfelled and burnt in the past. However, the black beech forest is intact in its current state, albeit without emergent podocarps, and it is not heavily infested by woody weeds.

Size, shape and buffering

The site is small, long and narrow, and adjoins the main body of Ruahine Forest Park.

Long term viability

In the long term the broadleaf-small leaved monocot scrub/treeland will regenerate, and podocarps will return to the black beech forest, but it will be over a hundred years before they are emergent above the canopy.

Fragility, threat and management

The site is well buffered, and will not require much active management to recover from past human impacts, other than browser and predator control. Woody weeds did not appear to be present in densities that would suppress successional rebuilding of the vegetation, but some wilding pine control may be required in future.

Smedley Exchange Block

Representativeness

The 146 ha Smedley Exchange Block contains 122 ha of indigenous vegetation. It is currently grazed, except for the separate block of 4.4 ha of black beech that has been fenced off (Photo 5). Some areas of black beech still have emergent podocarps. There's a mosaic of vegetation types, some induced through logging and agriculture, but there is a naturally occurring dry west facing slope dominated by small-leaved broadleaf scrub (Photo 6).

Smedley Exchange Block is in the Wakarara Range, a greywacke piercement body, which is separated from the main greywacke block of the Ruahines by a long narrow graben, the Ohara Depression (Kingma, 1958). The Wakarara Range is dominated by the Gwavas Conservation Area. The vegetation of Gwavas CA is described as "Some remnant pockets of forest in gullies containing red and black beech, rimu, matai and kahikatea. Most vegetation is scrub and low forest dominated by manuka and kanuka" (Department of Conservation, 1994).

Smedley Exchange Block therefore represents an area of beech forest with emergent podocarps that extends the altitudinal range of Gwavas Conservation Area, and includes some dry west facing slopes that are not represented elsewhere in Gwavas Conservation Area.



Photo 5. Patch of black beech forest on Smedley Exchange Block that has had grazing removed. Note emergent podocarps. (Photo: Geoff Rogers)



Photo 6. Mosaic of treeland and scrub vegetation types with patches of pasture on Smedley Exchange Block, and dry west facing slope dominated by small-leaved broadleaf scrub.
(Photo: Geoff Rogers)

Diversity and pattern

Smedley Exchange Block is relatively large (146 ha) and has an altitudinal range of approximately 300 m (480 to 780 m asl.). It has a range of vegetation classes, some natural and some resulting from human interference, four streams and two types of wetland.

Rarity and special features

Long-tailed bats (Threatened-Nationally Vulnerable) have been recorded from the margins of the Smedley Block, but have not been searched for on the actual Exchange Block. However, bats have been recorded throughout the landscape and are therefore likely to be present throughout the Smedley Exchange Block. New Zealand bush falcon (Threatened – Nationally Vulnerable) would likely overfly the area as part of their home range, as pairs of falcon are accepted as being scattered along the eastern Ruahine Forest Park boundary and therefore not uncommon (Cheyne 2012).

Up to 5 At Risk-Declining fish species may use the streams on Smedley Exchange Block. Although the proposed reservoir will not influence the streams on Smedley Exchange Block itself, the proximity of the reservoir will have an impact on the fish in the streams currently draining Smedley Exchange Block land and their passage to Makaroro River, and needs to be considered as an impact of the Ruataniwha Water Storage Scheme on the site.

No threatened or at risk plants were found by any of the parties that have visited this site.

The beech forest with emergent podocarps and the dry west facing slopes with broadleaf small-leaved scrub are poorly represented on the Wakarara Range. The Wakarara Range is also not protected down to the altitude as proposed in Smedley Exchange Block.

Naturalness/intactness

There are some areas of pasture (24 ha of 146 ha overall), but we believe that these areas will recover once grazing is removed as proposed.

Large podocarps have been logged from the beech forest, but several were not logged and remain as emergent podocarps throughout the black beech forest. By comparison no emergent podocarps remain in the black beech forest on the Ruahine Forest Park revocation land parcels. Other habitats described in Kessels & Associates (2013c) are impacted by current grazing. The area of black beech that has been withdrawn from grazing has developed an understorey, and appeared intact.

Size, shape and buffering

The site is large, and complements the adjoining Gwavas Conservation Area. Its proposed shape would be awkward to manage, with an area in the north that is set aside for forestry or pasture resulting in one separate 4.4 ha area about 150 m from the rest of the Smedley Exchange Block.

There is also a section around Donovan Gully which has been excluded. From a management perspective the inclusion of this area would simplify management and reduce edge effects. It also contains the lower reaches of the significant wetland that we recorded in Donovan Gully. Its inclusion has merit from a catchment management perspective.

Long term viability

The site does not have a major weed problem, so in the long term the vegetation and wetlands will recover, and areas currently in pasture will regenerate. Although extensive replanting is proposed, we do not believe that this will make a significant difference to the speed and direction of regeneration that would be achieved without planting.

The proposed increase in predator and browser control will also improve the long-term viability of the site.

Fragility, threat and management

The site is well buffered, and will not require much active management to recover, other than browser and predator control and exclusion of grazing. Some wilding pine control will be needed in future. A trap and transfer system is proposed to assist native fish (primarily eel) to move above or below the dam.

Discussion

Smedley Exchange Block has scored the same or higher than the two parcels of Ruahine Forest Park revocation land for every ecological significance assessment criterion (Table 1). This is attributed to the diversity of habitats offered by its size and altitudinal range, habitats in this altitude range being poorly represented on the Wakarara Range, which has a different geology from the neighbouring

Ruahine Forest Park, and the way that the Smedley Exchange Block complements the Gwavas Conservation Area. In contrast, the Ruahine Forest Park revocation lands make a disproportionately much smaller contribution to the present values of Ruahine Conservation Park. Both sites contain significant wetlands, and, other than long-tailed bats, do not support viable populations of threatened birds or plants.

The fragility, threats and management needs of Smedley Exchange Block are similar to those of the Dutch Creek parcel of Ruahine Forest Park revocation land, as is long-term viability. The Makaroro River parcel of Ruahine Forest Park revocation land had a lower long term viability and higher fragility, threat and management needs than Smedley Exchange Block and the Dutch Creek parcel of the Ruahine Forest Park revocation land.

Table 1: Comparison of significance criteria for Ruahine Forest Park revocation land and Smedley Exchange Block.

| Assessment criteria | Ruahine Forest Park Makaroro River | Ruahine Forest Park Dutch Creek | Smedley Exchange Block |
|----------------------------------|------------------------------------|---------------------------------|------------------------|
| Representativeness | L/M | M | M/H |
| Diversity and pattern | M | M | H |
| Rarity and special features | M | M | M/H |
| Naturalness/intactness | L | L/M | L/M |
| Size, shape and buffering | L | L/M | M |
| Connectivity | L | H | H |
| Long-term viability | L | M | M |
| Fragility, threat and management | H, H, H | L, L, M | L, L, M |

Conclusions

We have considered the relevant information that's available as part of the Ruataniwha Water Storage System RMA application process and as part of the land exchange hearings process. We have also assessed other pertinent literature, and undertaken two site assessments of the Ruahine Forest Park revocation land and the Smedley Exchange Block.

Based on this information and our own site assessments we conclude that, from an ecological and biological point of view, exchanging the 146 ha Smedley Exchange Block for the 22 ha Ruahine Forest Park Revocation Land would enhance the conservation values of land managed by the Department. The main reasons for reaching this conclusion were:

The Ruahine Forest Park revocation land and its immediate surroundings have been heavily logged in the past, with virtually no emergent podocarps left. Although Smedley Exchange Block has been logged it has some emergent podocarps.

The Makaroro River parcel of Ruahine Forest Park revocation land has been heavily logged, is infested with woody weeds, including shade-tolerant species, has an old house site, and is in

a generally degraded state. It requires a higher level of management input than the other two sites.

Smedley Exchange Block is larger than Ruahine Forest Park revocation land (146 ha compared to 22 ha), and covers an altitudinal range of almost 300 m. However, some of the 146ha has been cleared for grazing and the understorey of some forested areas is currently degraded due to grazing. With grazing removed the block will regenerate over time.

Smedley Exchange Block forms part of the Wakarara Range, which has a different underlying geology when compared to the rest of the Ruahine Range, including the Ruahine Forest Park revocation land.

This different geology and greater altitudinal range also support ecosystems that are not present in Ruahine Forest Park revocation land, such as the naturally occurring dry west-facing slopes dominated by small-leaved broadleaf scrub.

The Smedley Exchange Block extends the altitudinal range of Gwavas Conservation Area, and contains habitats and vegetation that are not present on the adjoining Gwavas Conservation area. The two sites complement each other.

The Makaroro River parcel of Ruahine Forest Park revocation land includes 3.3 ha of an Acutely Threatened land environment. Approximately 92.3 ha of this land environment is on public conservation land elsewhere in the district. The designers of this threatened environment classification system (Walker et al 2007) pointed out that their system is not a replacement for field work, did not see it as a replacement for the biogeographic planning framework of ecological regions and districts, did not see it as a fine-scale tool, and did not see it as a reserve planning tool. Based on our assessment the site is in a degraded condition, and does not rate highly when assessed against ecological significance criteria.

While the possible loss of the seven migratory fish species, including four of the five At Risk-Declining species, within the Makaroro River catchment upstream of the proposed dam would restrict the geographic range of these species within the wider Tukituki catchment, the loss of the upper Makaroro River catchment populations of these species is not expected to result in a significant increase to their threat of extinction from elsewhere in the catchment.

Dutch Creek has more suitable habitat for the seven migratory fish than Smedley Exchange Block, and so may have more of the migratory or threatened fish species present. Trap and transfer has been recognised by the fish experts as the best mitigation method for moving migratory fish above and below the dam. They have also identified that a management plan is needed for each species. This initiative is supported.

We found additional wetland habitats on Smedley Exchange Block that were not included in the applicant's and submitters' reports and submissions. The wetlands on Smedley Exchange Block and the oxbow wetland on Ruahine Forest Park revocation land were all considered significant in terms of the second National Priority for Protecting Rare and Threatened Biodiversity on Private Land (MfE & DOC 2007). The oxbow was also considered significant for its distinctiveness, whereas the wetlands on Smedley Exchange Block were not considered distinctive.

The two land parcels were deemed similar for providing suitable habitat for wildlife species known to be present in the area, except for fernbird, two birds being recorded from the

oxbow wetland. Should the Ruataniwha Water Storage Scheme proceed and the fernbirds be displaced, the secondary successional scrub immediately above Dutch Creek is considered suitable habitat for them. Fernbirds were also recorded at the nearby PanPac wetland which suggests that fernbirds are present within the surrounding area where suitable habitat is available.

The loss of kowhai as a food source for birds is not considered a potential problem, because there is a large amount of kowhai in the district that will not be inundated should the Ruataniwha Water Storage Scheme go ahead.

Smedley Exchange Block had promising habitat for skinks and geckos.

There were similar levels of bat activity recorded at the two sites during times of recording. There was no evidence of maternity roosts in either parcel of the Ruahine Forest Park revocation land. Both Dutch Creek and Smedley Exchange Block appeared to provide suitable roost trees, including emergent podocarps in the case of Smedley Exchange Block, and either site might well have roosts at times outside of the survey period.

Other than one red mistletoe found in the Dutch Creek parcel no threatened plant species were recorded from Ruahine forest Park revocation land or Smedley Exchange Block. Red mistletoe are widespread in the district, as well as in Ruahine Forest Park, and it is feasible to translocate mistletoe through careful placement of seed on host trees, therefore the presence of this one red mistletoe is not considered significant.

Therefore from an ecological and biological point of view we believe that the proposed exchange offers an enhancement to conservation values. Given that Smedley Exchange Block is underpinned by a different geology from that in Ruahine Forest Park, and thereby supports different ecosystems not currently present in the Park, we believe it complements the current values of, and would be a worthy addition to, Ruahine Forest Park.

We believe that this enhancement would be further improved by redesigning the boundaries of Smedley Exchange Block to include some areas of pasture and Donovan Gully. A more coherent design would reduce the length of the boundary and associated edge effects and fencing costs, and consolidate some of the wetland systems that would be split under the current design. Nonetheless, there is still an enhancement of conservation values under the current design.

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Appendix 1

Task Assignment – Consolidating conservation values of Ruahine land exchange

To: Carol West
From: Reg Kemper (Hearing Panel Convenor)
CC: David Bishop, Guy Kerrison, Graeme La Cock
Date: 27 March 2015

Context

HBRIC (the Hawke's Bay Regional Investment Company Limited) is an applicant for a Land Exchange involving part of Ruahine Conservation Park. It is not possible to exchange specially protected public conservation land for other land. To achieve that outcome the specially protected status must be revoked.

The Minister formed an intent to revoke the special protection over the land on the basis that the land offered by way of exchange appeared to enhance the conservation values of land managed by the Department and promote the purposes of the Conservation Act. That notice of intent to revoke has been publicly notified and a hearing has been held. As a result of this revocation hearing the Convenor has asked that a more detailed assessment of the sites involved be carried out by DOC staff.

Purpose

Undertake a more comprehensive gathering and evaluation of all relevant conservation values including biological data and other technical information applicable to these two sites (revocation and the exchange) and provide the Convenor with a report detailing the conservation values of each and undertaking a comparative analysis of the 2 sets of values to assist the decision maker in exercising his statutory powers under s 16A (2) and s 18 (7) of the Conservation Act.

The two sites being an exchange of the parcel of land known as the Smedley Exchange Block (SEB) for the parcel known as the Ruahine Conservation Park revocation land (RL).

Quality

Complete a report to the Convenor which provides a considered assessment of biological values of both sites including, but not limited to:

Ecosystems and Habitat values

Freshwater and hydrological values (including the Oxbow)

Flora and Fauna values

Status of endangered and threatened species and ecosystems.

An assessment of the sites' contributions to conservation over the longer term.

An assessment placing the RL and SEB in context with their surroundings.

The assessment must include an analysis (including a ranking on threatened species/habitat basis) of all the biological and natural resource information provided by the applicant and submitters to the Land Exchange and the Revocation Land [and should include any of the relevant technical information submitted for the RMA processes- e.g. the Terrestrial Ecological Report].

This assessment must include a comparative conservation value analysis of each of the sites; so that the decision maker can form a view as to whether SEB enhances the conservation values of land managed by the Department and promotes the purposes of the Conservation Act, and if so whether the conservation park status of the RL should be revoked.

The assessment should state what DOC's technical/science view is on this information.

Undertake a separate Departmental assessment of both sites, according to the bullet points in the item above. This assessment is to be developed having consideration for the application's proximity to Ruahine Conservation Park, and is to be based on field work by Departmental staff/contractors.

Quantity

A report to the Convenor in line with the quality requirements by 15 May 2015.

Actions

David Bishop is to confirm with HBRIC the financial deadline required by the company and to inform DOC internal of this, prior to any other action being taken;

Carol West to arrange for a separate WBS to be established to record costs against;

Carol West and Graeme La Cock (with urgency) to visit both sites prior to determining a response to this task assignment. Following the site visit, discussion with Convenor & PRSG managers (Guy Kerrison & Marie Long) should occur should the Task Assignment require changing;

Carol West to develop a cost estimate and timeline for the S&C assessments and report writing and submit those to David Bishop as soon as can practically be undertaken and before Good Friday (3 April 2015).

Critical Issues

Timing deadline, need to be completed by 15 May 2015 or earlier.

There is a BOI draft decision due at the end of April 2015, which is then open for comment for 10 working days. A final BOI decision will be issued as soon as possible after comments relating to the draft report have been considered;

The people engaged on the task assignment must have the appropriate knowledge and expertise and be recognised as technical experts in their field.

The DG, as decision maker must be able to make informed decisions on the revocation & exchange based on all the relevant information before him, including this report.

Appendix 2

Ecological issues raised by submitters Forest & Bird and Te Taiao Environment Forum

These are direct quotes from the submissions, except for text in italics which is paraphrased from the submissions.

Freshwater fish.

Forest & Bird pt 31: It is not clear why the Department has not assessed the freshwater ecological values of the two sites. Evidence before the Board of Enquiry indicates that threatened fish species have habitat within the conservation Land proposed for exchange.

Te Taiao Environment Forum: *Indigenous fish species were included in the list of threatened species, but they didn't elaborate on the issue of fish.*

Threatened land environments

Forest & Bird pt 34. The four National Priorities for Protecting Rare and Threatened Biodiversity on Private Land (MfE and DOC, 2007) are widely used as national assessment criteria for ecological values. The first National Priority is protection of Threatened Land Environments of New Zealand. Acutely threatened land environments are those land environments of which nationally less than 10% remains in indigenous cover. Chronically threatened land environments are those where nationally less than 20% remains in indigenous cover. An assessment of the land exchange in terms of the Threatened Land Environments and National Priorities does not support the exchange:

- a. 99.1% of the 22 ha conservation Land comprises acutely threatened (16.6%) and chronically threatened (82.5%) land environments.
- b. In contrast, of the remaining indigenous vegetation on the Smedley land, 29.95ha falls within the chronically threatened land environments, and none is within the acutely threatened land environments category. Most of the Smedley land that is in indigenous vegetation (about 161 ha) is on "less reduced and better protected" land environments. Protection of those land environments is not a National Priority.

The Conservation Land includes a small area of braided river, which triggers the third National Priority for Protection (Naturally Rare Ecosystems).

Te Taiao Environment Forum: The Doc exchange block comprises of Acutely Threatened (16.6%) and Chronically Threatened (82.5%) land environments. The 22ha within the Doc exchange block forms a continuous block of threatened land environments which is a national priority for the protection of indigenous biodiversity. The Smedley exchange block has no Acutely Threatened land environments and 29.95ha of Chronically Threatened land environments. The 29.95ha of Chronically Threatened Environment is patchy and dispersed through 234.25 ha of less reduced/better protected environment. Furthermore not all of the 29.95ha of the Chronically Threatened land environments would be protected (i.e. exchanged) within the 146ha DOC has proposed for the land swap. The exchange of Acutely Threatened for Chronically Threatened land environments is a fundamental problem with the proposed exchange, as it results in net loss of important lowland indigenous biodiversity that is exchanged for a larger area of less important hill country indigenous biodiversity.

The conservation gain of small-leaved shrubland is not valid. The small-leaved shrubland recognized within the Smedley block refers broadly to 'kanuka/manuka/coprosma species and varying amounts of pasture'. Small-leaved shrubland based on major vegetation types (e.g. kanuka/manuka/coprosma species) also exist within the Doc exchange land and are referred to as 'Broadleaf-small leaved-tussock scrubland', 'Broadleaf-small leaved -monocot scrub/treeland', 'kanuka/manuka treeland' types within TER and DOC Submission documents. Therefore there is a greater diversity of small-leaved shrubland types on the conservation land, and the suggested additional gain of a small-leaved shrubland type (indigenous shrublands) will not occur as the same shrubland type is found within the Doc exchange area. Furthermore the diversity of small-leaved shrubs described within the Doc exchange site indicates that this vegetation type is in significantly better condition than that within the Smedley exchange block. Therefore the exchange would result in a significant loss of an important shrubland habitat type if the revocation and exchange were to occur.

Wetlands

Forest & Bird pt 35. The second national priority is wetlands. The presence of an oxbow wetland on the true right of Dutch Creek triggers Priority 2 for the conservation land. The oxbow wetland type does not appear to be represented elsewhere in Ruahine Forest Park. The oxbow wetland contains diverse indigenous species, is hydrologically intact and is well-connected to surrounding indigenous vegetation, habitats, and the riparian margins of Dutch Creek. In contrast, the wetland within the Smedley block has been classed as a seepage (A treeland with podocarps (e.g. kahikatea and rimu), lacebark, manuka, cabbage tree linked to a seep zone with remnant sedges, fern species, blackberry, pasture grasses and herbs) and is highly degraded.

Te Taiao Environment Forum: Wetlands on the conservation land and in the Smedley Block are not equivalent. The wetland areas covered in the land swap differ significantly in nutrient status and hydrology and vegetation types. Seepages on the Smedley block have a high level of degradation and eutrophic conditions as indicated by cattle pugging and exotic grasses evident in photo provided in Kessels et al. SEB survey, Figure 7, pg 10. The oxbow wetland on conservation land contains indigenous wetland plants, is hydrologically intact and is well-connected to surrounding indigenous vegetation, habitats, and the riparian margins of Dutch Creek (photo provided, Kessels et al. TER, pg 35). The oxbow wetland within the Doc exchange area has a greater diversity of habitats and indigenous plants. The wetland within the Smedley block has been classed as a seepage (A treeland with podocarps (e.g. kahikatea and rimu), lacebark, manuka, cabbage tree linked to a seep zone with remnant sedges, fern species, blackberry, pasture grasses and herbs). The wetland within the Doc exchange has been classed as an oxbow wetland (including diverse indigenous vegetation; slender spike sedge, Carex and Juncus species, kiokio and swamp kiokio, toetoe, astelia, mountain flax, Hydrocotyle, Sphagnum moss, Coprosma species, cabbage tree, manuka and koromiko, wheki-ponga kahikatea, wineberry, broadleaf, kowhai, lancewood, lacebark, black matipo, snowberry, mingimingi, matai and horopito)

The area of wetland within the Doc exchange is larger than the 0.29 ha stated due to the fact that the desktop mapping technique used by Kessels Ecology does not identify small wetlands. Refer to comments of Dr Kelvin Lloyd (EPA, Statement of Evidence, point 97) below:

'The reservoir site includes swamp wetlands, seepages on cliffs and riverbanks, and what Mr Kessels defines as 'seepzones', which are probably also seepages, in toeslope habitats. The TER mapping defined 5.11 ha of wetland vegetation on terraces and in 'seepzones', but the mapping units do not cover seepages on cliffs, which are a prominent feature of the part of the project area that I visited, for example in the lower part of Dutch Creek. I appreciate that these seepages would be difficult to

map, due to their presence on steep topography, but they are a distinctive indigenous wetland type in the proposed reservoir site and would qualify under National Priority 2. I note that the TER maps only a single swamp wetland. I observed indigenous swamp vegetation on a terrace on conservation land on the north bank of the Makaroro River [Doc exchange land] within the proposed reservoir, but this vegetation has not been mapped, possibly because it is difficult to distinguish from surrounding vegetation in aerial imagery. None-the-less, it is apparent that there will be more than 5.11 ha of indigenous wetlands affected by the proposed reservoir.'

Threatened species

Forest & Bird. The fourth National Priority is protection of habitats of threatened and declining species. The Conservation Land supports North Island long tail bat (including maternity roosts), North Island fernbird, NZ falcon and red mistletoe (not all of these are identified in the Technical Advisor's File Note). The Smedley land is not known to support any threatened or at risk species. The potential for the Smedley land to support threatened species in future is highly uncertain.

The importance of the Conservation Land as long tail bat roosting and foraging habitat is a highly relevant aspect of its value that ought to be considered. The Smedley Block is not known to be bat habitat. The Conservation Land has been undervalued due to its value as bat habitat having been disregarded.

Te Taiao Environment Forum: The TER survey indicates that threatened species (e.g. NZ falcon, long tailed bat, North Island fernbird, red mistletoe, indigenous fish species [refer to Young et al. for fishes]) have habitats within the conservation land proposed for exchange. In contrast, There are no recorded red mistletoe plants within the Smedley Exchange block and no recent, specific recordings of NZ falcon or North Island fernbird, even though calls for fernbirds were elicited during Smedley Block bird surveys, and all bird sightings were recorded (SEB survey).

The exchange of a maternal long-tailed bat roost close to the river on the conservation land, for uncertain bat mitigation proposals on the Smedley Block, is not equivalent as it exchanges certain loss of an important habitat for indigenous fauna for very uncertain gain.

Exclusion of recordings - Fernbirds (more than 1 bird) and pair of NZ falcons and frequent long-tailed bat activity were recorded within the Dutch Creek tributary (refer to TER) and will be frequenting the Doc Exchange land. Therefore Doc land exchange should be recognized as important habitat of these Acutely and Chronically Threatened species.

Smedley Exchange Land not identified as an RAP

Forest & Bird: ..if the Smedley land were considered to be a desirable addition to the conservation estate, it would have been identified as a Recommended Area for Protection. PNAP surveys have identified RAPs in the area (Smedley Bluffs, Mangaoho 1 &2) but did not identify the Smedley land as a RAP.

Comparison of aquatic freshwater conservation values between existing conservation land and private land proposed for exchange

(Report to assist with the assessment of proposed land exchange between Ruahine Forest Park revocation land and proposed Smedley Exchange Block in relation to Ruataniwha Water Storage Scheme)

P. Gerbeaux

Technical Advisor

May 2015

1. Background

The Hawke's Bay Regional Investment Company Limited, a regional council owned entity, requires approximately 22 hectares of Ruahine Forest Park for the proposed Ruataniwha Water Storage Scheme [RWSS] (located in Central Hawke's Bay near Wakarara), and proposes to exchange this land (Land Revocation Site – LRS) for 146.87 hectares of land containing 122.2 ha of indigenous vegetation, known as the Smedley Exchange Block (SEB).

Figure 1 shows the area to be inundated and Figure 2 shows the blocks of land under scrutiny for the exchange.

I was provided with five documents: two reports describing ecological values of 1) DOC managed land, and 2) Smedley Exchange Block (Kessels Ecology 2013a and 2013b); an internal report "Assyst R56997: Proposed land swap at Ruataniwha Dam: Comments on proposal (La Cock, November 2014); the submission to the Minister of Conservation "Revocation of specially protected status to enable a land exchange decision, and associated actions" (Bishop, December 2014). I also had access to a Cawthron report on the aquatic ecology assessment of effects of the Ruataniwha Water Storage Scheme (Younget al. 2013); this report is not specifically targeted at the land managed by DOC or the SEB.

A site visit was organised over 13-15 April 2015. Allan Lee, Graeme La Cock, Jessica Scrimgeour and Geoff Rogers (DOC) took part in the visit. It should be noted here that my main brief was related to the value of wetlands present on both blocks. I will however comment on stream values where appropriate.



Figure 1: Area to be inundated by the proposed Ruataniwha Water Storage Scheme

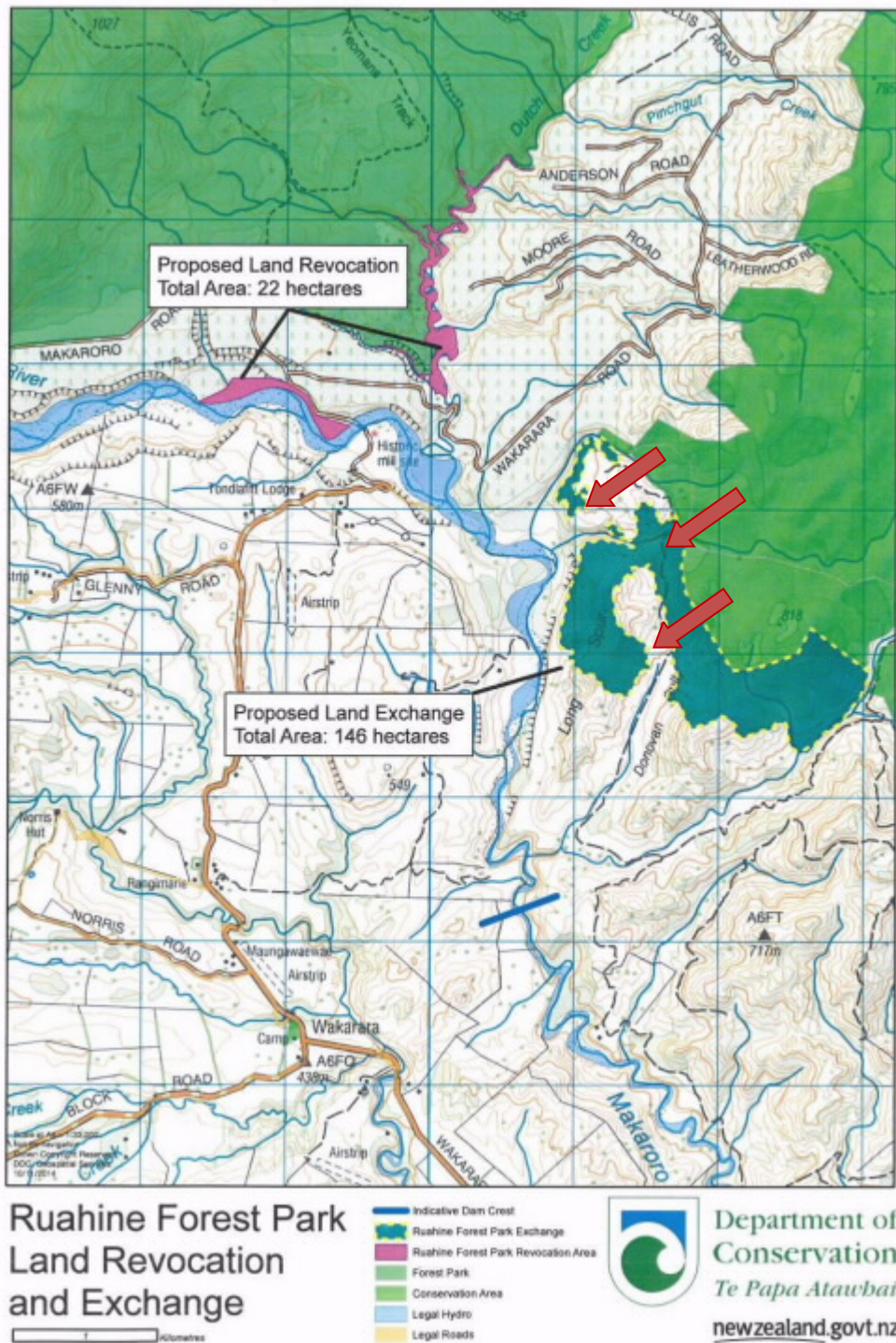


Figure 2: Areas proposed for revocation and exchange (red arrows indicate where seepage wetlands were observed – referred to as top, middle and bottom arrows in the text below. The bottom arrow points to wetlands in Donovan Gully that occur outside the Smedley Exchange Block)

2. Overview of Freshwater and wetland sites at the two sites

Three per cent of wetland (0.29ha – indigenous dominated floodplain swamp vegetation) and braided riverbed habitat (0.42ha) are reported to be present in the total area of land managed by the Department- Dutch Creek and Makaroro River - that would be affected by the proposed Ruataniwha water storage scheme (Kessels Ecology 2013a; Bishop 2014).



Figure 3: Oxbow wetland attached to Dutch Creek



Figure 4: Aerial views of oxbow wetland

Four first order streams run through the SEB, although none as large as Dutch Creek – a second order stream (or Makaroro River) – no braided river habitat is present in the block. The lower reaches of these streams would become inundated by the filling of the reservoir (Kessels Ecology 2013b). The block however contains a 0.49ha wetland (top arrow on figure 2) of which a portion contains indigenous dominated vegetation (podocarp-broadleaf-small-leaved shrubland/seep zone). Most of the exotic vegetation (blackberry, pasture grasses and herbs) are around the margins of the areas.



Figure 5: Unnamed creek in the SEB (near middle arrow on figure 2)



Figure 6: Seepage wetland in the SEB

3. Overall Assessment of wetlands in Hawke’s Bay using FENZ/WONI

Any wetland assessment of significance needs to be done in the context of the regional and the relevant ecological scale.

It is worth noting that Hawkes Bay (as a freshwater biogeographic unit(BU)– see Ausseil et al. 2008) has lost most its original wetland cover (see Table 1 below).

Table 1: Proportion of wetlands (total) and wetland classes remaining in the Hawkes Bay BU (historical extent (ha) in brackets)

| | Total | Pakihi | Bog | Swamp | Marsh | Fen | Seepage | Inland saline |
|------------|---------------|--------|-----|---------------|--------------|---------------|--------------|---------------|
| Hawkes Bay | 3% (33902) | | | 2% (27457) | 4% (3714) | 15% (2715) | 100% (15) | |

A comparison with the other biogeographic units around New Zealand shows us (Figure 7 and Table 2) that the extent of most types is severely reduced in Hawkes Bay. Many wetlands in New Zealand, including in Hawkes Bay, have often disappeared through an insidious nibbling away process, giving way cumulatively to large losses of extent.

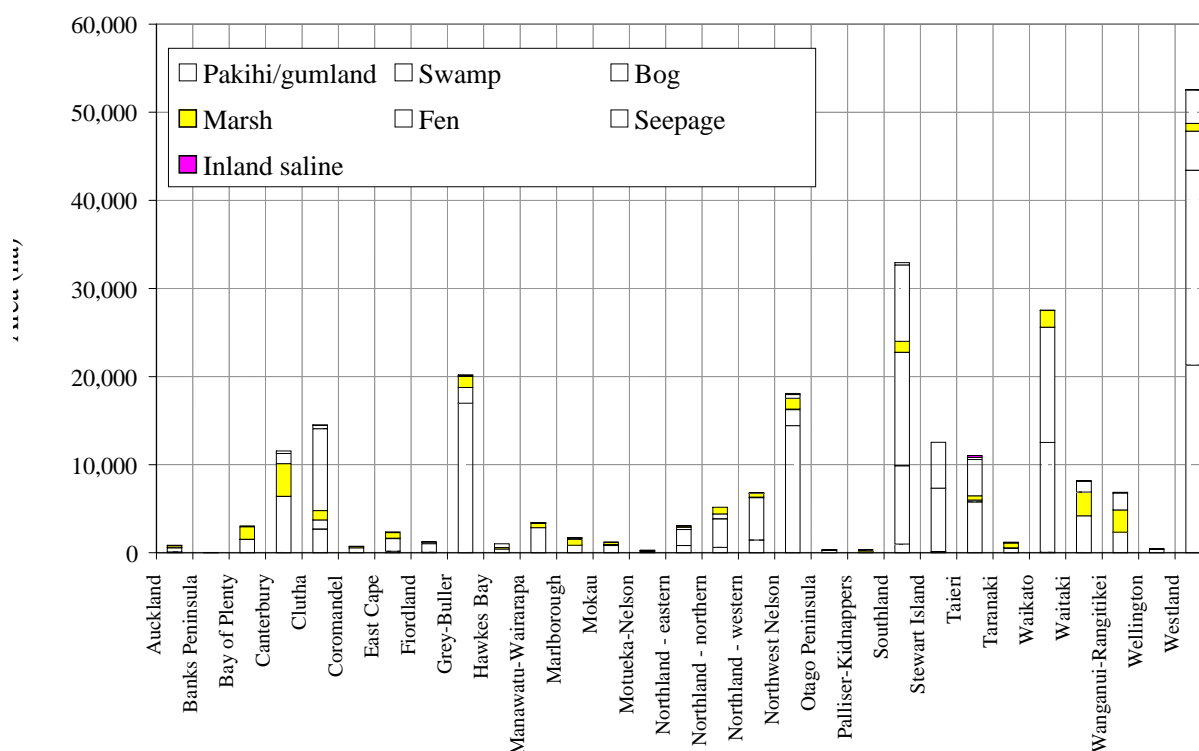


Figure 7: Distribution of wetland classes in each Freshwater Biogeographic Unit

(N.B. the seepages are poorly mapped in FENZ due to their small size and pasture-looking characteristics; the numbers associated to the extent of seepages cannot therefore be relied upon for that class of wetland)

Table 2: Proportion of wetland classes remaining in all biogeographic units (the historical extent is in brackets)

| | Total | Pakihi/ gumland | bog | swamp | marsh | fen | seepage | Inland saline |
|----------------------|-----------------|--------------------|----------------|-----------------|----------------|-----------------|---------------|------------------|
| Auckland | 3% (30381) | 2% (4393) | 4% (1141) | 2% (20815) | 13% (1541) | 0.2% (2478) | 100% (12) | |
| Banks Peninsula | 10% (356) | | | 3% (297) | 51% (47) | | 12% (12) | |
| Bay of Plenty | 10% (29136) | 0% (513) | 3% (888) | 7% (21569) | 47% (2981) | 1% (3184) | | |
| Canterbury | 7% (164869) | | | 4% (150249) | 31% (12068) | 49% (2366) | 100% (186) | |
| Clutha | 25% (58803) | | 47% (2191) | 12% (23202) | 16% (6635) | 38% (24612) | 34% (1136) | 7% (1027) |
| Coromandel | 3% (25984) | | 0% (108) | 2% (24507) | 52% (236) | 3% (1128) | 42% (5) | |
| East Cape | 2% (97033) | 41% (388) | 22% (233) | 2% (62879) | 2% (32036) | 0.4% (1443) | 97% (54) | |
| Fiordland | 4% (28704) | 0% (24587) | 0% (40) | 100% (653) | | 5% (3405) | 100% (19) | |
| Grey–Buller | 20% (102379) | 21% (82521) | 1% (437) | 18% (10076) | 13% (9321) | 100% (0) | 100% (24) | |
| Hawkes Bay | 3% (33902) | | | 2% (27457) | 4% (3714) | 15% (2715) | 100% (15) | |
| Manawatu–Wairarapa | 1% (254257) | | 0.3% (1266) | 1% (230068) | 2% (21631) | 1% (1290) | 100% (2) | |
| Marlborough | 12% (14756) | | | 8% (11028) | 38% (1755) | 5% (1863) | 91% (109) | |
| Mokau | 5% (23638) | | 13% (715) | 5% (17411) | 5% (5126) | 2% (371) | 100% (15) | |
| Motueka-Nelson | 5% (5802) | | | 2% (5379) | 26% (382) | | 52% (41) | |
| Northland – eastern | 4% (79457) | 3% (25812) | 3% (6432) | 5% (34596) | 2% (10296) | 1% (2320) | | |
| Northland - northern | 18% (27973) | 5% (12529) | 8% (7705) | 47% (6809) | 100% (451) | 1% (479) | | |
| Northland – western | 4% (179120) | 5% (31175) | 2% (3080) | 4% (121376) | 2% (18341) | 0.3% (5141) | 100% (7) | |
| Northwest Nelson | 27% (66461) | 35% (41349) | 4% (1960) | 15% (11702) | 11% (11336) | 100% (54) | 100% (61) | |
| Otago Peninsula | 35% (930) | | | 31% (925) | | | 74% (5) | |
| Palliser-Kidnappers | 0.4% (74009) | | | 0.3% (59544) | 1% (14156) | 0% (306) | 100% (4) | |
| Southland | 8% (415785) | 17% (5927) | 36% (36209) | 4% (250924) | 3% (36058) | 10% (86264) | 67% (404) | |
| Stewart Island | 100% (12552) | | 100% (7173) | 100% (140) | | 100% (5239) | | |
| Taieri | 30% (36828) | | 21% (1020) | 24% (23818) | 10% (4701) | 67% (6181) | 44% (548) | 39% (559) |
| Taranaki | 5% (23117) | | 100% (82) | 2% (20166) | 29% (1868) | 8% (997) | 100% (4) | |
| Waikato | 9% (312011) | 3% (1321) | 19% (69799) | 7% (179957) | 5% (37811) | 0.2% (23123) | | |
| Waitaki | 35% | | | 27% | 50% | 51% | 22% | |

| | | | | | | |
|------------|----------|----------|---------|---------|---------|--------|
| | (23416) | | (15275) | (5441) | (2406) | (293) |
| Wanganui- | 5% | 0% | 2% | 9% | 45% | 100% |
| Rangitikei | (127233) | (442) | (94548) | (27930) | (4283) | (30) |
| Wellington | 8% | | 16% | 86% | 0.3% | |
| | (5834) | | (2437) | (58) | (3340) | |
| Westland | 24% | 20% | 37% | 31% | 6% | 54% |
| | (215164) | (108767) | (12162) | (72398) | (14784) | (7051) |
| | | | | | | 100% |
| | | | | | | (2) |

4. Assessment of significance in the context of the above FENZ/WONI information, the recommended criteria for assessing significance under section 6c of the Resource Management Act, and various other policy recommendations.

Due to the low extent of wetland remaining in the Hawkes Bay Biogeographic Unit, all wetlands should be considered significant under section 6c of the Resource Management Act. I have attached in Appendix A the list of criteria for assessing wetland significance that was agreed on for the West Coast region through RMA caselaw (see Maseyk and Gerbeaux 2015). The table highlights that any type with less than 30% of the original extent remaining will indeed trigger the 'rarity' criterion (20% is more commonly adopted as a threshold for the rest of New Zealand).

The oxbow is immediately adjacent to Dutch Creek and includes two wetlands of riverine origin: one is totally filled in with vegetation, while the other one still retains open water areas – see figures 3 and 4; they are separated in the middle of the oxbow by a 2-3m high mound. Besides the 'rarity' aspect that would apply to any wetland in Hawkes Bay as mentioned above, those wetlands (on the revocation block) would also trigger significance for 'representativeness' (dominated by a typical indigenous dominated floodplain swamp vegetation - native sedges), 'ecological context' (well connected to surrounding vegetation and habitats including the creek and its riparian margins), 'rarity' related to species (two fernbirds were recorded from the area on the day of the visit) and possibly 'distinctiveness' – as a likely oxbow wetland type (this was confirmed from the site inspection by the presence of a mound in the centre of the oxbow – the aerial photos on Figure 4 tend to confirm this as well).

The realignment of the creek may be the result of historic logging operations around the area or possibly a consequence of severe earthquakes).

Of the four National Priorities for Protecting Rare and Threatened Biodiversity on Private Land (MfE and DOC, 2007) – which are widely used as national assessment criteria for ecological values, the second national priority is wetlands. The presence of wetlands on the SEB would therefore trigger Priority 2.

Only one wetland appears to have to be subjected to an assessment in the reports I have read. That wetland within the SEBis has been classed as a seepage (a treeland with podocarps (e.g. kahikatea and rimu), lacebark, manuka, cabbage tree linked to a seep zone with remnant sedges, fern species, blackberry, pasture grasses and herbs) and would trigger in my view the 'representativeness' (dominance of indigenous vegetation) and the 'rarity' criteria (acknowledging that FENZ does not identify seepages remaining as less than 20% than the former area – due to the mapping difficulties reported on above).



Figure 8: The ridge on the top right of this photo may have been connected to the mound in the middle of the oxbow and subsequently naturally or artificially opened, thus redirecting the creek

I have not walked the entire block, but I note that, at least in the area visited, other wetlands (seepages) are present within or nearby the land offered for exchange (see middle and bottom arrows on figure 2) – especially on toeslopes and in gullies. While those seepages may not always be dominated by indigenous vegetation, most are effectively headwaters/springs that in my view are significant (especially under ‘ecological context’ and –where dominated by indigenous vegetation- under ‘representativeness’).

Those seepages seem to have been overlooked in the Kessels Ecology (2013b) report (they are not recorded on the maps in figures 1 and 14). Those areas should in my view be identified, added to maps, and included as suitable under the proposed land exchange. Approximately half of the wetlands in Donovan gully occur outside the proposed exchange land.

A number of those are found in and along both sides of the upper parts of Donovan Gully (in the middle part of the land proposed for exchange – within a large white polygon on Figure 15 of Kessels Ecology (2013b); the area does include broadleaf-small leaved shrubland of high significant value).

I am unclear why the pastoral land (including the upper part of Donovan Gully) within the largest southern area proposed for exchange is currently excluded from the land on offer. If no grazing is envisaged for that area it would make sense from an ecological perspective to ‘fill that gap’ and include it in the proposed exchange.

I note that those headwaters located in Donovan Gully will run directly into the proposed reservoir and protecting those wetlands from stock/sheep grazing (via covenanting and fencing) would be desirable from a water quality management perspective and this could be further explored.

A few photos of a seepage wetland (middle arrow on Figure 2 – this area may be included in the proposed area for exchange but does not seem to be identified as seepage) and of Donovan Gully are included on Figure 9 and 10 respectively.



Figure 9: Unnamed gully (middle arrow on Figure 2) dominated by native sedges

5. Comparison of values between the two blocks and conclusions

Stream and braided habitats

This was not part of my brief and I will therefore only comment briefly. I am not aware of any braided habitat in the SEB (0.42ha of braided riverbed are present in the Ruahine Forest Park revocation land). Streams present within the SEB are first order streams of lesser value than those currently running through the DOC land offered for exchange. Due to the presence of grazing, the riparian margins of those streams are also of lesser integrity and significance, contributing in some places to degradation of habitat quality (sedimentation was observed along a number of reaches). I understand that freshwater species values are being assessed separately, but based on my experience and due to the smaller habitat size; they are likely to be also of lesser importance.

Wetlands

0.29ha of wetland has been recorded from the Land Revocation Sites - (Dutch Creek and Makaroro River). The wetland area present in the LRS is clearly dominated by indigenous species and is of a riverine type. The area triggers all primary criteria relevant to significance assessment methodology (representativeness, rarity, distinctiveness and ecological context). A few *Carex* sedgeland belonging to the Dutch Creek floodplain were observed on the way up to the wetland. Although restricted in extent they would possibly qualify as wetlands.

0.49ha of wetland (Figure 6) has been assessed and proposed for inclusion in the SEB. The size of that seepage is larger than the size of the wetland on the LRS. It is of a different type (palustrine – instead of riverine). It nevertheless retains a high degree of indigenous character, even if of lesser intactness. It triggers two of the significance criteria used in significance assessment methodology (representativeness and ecological context).

However, other seepages and similar headwater wetlands of significance have been observed during the site visit. They would all trigger in my view the ‘ecological context’ criterion and would certainly be significant under the second National Priority for Protecting Rare and Threatened Biodiversity on Private Land (MfE and DOC, 2007). Some, or some sections of them, would also trigger the ‘representativeness’ criterion due to the dominance of native species, some (e.g. *Schoenus fluitans*, *Isolepis crassiuscula*) specific to the Ruahine District adding possible ‘distinctiveness’. A number of wetland species were common to both the LRS and the SEB (e.g. *Carex secta*, *Carex virgata*, *Eleocharis acuta* and a number of *Coprosma* species). A number of bryophytes have also been recorded from both areas, adding to their biodiversity values.

Finally, although outside the SEB, we also visited another wetland (see photos in Appendix B) within the forestry plantation owned by Pan Pac Ltd. Independently from the land exchange. This wetland was relatively large (a few hectares) and included several palustrine types of wetland including seepage (apparent spring areas), and fens. The vegetation was dominated by indigenous plants (*Baumea/Machaerina* spp. sedgeland for the fen part; *Carex* sedgeland for the seepage areas). It is recommended that the owners are approached to highlight the significance of that wetland, with a view to discuss future options for the area, including covenanting. This wetland was not captured in the FENZ national layer.

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Figure 10 : Gully and toeslope seepage wetlands in Donovan Gully

Appendix A: Criteria for assessing wetland significance as upheld by the Environment Court for the West Coast Land and Water Plan

| | 1. Representative Wetlands | 2. Rarity | 3. Distinctiveness | 4. Ecological Context |
|--|---|--|---|---|
| <p>West Coast Land and Water Plan (Schedule 3: Ecological Criteria for Significant Wetlands</p> <p>A wetland is ecologically significant if it meets one or more of the following criteria:</p> | <p>A wetland that contains indigenous wetland vegetation types or indigenous fauna assemblages that were typical for, and has the attributes of, the relevant class of wetland as it would have existed circa 1840.</p> | <p>(A) Nationally threatened species are present; or</p> <p>(B) Nationally at risk species or uncommon communities or habitats are present and either:</p> <p style="padding-left: 20px;">The population at this site provides an important contribution to the national population and its distribution;</p> <p style="padding-left: 20px;">There are a number of at risk species present; or</p> <p style="padding-left: 20px;">The wetland provides an important contribution to the national distribution and extent of uncommon communities or habitats; or</p> <p>(C) Regionally uncommon species are present; or</p> <p>(D) The wetland is a member of a wetland class that is now less than 30% of its original extent as assessed at the ecological district and the freshwater bio-geographic unit scales; or</p> <p>(e) Excluding pakihi, it contains lake margins, cushion bogs, ephemeral wetlands, damp sand plains, dune slacks, string mires, tarns, seepages and flushes or snow banks which are wetland classes or forms identified as historically rare by Williams et al (2007).</p> | <p>The wetland has special ecological features of importance at the international, national, freshwater bio-geographic unit or ecological district scale including:</p> <p>(A) Intact ecological sequences such as estuarine wetland systems adjoining tall forest; or</p> <p>(B) An unusual characteristic (for example an unusual combination of species, wetland classes, wetland structural forms, or wetland landforms); or</p> <p>(C) It contains species dependent on the presence of that wetland and at their distribution limit or beyond known limits.</p> | <p>The wetland has one or more of the following functions or attributes:</p> <p>(A) It plays an important role in protecting adjacent ecological values, including adjacent and downstream ecological and hydrological processes, indigenous vegetation, habitats or species populations; or</p> <p>(B) Is an important habitat for critical life history stages of indigenous fauna including breeding/spawning, roosting, nesting, resting, feeding, moulting, refugia, or migration staging points (as used seasonally, temporarily or permanently); or</p> <p>(C) It makes an important contribution to ecological networks (such as connectivity and corridors for movement of indigenous fauna); or</p> <p>(D) It makes an important contribution to the ecological functions and processes within the wetland.</p> |

(See Maseyk and Gerbeaux 2015)

APPENDIX B; Wetland within the Pan Pac Forestry Plantation included in the visit



Figure 11: Raupo reedland seepage and *Baumea/Machaerina* sedgeland/Manuka shrubland fen

Appendix 4

Assessment of fauna values in a proposed land exchange in Hawkes Bay

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Introduction

The Hawke's Bay Regional Investment Company has applied to exchange 146 ha of private land (Smedleys), for 22 ha of the Ruahine Forest Park, which it needs for the proposed Ruataniwha Water Storage Scheme. Ecological assessments of both sites were made by Kessels & Associates in 2013.

The purpose of this document is to describe the site visit undertaken by Department of Conservation (DOC) staff including myself in April 2015, and specifically report on the potential bird, bat and lizard values of a proposed land exchange in Hawkes Bay. Please note that this report does not assess the impact of the proposed Ruataniwha dam on the wider landscape.

Methods

Four DOC staff and a DOC honorary research associate visited the sites on the 14th and 15th of April 2015. The first day was spent looking at the 22 hectares of conservation park which involves a fringe area (14 ha) of the Ruahine Forest Park where it lies alongside Dutch Creek and a separate block (8 ha) located between the Makaroro River and pine plantations.

The following day was spent at the proposed Smedley Exchange Block, and although we were not able to walk through the entire block, we got an overview of the site from high points where possible.

From a terrestrial fauna perspective, this was not considered a site assessment. A similar effort to that undertaken by Kessels & Associates would be required to have confidence in what values both sites provided for different species. This has in part been obtained by the reports provided by Kessels Ecology, although the level of effort for the Smedley Block was less. Therefore during this visit a 'snapshot' was obtained of what fauna were identified on site and the habitat suitability of each site for threatened, rare or other species was noted. Considerations of what values the sites presented included thinking about size of the area, connectivity, available habitat, future potential and impact of loss of that habitat on resident fauna.

Observations

Birds

Both sites had similar composition of native birds heard, which included predominantly common forest birds. They were kereru (*Hemiphaga novaeseelandiae*), bellbirds (*Anthornis melanura*), grey warbler (*Gerygone igata*), silvereye (*Zosterops lateralis*), tomtits (*Petroica macrocephala*) and harriers (*Circus approximans*). Fernbirds (*Bowdleria punctata vealeae*) were recorded in the small wetland in Dutch Creek, but were not heard at Smedleys.

Based on Kessels and Associates Ltd reports, birds that are known to be present at both sites but not recorded in this visit are tui (*Prosthemadera novaeseelandiae*), kingfisher (*Halcyon sancta*) and whitehead (*Mohoua albicilla*).

Of note is the pair of NZ bush falcon (*Falco novaeseelandiae*; Threatened - Nationally Vulnerable) recorded nearby along the Makaroro River. These are birds that have large home ranges and would find suitable habitat at both sites.

NZ pipit (*Anthus novaeseelandiae*; At Risk - Declining) was also noted in the braided river of the Makaroro River, but not recorded in this visit. They may be present along the river at the 8ha Conservation Park Block (similar habitat to where they were noted), and as their habitat preferences extend to open pasture/woodland they may also be present at Smedleys.

Bats

Long-tailed bats (*Chalinolobus tuberculatus*) were found throughout the landscape by Kessels and Associates. There were two recorders placed along Dutch Creek in November 2011, that recorded 2.6 and 3.7 passes/night along Dutch Creek. When compared to a site further along the Makaroro River that recorded closer to 65 calls/night, it did suggest that for that recording period bats were probably not utilising Dutch Creek for roosting. However, the habitat appeared suitable for bat roosts (i.e. large mature beech trees) and bats may well use that habitat at other times.

Two recorders were placed on the margin of the Smedley Exchange Block, and recorded within the same timeframe as Dutch Creek 2.7 and 12.8 passes/night. Similarly to the Conservation Park, there were large mature beech and some podocarp trees available for roosting opportunities. Therefore both sites appeared suitable for long-tailed bat activity/foraging, but neither site had been shown to conclusively be used as roosting sites during the timeframe of monitoring. More work would be required to more clearly understand bat use of both blocks, although to me both blocks had the potential to support bat colonies.

Lizards

Of the 11 lizard species that have been recorded in Hawkes Bay, only northern grass (common) skink (*Oligosoma polychroma*), common gecko (*Woodworthia maculatus*), Wellington green gecko (*Naultinus elegans punctatus*) and forest gecko (*Mokopirirakau granulatus*) would be expected to be found in this area. Kessels Ecology undertook diurnal searches of the public conservation land, and found no lizards. This does not mean that they are not present, but it does indicate that they are not present in large numbers. Note that effective monitoring techniques for green gecko are still in development.

Similarly, no lizards were found in the Smedley Exchange Block, although the search effort was confined to a 2-day visit which did not include active searching for lizards. I personally noted potential habitat for both skinks and geckos (scree slopes, rock outcrops, cracks etc. – see Figure 1), although none were seen at midday (which is not unexpected considering the heat of the day) and no lizard droppings were noted on the rock outcrops.

Again, without a significant search effort devoted to both sites it is difficult to tell whether they are present, but Smedley Exchange Block provided more obvious potential for lizard habitat (in terms of those that inhabit scree slopes and/or rock outcrops).

Discussion

Habitat opportunities

In terms of opportunities for providing suitable habitat for fauna species, both the public conservation land blocks and the Smedley Exchange Block appeared similar in the composition of fauna species that were present, or had the potential to be present.

The only notable exception was fernbirds, although neither I nor Kessels spent a lot of time searching for them at Smedleys. From the small portion of the Smedley block that I saw, there wasn't obvious suitable habitat, although Kessels noted otherwise. The potential for fernbirds to be present in potential wetland margins that could be created around the new dam was noted. This however remains an unknown and very dependent on the nature of the margins created by the proposed dam. I do note however that we detected fernbirds in a nearby wetland in the PanPac forest relatively close to the oxbow wetland in Dutch Creek. This suggested to me that fernbirds may be present throughout the area where suitable habitat is available. This is supported by the fact that only small numbers of birds were recorded at each site (i.e. not enough to be self-sustaining at that site), which means they have to be part of a larger population within the landscape where juveniles can disperse between sites.

The quality of habitat varied, both within the public conservation land blocks and compared to Smedley Exchange Block. With the two public conservation land blocks, the 8ha block along the Makaroro River was relatively degraded, with tracks, habitat clearance and weeds noted. However, the 14ha of conservation land along Dutch Creek appeared intact (excepting the logging that had occurred) and in good condition with no weeds noted. This site looked like it would support a range of species in a productive system.

The Smedley Block varied in habitat quality. Much of the land was cleared for pasture. Large beech and some podocarp trees were commonly present in clusters, but where grazing has been allowed to occur the understorey was degraded or in some cases non-existent. This may reduce the food availability for some species like kereru, tui and bellbirds, although they were noted as present. It was in the areas where grazing had been excluded that the potential for the site could be seen, and regeneration resulted in a dense understorey providing ample food, nesting and roosting opportunities. Currently the Smedley Block is more degraded in parts than the public conservation land, and similar in other areas where grazing is excluded. Therefore the potential for increased habitat for threatened species once grazing is excluded should be acknowledged.

For lizards specifically there appeared to be some promising habitat opportunities worth further investigation.

Size, shape, connectivity and impact of loss

For most fauna species the available habitat at a site needs to be taken in context of the landscape. The size of habitat is important as it will allow for self-sustaining populations to be supported in one place. If a site is not large enough, dispersal of juveniles becomes important to help sustain small numbers, which can become problematic since dispersal can be at risk from barriers such as isolation, land use change, geographic features etc. Therefore a large self-sustaining population in one place is more resilient than a number of small populations that relies on dispersal. Similarly most species benefit from a habitat shape that is more circular and has reduced edge effects compared to a long narrow shape.

The 8 ha of public conservation land next to the Makaroro River is unlikely to support a self-sustaining population of most species, and relies on the connection with the forestry land behind it and pockets of vegetation within the farmland to provide stepping stones with other populations. Therefore the loss of this bit of land is unlikely to impact significantly on those species present which are adapted to the modified landscape.

The remaining 14 ha of conservation land along Dutch Creek was in better condition, and probably provides a more productive system which could support more birds than along the river. In isolation this bit of land might have been significant within the landscape, but it is connected to 94,000 ha of the Ruahine Forest Park, and therefore the loss of this 14 ha is unlikely to significantly impact any terrestrial fauna populations.

The Smedley Block has a network of vegetation clusters that would act as stepping stones for smaller birds and probably bats. It neighbours the Gwavas Conservation Area and its addition to that area will connect the two sites, increasing the area under protection and therefore the size of the fauna populations inhabiting the area. This increases the resilience of populations when faced with a modified landscape which may inhibit dispersal for some species.

As an aside, the shape of the Smedley Exchange Block introduces edge effects due to an increased boundary exposed to sun, wind and other elements. It is recommended that the shape be revised to include the central area around Donovan's Gully.

Summary

Currently there appears to be no significant difference in habitat opportunities for fauna between public conservation land and the Smedley Block. Both sites had generalist species present, except for fernbirds which were not found on the Smedley Block. It has been noted that the Smedley Block will be on the edge of the proposed dam, which may provide further habitat opportunities for fernbirds. Whether this will naturally happen remains an unknown.

The 14 ha of public conservation land along Dutch Creek is in better condition than the small portion of the Smedley Block that we explored, other than the fenced 4.4 ha of black beech forest, and in its current state has the potential to support more productive populations. It is however connected to a further 94 000 ha of the Ruahine Forest Park, and the loss of 14 ha is unlikely to impact native fauna significantly. The Smedley Block is in a degraded state at present, with vegetation (including large beech and podocarp trees) present in clusters, but it is much larger than Dutch Creek, and has habitat suitable for lizards that is not present in Dutch Creek. Exclusion of grazing is likely to allow for regeneration to occur which will be able to support more birds, bats and lizards. It also links in with the Gwavas Conservation Area, adding to the size and therefore the available habitat of that protected bit of forest.

Therefore the proposed exchange of the 146 ha Smedley Block for the 22 ha of Ruahine Forest Park would enhance the value of land managed by DOC. These benefits will be further enhanced should the current shape of the proposed exchange land be altered to minimize edge effects and once grazing is removed.

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