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Departmental Memo

Department of Conservation
Te Papa Atawhai

Ref: 20 – B – 0963

In Confidence

Date: 25 February 2021

To: Minister of Conservation

From: Jack Mace, Director Operations – Lower North Island

Subject: **Wainuiomata fenced sanctuary proposal – information to support site visit**

Executive summary – Whakarāpopoto ā kaiwhakahaere

1. A proposal has been put forward to predator-proof fence the Greater Wellington Regional Council-managed Wainuiomata Water Catchment in Wainuiomata.
2. Jim Lynch (QSM) is spearheading the proposal. Jim was an original founder of Zealandia in Wellington. He has support from Greater Wellington Regional Council (GWRC) and Taranaki Whānui ki te Upoko o te Ika (Port Nicholson Block Settlement Trust Board (PNBST)).
3. Kākāpō breeding and recovery has been put forward as the key conservation opportunity based on the habitat available within the site. DOC and Ngāi Tahu representatives of the kākāpō team visited the site and initial assessments indicate it meets the criteria for kākāpō breeding.
4. GWRC has agreed to a feasibility study being undertaken.
5. We have been approached to co-fund the feasibility study and have agreed a contribution of 30k (total estimate $100k). Along with this we will support the drafting of the feasibility study with Jim Lynch. DOC has not been approached to fund construction of the project establishment (estimate $20 million).
6. DOC will continue providing expert support in relation to potential kākāpō and other species. However, we would need to undertake a thorough assessment of the project costs before an official position could be reached on whether, and how, DOC might be involved in funding.
7. In the proposal, DOC are listed as providers of Operating Revenue, up to $300k a year, from year 4, and ongoing.
8. We are currently undertaking an internal assessment to determine the strategic alignment and potential conservation benefits, in order to establish a position on whether or not we could, or would, provide ongoing operating revenue.

Purpose – Te aronga

9. This memo provides background on the site and proposal; identifies the key players; outlines DOC's involvement to date and recommends next steps.

Background and context – Te horopaki

10. The Wainuiomata Water Catchment has an area of around 3400 ha and is contiguous with the Remutaka Forest Park (20,000 ha), which is managed by DOC. GWRC manages the Catchment as part of Wellington's water supply infrastructure and the public has limited access to a small portion for recreational purposes. GWRC's investment at site is significant, including control of ungulates, mustelids, rats and possums to low levels across the Catchment.
11. The Catchment's habitat consists of unmodified rimu/rata/beech forest and is one of the best examples of lowland podocarp forest in the lower North Island. The proposal is to enclose the Catchment with a predator-proof fence (see Attachments A and B).
12. The site supports a full range of more common native species and it is proposed to reintroduce rarer species such as hihi, rowi kiwi and kākāpō once the fence is built. Based on discussions with the kākāpō team and subsequent media articles, kākāpō are being promoted as the centrepiece due to the favourability of the habitat at site.

Kākāpō recovery

13. There are currently 208 kākāpō, based on predator free, offshore islands and the species urgently requires more breeding habitat. DOC and Ngāi Tahu's shared vision is to restore the mauri of the kākāpō. Returning birds to large areas of their former natural range is of highest priority. Rakiura and mainland Fiordland are preferred sites due to the whakapapa links of today's kākāpō population to these areas. Until these are ready for kākāpō, other sites are needed in order to grow the population and fulfil this shared vision. Given this need, we are also pursuing other potential new breeding sites at Maungatautari, Coal Island and Five Fingers Peninsula, Resolution Island.
14. Based on an initial site visit and information supplied, the Wainuiomata Catchment meets the criteria for a kākāpō breeding site in terms of size, habitat quality, lek display areas and, most importantly, the presence of large areas of rimu-dominant forest, which is essential for successful breeding. If the catchment had a suitable predator-proof fence that kept kākāpō contained, it may prove to be an excellent site for kākāpō breeding. Wainuiomata could house up to 150 kākāpō. Being on the mainland and close to a major city, it would offer easy, low-cost and low-carbon access for breeding management as well as excellent opportunities for kākāpō advocacy.
15. DOC and Ngāi Tahu recognise that potential breeding sites of the quality that Wainuiomata offers are extremely rare. However, suitability of the site for kākāpō can only be determined with certainty by moving birds to the location. It would take many years to truly establish the site's potential. Its suitability for kākāpō should be subject to ongoing assessment if the proposal progresses.

Key Parties

16. Jim Lynch is driving the project. He has experience in fenced sanctuaries and multi-stakeholder approaches. He has championed the project widely and brought the key parties on board.
17. GWRC manages Wainuiomata Water Catchment. Thomas Nash (Regional Councillor) has championed the project within Council and leads the working group established following unanimous support for the proposal by their Environment Committee. A report by BECA and Boffa Miskell has been produced on the proposed fence line route and potential species that could benefit from the sanctuary. GWRC has reviewed the project proposal and supports undertaking a feasibility study.
18. Taranaki Whānui ki te Upoko o te Ika are mana whenua. s.9(2)(a) [redacted] is the key contact for the iwi and is based at Waiwhetu Marae in Lower Hutt. PNBST's board has provided written support for the project based on the proposal that was prepared for them and the opportunities offered for the iwi.

19. Ngāi Tahu supports sharing the kaitiakitanga of their taonga species with other iwi, where this supports the long-term vision for kākāpō and other species within their takiwa.

20. You will be joined by DOC staff on this visit: Jacquelyn Shannon, Deputy Director-General Biodiversity; Brent Beaven, Programme Manager Predator Free 2050; Jack Mace, Director Operations Lower North Island, and Paul Jansen, Advisor.

Risk assessment – Aronga tūraru

21. GWRC manages the site and so Jim's focus has been building support with them and Taranaki Whānui. Our support to date has been provided through advice, specifically via the visit and feedback provided by the kākāpō team and our senior leadership, and through our commitment to support the feasibility study scope and cost.

22. We have not been formally approached for ongoing funding as yet, however we note the proposal does stipulate that DOC could be a source of ongoing operational funds, from years 4 and ongoing, up to $300k a year.

23. We have not established an official position on the proposal, however we are working toward doing so. This process will include an assessment of strategic alignment with our various work programmes.

24. Further, there are known financial risks with the build and ongoing management of large fenced sanctuaries.

25. All these factors would need to be considered before an official position could be reached.

Next steps and recommendations – Ngā tāwhaitanga

26. We propose to:

    a) acknowledge the proposal, the work to date and the general conservation benefit it would bring given the habitat is potentially suitable for a multitude of threatened species, including kākāpō;

    b) communicate that commitment for any further funding from DOC would be reliant on several strategic considerations, which have not yet been considered; and

    c) indicate that DOC are working on assessing the proposal to understand if we are able to lend additional support be it in principle, in kind or to a greater degree, in the near- mid- and long-term.

Attachments – Ngā tāpiritanga

- Attachment A: Wainuiomata short proposal, Jim Lynch

20-B-0963-Attachment A-Wainuiomata

- Attachment B: Wainuiomata full proposal, Jim Lynch

20-B-0963-Attachment B-Wainuiomata

Contact for queries: Mark Fitzpatrick, Director Terrestrial Science, mfitzpatrick@doc.govt.nz, s.9(2)(a) [redacted]

ENDS

Proposal to fence the Wainuiomata catchment and restore the Remutaka range

This paper is a summary of the full proposal and should be read in conjunction with that document. It can be obtained from the author; James Lynch QSM. s.9(2)(a) .

1. The Proposal

The proposal is to establish a secure pest-fenced eco-sanctuary in the Wainuiomata catchment (cost estimate $20 million) and maximise its biodiversity, social and economic potential over time.

The proposal has exceptionally high biodiversity value.

2. The Site

The Wainuiomata catchment is a 3,350-hectare valley complex on the outskirts of Wainuiomata township in Lower Hutt city. It is part of the Wellington water supply and consists of **unmodified rimu/rata forest**. It is the finest example of lowland/podocarp forest in the lower North Island. It is adjacent to the 5,000-hectare Orongorongo catchment and the 23,000-hectare Remutaka Forest Park. The valley has a uniquely efficient and readily fenced 31 km boundary of which 16 km has an existing deer fence. It is the same size as Little barrier Island. (see attached maps).

3. The Vision

The vision is to fully restore the biodiversity of the catchment within thirty years, to use it as the 'nursery' for the restoration of the wider Remutaka ecosystem and to create a world class enterprise which integrates biodiversity, social and economic goals. The benefits are as follows.

4. A Potential Kakapo Recovery Site.

The catchment is being assessed by DOC for its suitability as a mainland kakapo site. The site is uniquely suitable as it has abundant rimu and suitable habitat, is twice the size of Codfish Island and is close to a large and supportive population centre. The catchment could support up to 150 kakapo.

5. Benefits

This proposal will.

- Offer a large potential **safe mainland site** for two of NZ's most critically threatened species; **Kakapo** (potentially 150 birds) and **rowi kiwi** (potentially 500 to 1,000 birds) and other threatened species such as kokako, takahe, tuatara, saddleback, hihi, pateke and whio.
- Restore **resilient and viable populations** of all extant endemic species (including Kokako, kaka, pateke and kakariki) to the Remutaka range and provide a springboard to restore the entire southern Wellington and Wairarapa ecosystem.
- Align perfectly with **Predator Free NZ goals** as, when the new technologies emerge (30 years), the fenced area will provide a biodiversity rich 'hot spot' to accelerate species recovery. It will provide a viable large scale **'back-up' strategy,** using existing proven technology, in case Predator-Free is less than effective.
- Provide an accessible **large-scale experimental site** for emerging technologies in one of the best researched and understood forests in NZ.
- Provide excellent **value for money** invested and **long-term high value job creation** potential – estimated 20-30 jobs in the first two years growing to 30-50 permanent jobs within 15 years.
- Add **economic value** of $10-15 million p.a.to the local economy in the first 10 years rising to $30-$50 million pa. within 20 years.
- Provide a **multi-agency, landscape scale** (40,000 ha) operation which integrates all proven and emerging technology to restore the biodiversity of the Remutaka range.
- Provide unlimited opportunities for **social engagement,** including kakapo advocacy, memberships, volunteering and sponsorship, in a highly accessible peri-urban locality with an already highly engaged and supportive population.

- Provide a platform for many potential business opportunities and public good activities (Great walk, RV park, camping, education, research, guided tours, accommodation, business and private functions, etc), for the surrounding area. Wainuiomata is in need of such economic opportunities.
- Enhance water quality and aid **ecosystem service**s and climate change resilience (e.g. insurance against accelerating mega-masting).

6. Process

The vison would be achieved by following this long-term strategy:

Process	Time Frame
1. Establish a trust to manage the ecosanctuary and halo.	A CCO under GWRC auspices with iwi, DOC and Hutt CC as partners. Complete within six months of obtaining go-ahead.
2. Pest-proof fence the Wainuiomata catchment.	There is a practical 31 km route and fencing an area this size has been done before. It can be completed within 18 months and will cost $12.5 million
3. Eradicate all pests from the enclosed area.	This has been done at this scale before. It can be completed within 18 months after the fence is built and will cost $1.5 million. A surveillance programme will cost $300K p.a.
4. Restore missing species to the enclosed area.	Begin after eradication when funding obtained. This programme will cost $550K p.a. and will take thirty years to complete.
5. Establish a 'buffer zone' managed area around the sanctuary to take advantage of the 'halo' effect from the fenced area.	To be undertaken by Predator-Free NZ. Begin five years after eradication and continuous for twenty years plus.
6. Establish a continuous management regime across the whole Remutaka/East harbour ecosystem.	To be undertaken by DOC and GWRC. Begin ten years after eradication and continuous after that.
7. Develop membership, volunteer, visitor and education programmes.	Begin membership and volunteer programmes soon after trust formed. Begin visitor and education programmes after eradication. Expand over time to reach optimum and be largely self-funding after twenty years.
8. Establish long term business and funding streams.	Secure base five-year funding within one year. Secure other funding and add businesses over time to reach financial stability and be largely self-funding within twenty years.

7. Governance and management

The preferred governance structure is a Council Controlled charitable trust which involves partners such as DOC, Hutt City Council, Iwi, the community, and Predator-Free NZ.

8. Costs and phasing

Estimated establishment costs are approximately $20 million for the first five years.

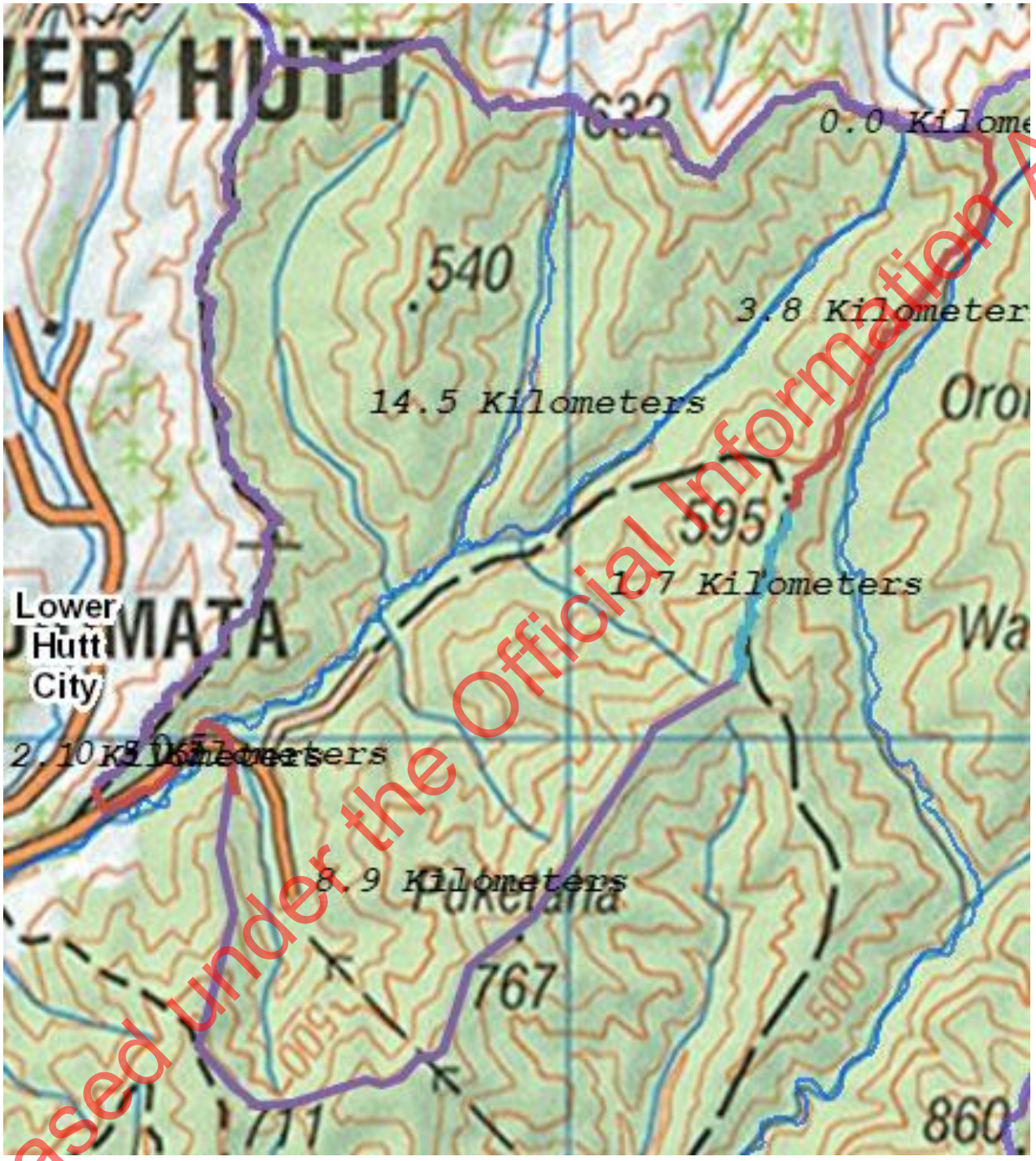
The venture can be undertaken in three phases.

Phase 1. **initiation**	Phase 2 **Restore & Develop**	Phase three. **Expand**
Time frame. Five years	Time frame. After 5 years	Time frame. After 10 years
Costs. Fence $12,500,000 Eradication $1,500,000 Operating. $170,000 first year growing to $500,000 pa. by five years.	**Costs** Staff facilities $1,000,000 Visitor centre $5,000,000 Operating. Growing from $500,000 at 5 years to $1,500,000 p.a. after ten years.	**Costs** 10,000 ha Buffer zone. $1,500,000 pa. Broadscale control over 35,000 ha. $1,500,000 pa.

The Wainuiomata catchment in relation to the surrounding localities and the Remutaka Range.

The Wainuiomata Catchment viewed in 3D from the south with proposed fence boundary.

Topographic map of te catchment with the proposed fence route marked.



Briefing Notes: Wainuiomata Fence Proposal

Current DOC TSU position

Based on team process completed so far, the recommendation is that DOC should support this proposal, if it is not dependent upon existing baseline funds for establishment or future funds for OPEX. This is for three key reasons. 1. It is not strategically aligned; 2. We do not fund any sanctuaries and to do so for this would compromise existing relations; and 3. dependency on Government funding is not a sustainable business model as it carries significant financial risk should government funding priorities shift in the future.

The Proposal

1. Jim Lynch has put forward a proposal (the proposal) to install a predator-proof fence in the Wainuiomata Water Catchment, managed by Greater Wellington Regional Council-managed (GWRC).
2. Jim Lynch (QSM) is an original founder of Zealandia in Wellington. He has support from GWRC and Taranaki Whānui ki te Upoko o te Ika (Port Nicholson Block Settlement Trust Board [PNBST]).
3. GWRC and DOC have funded a feasibility study on the proposal, which is currently being undertaken. In-kind support from a couple of consultancies has reduced the cost of the feasibility study to within the available funds provided by GWRC and DOC. Predator Free 2050 Ltd are exploring whether or they will contribute as well.

Benefits of the proposal to DOC

4. Assessments have indicated that the proposed predator proof fence would benefit many threatened bird species. Below we list three examples:
5. Kākāpō breeding and recovery has been proposed as the key conservation opportunity based on habitat within the site. DOC and Ngāi Tahu representatives on the kākāpō team visited the site and determined that it meets the criteria for kākāpō breeding. Approximately 100-150 kākāpō could be sustained within the site.
6. Rowi could also be translocated to the site, which would provide a critical stronghold as there are no other safe locations for rowi translocation.
7. Hihi could also benefit from the proposed predator proof fence at this site as it would provide the additional security required to ensure the species does not become extinct.

Potential Budget Bid

8. Jim is currently discussing a 2022 FY Budget Bid lead by DOC with colleagues. The estimated cost for the fence is $12-20 million and the cost to run the sanctuary is $300-600k pa. Some of these costs are already part of baseline funding within GWRC

(e.g., pest control). However, there remain funds (hundreds of thousands per year) to run the sanctuary that need to be raised.

Risks to DOC

9. 9(2)(g)(i) [redacted]. Some of the species that are being proposed to be translocated into this area are our most threatened and deeply endemic species. The public expects DOC to support programmes of work that provide new locations being established for threatened species.
10. Many sanctuaries around New Zealand request DOC provide them with funds. Funding this proposal and not others could become problematic and affect our relationships with some sanctuaries.
11. DOC will require pest species to be maintained at zero within the fenced area to ensure that vulnerable species that are translocated into the area are protected. If DOC is not involved in the project, or the funding to run the sanctuary runs out DOC will need to relocate all of the threatened species that require zero pest numbers.
12. DOC does not establish fence sanctuaries as part of our business as usual work programme. In fact, DOC provides a small amount of support to existing sanctuaries in the form of technical support and access to best practice information. Therefore, this proposal sits outside many of the prioritisation processes, and strategic direction, that exist to manage where funds are used in DOC. If DOC is required to put funds into this proposal, particularly the ongoing running of the sanctuary, it may be at the cost of higher priority work programmes. We do note, however, that sites for hihi and rowi could improve the threat status for thes two species and that this site enables more of the recovery group goals to be met.

The Site

13. The Wainuiomata Water Catchment is ~3,400 ha and is contiguous with the Remutaka Forest Park (20,000 ha), which is managed by DOC. GWRC manages the Catchment as part of Wellington's water supply infrastructure and the public has limited access to a small portion for recreational purposes. GWRC's investment at the site is significant (e.g., control of ungulates, mustelids, rats and possums to low levels across the catchment).
14. The catchment's habitat consists of unmodified rimu/rata/beech forest and is one of the best examples of lowland podocarp forest in the lower North Island.

Key Parties

15. Jim Lynch is leading the project. He has experience in fenced sanctuaries (establishing them and managing) and multi-stakeholder approaches. To date, he has championed the project widely and brought the key parties on board.

16. GWRC manages the Wainuiomata water catchment. Thomas Nash (Regional Councillor) has championed the project within Council and leads the working group established following unanimous support for the proposal by their Environment Committee. BECA and Boffa Miskell have produced a report on the proposed fence line route and potential species that could benefit from the sanctuary. GWRC has reviewed the project proposal and supports undertaking a feasibility study.
17. Taranaki Whānui ki te Upoko o te Ika are mana whenua. s.9(2)(a) is the key contact for the iwi and is based at Waiwhetu Marae in Lower Hutt. PNBST's board has provided written support for the project based on the proposal and the opportunities for the iwi.
18. Ngāi Tahu supports sharing kaitiakitanga of their taonga species with other iwi, where this uplifts their long term vision for kākāpō and other species within their takiwa.

Contact: Mark Fitzpatrick

Department of Conservation
Te Papa Atawhai

Our ref: DOC-6736693

To: Jim Lynch, Project Lead
Wayne O'Donnell, General Manager Catchment - Greater Wellington Regional Council

Cc: Angus Hulme-Muir, DOC Operations Manager Wellington;
Ricky Clarkson, Greater Wellington Regional Council
Kim Broad, Greater Wellington Regional Council
Owen Spearpoint, Greater Wellington Regional Council
Barrett Pistoll, Greater Wellington Regional Council

From: Lynn Adams, John Ewen, on behalf of the Hihi Recovery Group (HRG)

Date: 17 August 2021

Subject: Hihi Recovery Group site assessment: Translocation of hihi to the Wainuiomata water catchment

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Summary

Hihi experts agree the area is probably suitable for a hihi reintroduction and has the potential to hold a large population. The group were particularly interested in the size of the site given this is rarely available for hihi reintroductions. This assessment assumed a 3350ha area was protected by a fence that successfully excluded mammalian predators (except mice). The experts encourage the site development to progress and the Hihi Recovery Group will include it within our national adaptive management strategy when the fence and subsequent predator eradications have been done.

A fence is being proposed around 3350ha of the Wainuiomata water catchment to exclude mammalian pests except mice. Jim Lynch has sought advice from the Hihi Recovery Group on the suitability of the area for hihi reintroductions and then he and Greater Wellington staff hosted a visit during the 2021 Hihi Recovery Group meeting in Wellington. During this visit 12 hihi experts (those with experience in hihi translocation and/or management) investigated the habitat and were asked to formulate an opinion on the suitability of hihi reintroduction at the site. The group assumed that mammalian predators (except mice) could be successfully eradicated and excluded from the site in perpetuity.

The HRG think the site has good scope for a hihi population if a fence is built and the predators removed. We recommend that site managers reconnect with the Hihi Recovery Group once the fence and subsequent predator eradications are complete. The site would be re-assessed with these important milestones achieved and included within our national adaptive management strategy where it is likely to feature as a priority given its size and potential carrying capacity for the species.

Rationale for proposing rowi rather than kiwi pukupuku for Wainuiomata

The Kiwi Recovery Plan (2018-2028) sets the strategic direction for all kiwi species.

Context

Rowi

There are an estimated 650 birds, with a current threat status of 'Threatened – Nationally Vulnerable'.

Kiwi Recovery Plan:

- Goal 1.2 – to increase the number of viable populations of rowi and Haast tokoeka in the wild within their former range
- Objective 12.2 – to effectively manage rowi and Haast tokoeka *in situ*, except for the purposes of genetic rescue for unmanaged outlying populations

Although ONE has been pivotal in growing the population (as you have noted), the priority for the next 10 years is to grow rowi numbers through managing predators in the wild. If we want to be successful with the Kiwi Recovery Plan goal, we have to know what successful predator control looks like. Resources have therefore shifted from investing in ONE to developing predator control prescriptions. We don't yet know to what levels stoats have to be controlled to, that allow rowi numbers to increase. The upcoming ZIP programme will help us learn, and if rowi are brought to Capital Kiwi, there will be another opportunity to learn. Without the outcomes of these programmes at hand, the current assessment is that there is a greater need to find a secure site for rowi.

Note that the current small kōhanga site on Mana Island has not produced a significant return to the mainland population, and it is too early to judge the success of Blumine Island as a kōhanga site. So far, after 8 to 9 years, only 6 subadults have been returned to Okarito.

Kiwi pukupuku

There are now an estimated 2000 birds, with a current threat status of 'At risk – Recovering'.

Kiwi Recovery Plan:

- Goal 1.3 – to expand the current distribution of brown kiwi, great spotted kiwi/Roroa and little spotted kiwi/kiwi pukupuku into areas of their former range
- Action 1.9 – Test whether a population of kiwi pukupuku can be established without predator-exclusion fence in a predator-managed site on the mainland

The priority for the KRG is to look for opportunities to translocate kiwi pukupuku back to the mainland, preferably within Ngāi Tahu rohe where the Kapiti Island birds came from, and test the level of predator control required outside of a fenced site. We have been exploring this with a couple of sites. We recognise that closed populations on islands and in fenced sites reach the limit of their potential, and if we want a significant change in the kiwi pukupuku recovery programme, we need to be able to introduce them in to large (10,000ha+), predator-controlled areas. Kiwi pukupuku are currently secured at 11 different sites from Taranga Island in the north to Chalky Island in the south, with a couple more on the horizon.

We acknowledge the genetic challenges this species faces having passed through a narrow bottleneck when birds were introduced to Kapiti Island over 100 years ago. We agree with your point that if another large population of kiwi pukupuku was established, with a large number of founders and the ability to grow fast, then it would improve the chances of not losing what little

genetic diversity we have left. We currently have Brook Sanctuary (700ha) for which we hope to establish a 12th secure site with a significantly higher normal of founders compared to what we would aim for in other species.

Recommendation

Based on the current context, the Kiwi Recovery Group suggested rowi for Wainuiomata because:

- Rowi lived in the Wellington region within the last 750 years
- There are fewer rowi than kiwi pukupuku
- Their threat status is higher, and this site may help to improve their status
- They don't currently have any large sites where they are secure from predators (although acknowledge the trials being run with ZIP and potentially Capital Kiwi)
- Predator-free areas large enough to hold a viable population of rowi (each with territories of 50-100 ha) are very rare, whilst smaller sites appropriate for kiwi pukupuku (each with territories of 3-10 ha) are still available
- The priority for kiwi pukupuku is to find unfenced areas on the mainland, especially within Ngai Tahu rohe, that can suppress mustelids to the level required to allow kiwi pukupuku to grow in numbers, rather than another fenced site

We acknowledge that by the time the fence is actually in place and the site is predator-free and brown kiwi-free, the context may have changed through what we've learnt from upcoming experimental management programmes. We are open to re-assessing the preferred species at that time.

Department of Conservation
Te Papa Atawhai

File Ref: DOC-67897603

Date: 23 September 2021

To: Marie Long (DDG-Biodiversity)

From: Mark Fitzpatrick (Director, Biodiversity Group)

Subject: Recommendation and Acceptance of a DOC Position regarding the proposed Wainuiomata Sanctuary

Context

A proposal has been developed to build a fence around 3,400 ha of forest that is vested in the Greater Wellington Regional Council as part of the 8,000-hectare Wainuiomata/Orongorongo water collection area. The initial proposal states a dependency on the Department of Conservation to provide financial support through both the establishment and operating phases.

Previous Director-General (Lou Sanson) was invited by Greater Wellington Regional Council (GWRC) to conduct a site visit. During this site visit, the DG offered to provide $30,000, as well as in-kind support, toward the feasibility study for the proposal.

The previous DG assigned SPA to develop a DOC position on the proposal, as well as engage in the feasibility study, to the previous DDG-Biodiversity (Jacquelyn Shannon). Jacquelyn assigned this to TSU Director (Mark Fitzpatrick) who has attended ongoing monthly governance meetings. The Terrestrial Science Unit has also completed a report assessing the proposal and providing a recommendation for the DOC Position, to the DDG-Biodiversity.

GWRC have been positioning the responsibility for driving the proposal as sitting with DOC, including engagement with Minister Shaw, Minister Allan and Minister Robertson, as well as through verbal statements in public meetings. We understand they are seeking a budget bid, led by DOC, to be included in the upcoming government budget round. Most recently (20 September, 2021), the chair of GWRC (Daran Ponter) wrote to Minister Allan and Minister Robertson a letter providing an update on the feasibility study stating it *"…may be used for pre-Budget planning processes*". The following table outlines the costs stated in the letter. The letter also states Minister Allan is conducting a site visit in the coming few weeks, along with an invite for Minister Robertson to visit for a second time.

Total project cost

Year	1	2	3	4	5	6	7	8	9	10	Total
Capex ($m)	0.5	6.75	9.75	7.75	5.0						$29.75
Opex ($m)	0.5	0.5	0.5	0.5	0.5	2.5	3.0	3.0	3.0	3.0	$17.0

It is important the Department now establishes a final position on the proposal and communicates this position to the relevant parties including the Minister of Conservation, GWRC and the members of the Feasibility Study Governance Group which includes Mana Whenua.

Recommendation and Overview of Findings

Appendix 1 of this Memo provides an assessment of the benefits to biodiversity. It does not include any sort of assessment on the economic benefits of the proposal, nor the benefits of this site over others, when considering DOC's carbon neutrality goal[1].

Based on information gathered and assessed, we recommend the DDG Biodiversity accept and maintain the following as the DOC position regarding this proposal:

DOC should support this proposal, but with the following three limitations and conditions:

1. **An independent entity being established that 'owns' the proposed sanctuary and its operation in partnership with mana whenua and GWRC.**
2. **Agreement that DOC's involvement would only extend to the provision of in-kind support.**
3. **Agreement that no further funds would be required from DOC for the planning, establishment, or operation of the proposed sanctuary**

The reason for this recommendation include:

- The proposal enables recovery efforts to be increased for some of our threatened species; namely kākāpō, rowi and hihi.
- This fenced location provides the security these species need when on the mainland. The proposal also enables DOC to manage kakapo genetics and breeding which is essential to ensure the recovery of this species continues.
- While we support this proposal for the above reasons, we recommend DOC does not lead the proposal, and that any support is offered conditional upon it obtaining a funding stream, independent of the Department.
- The most pertinent reasons for this recommendation are:
    - The site and proposal falls outside the most relevant of our prioritisation processes (e.g. Ecosystem Management Units (EMU);

1 Being on the mainland and close to a major city, it would offer easy, low-cost and low-carbon access for breeding management as well as excellent opportunities for kākāpō advocacy. Similar benefits are expected for hihi and kiwi.

Species Management Unit (SMU); landscape scale predator control) with the exception of threatened species management; and

- DOC's strategic positioning is to support landscape predator free approaches that sustain themselves without the need for fencing; and
- The species that would benefit most substantially from this programme, have alternate options available to the; and
- Funding this proposal would divert funds from existing prioritised work programmes, which could result in a net reduction of biodiversity benefit from our investment.

Formalisation of DOC Position

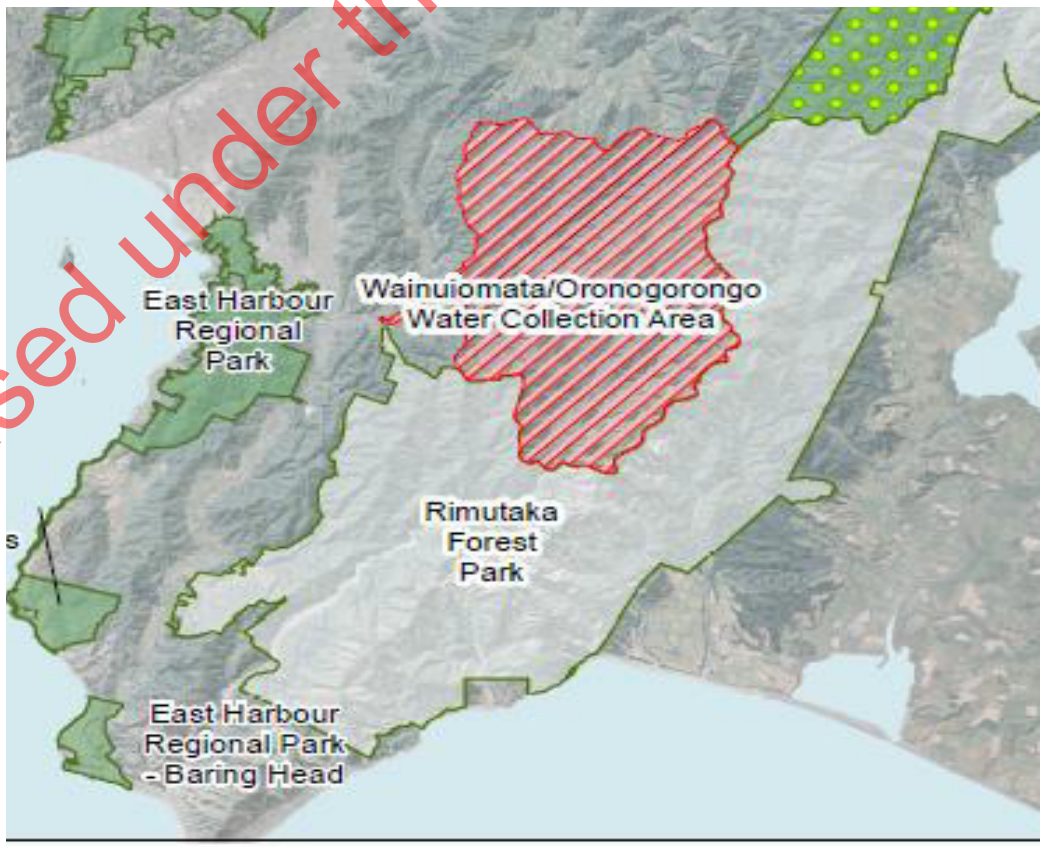
Decision	Confirmation (Yes/No)
The recommendation stated above in this memo is accepted as the DOC position and can now be communicated externally as such.	Yes
Signature	s.9(2)(a)
	Marie Long
Date	30 September 2021

Appendix 1: Detailed Assessment of the Proposal

Benefits to Species' Recovery

The Site

1. The Wainuiomata water catchment is located two kilometres east of Wainuiomata township (part of Lower Hutt City). It is the headwaters of the Wainuiomata River. The water catchment consists of the west and east branches of the river with many tributary streams including Sinclair's Creek and Georges Creek. It is the western section of the 7,373-hectare Wainuiomata/Orongorongo Water Collection Area which includes the headwaters of the neighbouring Orongorongo River.
2. The Water Collection Area is part of a major complex of protected natural areas totalling approximately 40.000 ha which includes the neighbouring Wainuiomata/Lower Hutt City and private reserves, the East Harbour Regional Park (2,250 ha), Pakuratahi Forest (8,000 ha) and Remutaka Forest park (23,000 ha).
3. The site is roughly triangular and is approximately 3,350 hectares in size. It is enclosed by ridges separating it from three neighbouring valleys to the west (Moore's valley), north (Whiteman's Valley) and east (Orongorongo valley). The Wainuiomata Recreation Area, from where the catchment is accessed via Whitcher Grove and Reservoir Road, is immediately to the south.
4. The Remutaka Forest Park, which is adjacent to the site is managed by DOC. Greater Wellington Regional Council (GWRC) manages the Wainuiomata water catchment as part of Wellington's water supply infrastructure and the public has limited access to a small portion for recreational purposes. GWRC's investment at this site is significant, including control of ungulates, mustelids, rats, and possums to low levels across the Catchment.



Benefits to Fauna

5. The site supports a full range of more common native species such as NI rifleman, bellbird, shining cuckoo, Australian harrier, yellow-crowned parakeet, long-tailed cuckoo, NZ falcon, grey warbler, kereru, welcome swallow, whitehead, morepork, pied tit, tui, NI fantail, NZ kingfisher, and silvereye.
6. It is proposed to introduce rarer species such as hihi, rowi and kākāpō, once the fence is built.
7. Table one shows an analysis of all the species that have been proposed within the Wainuiomata Project Document. We have assessed if a fence is required for each species to be translocated, the potential change (if any) of the threat status over time, and if the site is required for persistence.
8. The current recommendation for three species; rowi, kakapo, and hihi are that they are put into fenced sanctuaries or offshore islands to ensure they are not predated. It is likely that if translocations of rowi and hihi are successful and the populations establish at this site, the threat status of these species would improve over time.

Table 1. Species that could be translocated into the Wainuiomata Proposed Site							
Species	**Current NZTCS Status**	**a) Is site suitable for a viable population?**	**b) Is a pest fence essential?**	**c) Required for persistence?**	**d) Lead to NZTCS status improvement?**	**No of pairs or individuals***	**Comments**
Kakapo	Threatened-Nationally critical	Yes	Yes	Yes	Yes, a change over time to Nationally Vulnerable	150 individuals	The Wainuiomata Catchment meets the criteria for a kākāpō breeding site in terms of size, habitat quality, lek display areas and, most importantly, the presence of large areas of rimu dominant forest, which is essential for successful breeding.
Rowi kiwi	Threatened – Nationally Vulnerable	Yes	Yes, at this stage as no other proven management prescription	Yes	Yes, once a population I secure and breeding	Site will hold 70-100 pairs, but NI brown kiwi must be removed first	Currently do not have a proven in-situ predator management prescription for this species, so a fenced sanctuary offers a good opportunity for growing the population until a proven management prescription is in place.
Hihi	Threatened – Nationally Vulnerable	Likely	Yes	Yes, but dependent on a large population establishing, which has some uncertainty associated	Yes, potential to move into relict (from Threatened to At Risk)	100-2000 individuals	Waiting on report from expert assessment which will give a better assessment of the site's potential.
NI Kokako	At Risk-recovering	Yes	No	No	No	420 pairs	Already recovering
NI Saddleback	At Risk-Recovering	Yes	Yes	No	No	Hundreds-low thousands of individuals, but dispersal post translocation is a risk	Already recovering and likely to be assessed as relict in next assessment.
NI kaka	At Risk - Recovering	Yes	No	No	No	Hundreds-low thousands of individuals	Already recovering, but unlikely this project alone would put in relict.
NI Robin	At Risk-Declining	Likely, but previous translocation failed, possibly due to dispersal	No	No	No	0-9000 pairs. Previous translocation failed so this depends if another is successful	Large population declining NZTCS status. This project could help but would be unlikely alone to make enough difference. Also, establishment uncertainty because of dispersal.
Red crown parakeets	Relict	Likely	Yes	No	No	Hundreds to low thousands but may not introduce due to competition with yellow crowns	Red-crowned = relict

Table 1 cont. Species that could be translocated into the Wainuiomata Proposed Site							
Species	**Current NZTCS Status**	**a) Is site suitable for a viable population?**	**b) Is a pest fence essential?**	**c) Required for persistence?**	**d) Lead to NZTCS status improvement?**	**No of pairs or individuals***	**Comments**
Giant weta (Cook Strait)	At Risk-Relict	Likely	Yes	No	No	Unknown, but estimate low thousands	We have other mainland sanctuary options for this species.
Fernbird	At Risk-Declining	Uncertain	No	No	No	Uncertain	Large population declining NZTCS status. This project might help but would be unlikely alone to make enough difference.
Brown teal	At Risk-Recovering	Uncertain	No	No	No	Uncertain	Not much wetland to provide suitable habitat
Blue duck	Threatened – nationally Vulnerable	Unlikely - uncertain how much of the catchment contained within the planned fence is suitable.	No	No	No	Uncertain – no technique for translocation	No technique for translocating whio to new sites unless highly isolated
Bittern	Threatened-Nationally Critical	Unlikely – too small, but could contribute a small amount of protected habitat for a highly mobile species	No	No	No	1 intermittent pair	
Banded rail	At Risk - Declining	Unlikely – too small	No	No		Uncertain	
Hamilton's frog	Threatened – Nationally Vulnerable		?	?		Uncertain	This species very likely requires mouse control
Takahe	Threatened-Nationally Vulnerable	No	Yes	No	No	1 or 2 pairs as ambassador birds only	Ambassador birds could go there only – habitat unsuitable
Yellow crown	Not threatened	Natural population present	No	No	No	Hundreds-low thousands	Yellow crowned+ not threatened

*These figures are an estimate only.

Kākāpō Recovery

9. There are currently 208 kākāpō, held on predator free, offshore islands. The species urgently requires more breeding habitat and returning birds to large areas of their former natural range is of highest priority. DOC and Ngāi Tahu's shared vision is to restore the mauri of the kākāpō. Rakiura and mainland Fiordland are preferred reintroduction sites, due to the whakapapa links of today's kākāpō population to these areas. Until these are ready for kākāpō, other sites are needed to grow the population.
10. Based on an initial site visit and information supplied, the Wainuiomata catchment meets the criteria for a kākāpō breeding site in terms of size, habitat quality, lek display areas and, most importantly, the presence of large areas of rimu-dominant forest, which is essential for successful breeding. If the catchment had a suitable predator-proof fence that kept kākāpō contained, it may prove to be an excellent site for kākāpō breeding. Wainuiomata could house up to 150 kākāpō.
11. DOC and Ngāi Tahu recognise that potential breeding sites of the quality that Wainuiomata offers are extremely rare. However, suitability of the site for kākāpō can only be determined with certainty by moving birds to the location. It would take many years to truly establish the site's potential. So, its suitability for kākāpō should be subject to ongoing assessment if the proposal progresses.

Rowi Recovery

12. Rowi are one of the most threatened kiwi taxa. The population estimate is at around 600 birds across two sites in New Zealand (Blumine Island and Mana Island; 2018-2028 Kiwi Recovery Plan).
13. The site could support 70-100 pairs of rowi. Currently do not have any other sites we can put rowi that provide security to the species by being pest free. One of the benefits of this site is that it falls within the historic known range of rowi. A predator free site of this size that is secured with a fence is currently not available for rowi and could provide significant benefits for the species.
14. Within the footprint of the site there could be some north island brown kiwi that would need to be removed from the site to stop them intermixing.

Hihi Recovery

15. The Hihi Recovery Group aims to increase the number of self-sustaining hihi populations to five, by establishing populations at new sites through translocation. If a successful translocation were to occur, and a population of hihi established, the result would be an improvement in the threat status of hihi.
16. The Hihi Recovery Group has completed a site visit on 15 July. They have informally said that the site is looking really promising for hihi and will be able to provide more information on the benefits to hihi in the near future. Their preliminary view is that the site does have potential and is of interest.
17. If Hihi were to be translocated into the site, there is no clear mechanism to fund their management, which would need to be planned. Hihi require supplementary feeding in nearly every site they are in. At this stage advice form the Recovery Group is that supplementary feeding would be required for the first 5 years after a translocation is completed. One of the benefits of supplementary feeding is that it does provide a mechanism for monitoring.

18. Supplementary feeding is currently carried out by the community groups that have raised money for the translocations to occur in the different locations in the north island where this has taken place. Feeders need to be changed every two days to reduce the chance of diseases
19. The recovery group estimates that the site could hold around 1500 hihi.
20. The Wainuiomata proposal provides a fenced site that is at a scale with habitat quality that we currently don't have for hihi populations.

Costs and management of species moved to the site

21. DOC will need to maintain oversight and management of kākāpō populations that are moved into the area. The kākāpō team have confirmed they are able to support and fund any work on the ground that is specific to kākāpō.
22. Hihi will require supplementary feeding at the site for at least 5 years after they are translocated into the site. Currently, supplementary feeding (changing nectar every two days) is run by the community groups, or sanctuaries that have received hihi. There is not funding that sits alongside hihi recovery that could be used to pay personal if hihi are moved to this site.
23. Rowi populations could be monitored once moved into the site, but do not require specialised support, other than pest free status being maintained at the site.
24. All species would be vulnerable to pest incursions, so maintenance and checking of the fence becomes a core expectation of translocations and management of this site.

Benefits to Flora

25. The catchment is part of the Tararua Ecological district and consists primarily of lowland rimurata/tawa-kamahi forest. This is typical of central and southern North Island lowland forest on better soils. While it is not a particularly threatened forest type at a national level, it has been substantially depleted by land clearance (19% remaining) and a lot of the remaining area has been degraded by logging, fire and browsing (Manaaki Whenua/Landcare -2004).
26. Rimu and kahikatea dominate in the valley bottoms and rimu/miro on higher ground. Matai is scattered throughout, and silver and red beech predominate on the highest perimeter ridgetops. The canopy consists primarily of hinau, tawa and kamahi. (O. Spearpoint 2020 see vegetation map at end). This forest type was once the dominant vegetation in the Wainuiomata and Hutt lowlands and valleys and the Wellington peninsula.
27. The Wainuiomata catchment represents a unique remnant outlier of this almost lost rimu/rata lowland ecosystem.
28. A feature of the forest is the extent of rimu which covers about 85% of the site and dominates the canopy with numerous emergent rata, which needs rimu as its primary host. The forest structure (emergents, canopy, subcanopy, shrub, lianes, floor) is largely intact except for parts of the shrub and floor layers which have been damaged by historical herbivore browsing.
29. Table 2 summarises different flora species that are known to be within the proposal site. There are both some potential risks (e.g., myrtle rust spread that would be considered during the Resource Consent stage) as well as benefits of the proposal to the flora in the area.
30. There has not been a botanical assessment completed at the site to determine what plants would benefit from complete removal of mammalian pests. However,

based on knowledge of some team members we have been able to complete a high-level assessment on the benefits of the site.

31. We expect the understory to continue to regenerate with the permanent removal of goats, deer, and possums. This will provide food for invertebrates and birds within the area.

Table 2. Assessment of flora

Species	Description	Significance to DOC
Species of the **Myrtaceae** family **CONSERVATION STATUS:** 'Threatened-Nationally Vulnerable' (de Lange et al. 2018) due to their vulnerability to myrtle rust	• There is a healthy population of ramarama (*Lophomyrthus bullata*) • The forest is dominated by northern rata (*Metrosideros robusta*) • Rata vine is also abundant (e.g., *Metrosideros perforata*) • A few swamp maire (*Syzygium maire*) is present and significant as this species is uncommon in the Wellington region. DOC and Otari Wilton Bush are researching ways to conserve seeds of this species (seed banking project). • Kanuka (*Kunzea robusta*?) and manuka (*Leptospernum scoparium*) are present.	• DOC should consider the protection and vulnerability of these species. • The building of fence and infrastructure could threaten these populations by spreading Myrtle rust in the area (see additional risk below).
Brachyglottis kirkii* var. *kirkii **CONSERVATION STATUS:** 'Threatened-Nationally Vulnerable' (de Lange et al. 2018) Regionally 'Endangered' (Crisp 2020)	• Wainuiomata catchment is a strong hold for this species. • GWRC is currently working with Otari Wilton Bush nursery in conserving and propagating this species. • This species could benefit from removal of grazers (deer and possum)	• This species is currently not managed by DOC

Mistletoe species
 	
Korthalsella salicornioides
CONSERVATION STATUS: 'Threatened-Nationally Critical' (de Lange et al. 2018)
 	
Tupeia antarctica
CONSERVATION STATUS: 'At Risk-Declining' (de Lange et al. 2018)
 	
Ileostylus micranthus
CONSERVATION STATUS: 'Not Threatened' (de Lange et al. 2018)
	• The three suggested species are suitable for the area.
	• Suitable habitat for these species might currently be limited and planting of host tree/shrub species might be needed prior to translocation.
	• *Peraxilla* species were not included in the list as there might not be good beech habitat within the proposed fence boundaries.
		• Translocation of threatened species of mistletoe in Wainuiomata is not a priority for DOC.
		• Conservation efforts should focus on the natural populations on DOC land in the Wellington regional region (e.g., Kapiti Island).
		  ○ These populations are not monitored due to lack of resources.
		  ○ It is however critical to ensure the genetic diversity of the species.

The Halo

32. The proposal suggests regular pest control in a 'halo' around the fenced site. The long-term goal is stated as "to have 10,000 hectares surrounding the area that is under sustained pest control".
33. The proposal estimates $1.5 million is required for the first year of management, with $1 million required annually to maintain the halo. The halo provides more security for any species that leave the fenced sites as they would be moving into an area that is receiving pest control.
34. It is not clear who would be expected to fund or execute this management, however large portions of it are PCL thus it may fall to DOC. This would be an additional deviation of funding allocation, from that determined through current prioritisation processes.

Relationships Considerations

35. In discussions with the Sanctuaries of New Zealand Chair, feedback was that while there is not necessarily a relationship risk for DOC if this bid is supported, or funding provided, other sanctuaries could ask us to provide technical support for their restoration plans and translocations in the same way we provide support to Wainuiomata. This is not something DOC currently resources, and such work would require a reprioritisation of technical advice.
36. There is already some public interest, and interest from Ministers in this proposal progressing. 9(2)(g)(i) [redacted]
37. Mana Whenua Taranaki Whānui ki te Upoko o te Ika strongly support the project. They have a close working relationship with GWRC as the land manager and have been engaged to complete a Cultural Impact Assessment by the Project Lead. .

Alignment to other DOC work programmes.

Te Mana o te Taiao

38. The proposal aligns with four of the outcomes within Te Mana o te Taiao.
    Outcome 1 "Ecosystems from mountain tops to the ocean depths are thriving
    Outcome 2 "Indigenous species are their habitats across Aotearoa New Zealand and beyond are thriving."
    Outcome 3 "People's lives are enriched through their connection with nature."
    Outcome 4 Treaty partners, whanau, hapu and iwi are exercising their full role as Rangatira and kaitiaki
39. While the implementation plan for Te Mana o te Taiao is still being developed it is easy to see that projects that are looking to provide protection the native flora and fauna align to this kaupapapa.

Optimised Landscape Scale Projects

40. Doc has an Optimised Landscape Scale Portfolio Work (OLSP) programme where sites are assessed and prioritised for management. The fenced area proposal for Wainuiomata did not rank in the top 10 sites for management. The site is also not an existing EMU (ecosystem management unit) that DOC is managing.
41. What this means is that the OLSP work programme would not be an appropriate source of funding for this project as the site did not fall within the top ten sites that are being progressed. It is not uncommon for sanctuaries to site alongside the work of DOC, and to not necessarily align directly with our work priorities. This is because the proposals are often community led and have a community of interest that sites behind it.

DOC's use of fences

42. DOC does use fences to protect different species in specific locations. Some examples include where we may have fenced a peninsula to protect some sea birds; a fence for a particular population of invertebrates, for instance snails; fences for populations of lizards. This is done on a case-by-case basis and is most commonly done to protect a population or species. Therefore, this proposal does align with other management DOC has put in place, and proposals from community groups that DOC may have supported in the past.

Conclusion

43. The proposal is highly likely to have a positive benefit to the threat status of at least three species of birds, as well as plants, invertebrates, and reptiles.
44. The close proximity to a large urban centre could help in raising the funds necessary to build and run the facility, as well as volunteers that may be required for different aspects of operating the site.
45. There would be significant de-investment in current conservation projects if DOC was to fund this proposal.
46. Such de-investment could see some species which are already threatened decline to the detriment of their current threat status.
47. Therefore, the recommendation is that DOC provide in-kind technical support for this proposal only.

Read	

Departmental Briefing

Department of Conservation
Te Papa Atawhai

In Confidence

GS ref: 21-B-0758
DOCCM: 6788889

To: Minister of Conservation **Date:** 29 September 2021

Subject: **Proposed Wainuiomata fenced sanctuary – Recommended Ministerial position**

Action sought: Agree recommendation.

Time Frame: Deadline Friday 15 October 2021.

Risk Assessment: Excluding the use of your Department's existing funds, while otherwise being supportive of the proposal may frustrate stakeholders and the perception it may weaken any funding opportunities.

Department's Priority: High

Level of Risk: Medium

Contacts

Name and position	Cellphone	First contact	Principal author
Marie Long, DDG Biodiversity	s.9(2)(a)	✓	
Mark Fitzpatrick, Director Terrestrial Science			✓

Executive summary – Whakarāpopoto ā kaiwhakahaere

1. This briefing provides an update on the assessment that DOC has completed about the benefits to biodiversity of the proposed Wainuiomata Fenced sanctuary. The proposal seeks to fence a significant area in the Wainuiomata catchment, similar in concept to Zealandia. Within this briefing is DOC's recommendation on the position we would like you to endorse.

2. DOC's strategic approach for managing predators to protect species is through non-fenced landscape pest control operations, rather than fenced sanctuaries. Large landscape predator-controlled areas provide habitat that can sustain translocated populations and enable management of critically threatened species. There is great potential to progress Predator Free 2050 work and create appropriate habitat for kākāpō and rowi in parts of Fiordland, Rakiura, for example. These are programmes already being considered and progressed.

3. The proposal may have ongoing financial implications.

4. The Department has undertaken a detailed assessment of the proposal and has established a position of support, but only in principle and with clearly defined limitations.

5. The proposal provides an important opportunity to aid kākāpō, rowi and hihi recovery. This is particularly significant for critically endangered kākāpō. It also continues to build the spectrum of societal connections to nature demonstrated regionally at Zealandia.

6. In supporting the proposal DOC considers that:

   - sources of funding for planning, fence construction and long-term maintenance of the project should be obtained independent of DOC's existing funding streams.
   - leadership of development, operation, and governance to remain with GWRC or perhaps an entity created by GWRC, mana whenua and other partners.
   - no further funds would be required from the DOC for the planning, establishment, or operation of the proposed sanctuary, outside of targeted management for kākāpō.

7. DOC also notes, that Daran Ponter, Chair of Greater Wellington Regional Council (GWRC), has written to you and Hon. Grant Robertson promoting the proposed Wainuiomata fenced sanctuary.

8. The correspondence from Daran presents a preview of key points in favour of the sanctuary and an approximate cost estimates from a draft feasibility analysis sponsored by GWRC and DOC. A full analysis is due in November 2021. The correspondence includes a cost estimate of $46.75 million over ten years for "pre-Budget planning processes". DOC will prepare a response to Daran that reflects your position once you have considered the recommendations contained within this briefing and have made your decisions.

We recommend that you … (Ngā tohutohu)

		Decision
(a)	**Agree** the following messages in principle in any further meetings and correspondence about the Wainuiomata fenced sanctuary proposal:	
	1. The proposal is a potentially valuable opportunity to aid kākāpō, rowi and hihi recovery. This is particularly significant for critically endangered kākāpō.	Yes / No
	2. This is a valuable opportunity to continue building the spectrum of societal connections to nature demonstrated regionally at Zealandia.	Yes / No
	3. There is a potential cost burden on DOC that would undermine the biodiversity gains of existing programmes developed nationwide across ecosystem, species, and pest priorities.	Yes / No
	4. Sources of funding should be obtained independent of the Department's existing funding streams.	Yes / No
	5. We respect the project leadership shown by GWRC and recommend that you direct the Department to participate with reasonable in-kind support.	Yes / No

s.9(2)(a)

17 / 10 / 2021

Marie Long
Deputy-Director General, Biodiversity

For Director-General of Conservation

Hon Kiritapu Allan
Minister of Conservation

Purpose – Te aronga

1. To provide context on DOC's position on the Wainuiomata fenced sanctuary proposal that enables you to form a position that DOC and your office can communicate to external stakeholders.

Background and context – Te horopaki

2. A proposal has been developed to build a fence around 3,400 ha of forest that is vested in the Greater Wellington Regional Council as part of the 8,000-hectare Wainuiomata/Ōrongorongo water collection area.

3. The key premise of the proposal is to provide another secure, predator-free environment that will ensure the long-term persistence of a handful of forest birds currently threatened with extinction. Top candidates include kākāpō, hihi and rowi (kiwi). These threatened birds have shown strong recovery in recent decades, but further population growth is hampered by a lack of suitable pest-free islands, fenced sanctuaries, or mainland sites

with effective pest control. As at Zealandia, other birds, bats, reptiles, invertebrates, plants, and vegetation pattern would also likely benefit within the proposed sanctuary and within a halo of influence beyond the fence.

4. The initial proposal states a dependency on the Department of Conservation to provide financial support through both the establishment and operating phases. Previous Director-General (Lou Sanson) was invited by Greater Wellington Regional Council (GWRC) to conduct a site visit. During this site visit, the DG offered to provide $30,000, as well as in-kind support, toward the feasibility study for the proposal.

5. The timing of this briefing follows the completion of an assessment on the benefits to biodiversity of the proposed sanctuary. DOC is seeking to protect its committed resources while supporting the overall concept of this proposal.

6. In addition, you have received a letter from Daran Ponter - Chair GWRC, dated 20 September 2021, petitioning you and Hon Grant Robertson with a preview of a feasibility analysis due to be completed in November 2021.

7. GWRC are seeking that DOC be responsible for driving the budget bids for this proposal through government.

8. 9(2)(g)(i) [redacted]

9. Some benefits for species were outlined in support of the recent recommendation (21-M-0082) we made to accept an invitation to visit the proposal site.

Potential impacts of the Proposal

10. Seventeen species were evaluated by DOC for translocation potential into the proposed sanctuary. Analysis showed that the conservation status of three - hihi, rowi and kākāpō - would most likely improve over time if translocations into the site are successful and populations establish within the sanctuary. While a change in conservation status is unlikely be the case for the other 14 species evaluated, their populations would gain some benefits from the protection provided by a large predator free area.

11. With a proposal to enclose a 3,500-hectare catchment, 15 times the size of Zealandia, the Wainuiomata sanctuary would challenge any New Zealand agency to fund the establishment and ongoing costs.

12. Greater Wellington Regional Council administers the catchment, but its leadership anticipates a shared vision with DOC and others because the DOC leads bird species conservation nationally (including much technical expertise and numerous partnerships).

13. Potentially, sharing the vision and forming a partnership could leverage at least some of the funds required for success. However, re-allocating funding from DOC's existing programme commitments would undermine a range of existing national conservation priorities. Due to the clear benefits for the species mentioned above however, it would be appropriate for DOC to provide in-kind support in the form of advice on translocations and monitoring, and associated plans for critical species. We do note that any translocations and management of kākāpō is funded by the kākāpō programme.

14. The proposal falls outside the most relevant of the Department's prioritisation processes (e.g., for ecosystems, for species management locations or for wide-scale pest control). DOC has an Optimised Landscape Scale Portfolio Work (OLSP) programme where sites are assessed and prioritised for management. The fenced area proposal for Wainuiomata did not rank in the top 10 sites for management. The site is also not an existing ecosystem management unit (EMU) or species management unit (SMU) that DOC is managing. EMU and SMU prioritisation is the way that we manage resources and ensure that we are delivery our highest priority work programmes.

15. Because of the substantial costs associated with this project, tensions may arise between GWRC as the regional agency holding a regional objective that has merit and, DOC's country-wide remit which is already balancing numerous competing biodiversity, cultural, historic, recreation and tourism objectives.

16. The large projected cost also means that a well organised fund-raising effort is needed and a government budget bid in this case is seen by GWRC as a potential solution.

17. This briefing does not address the merit of developing or supporting a specific Cabinet level budget bid to fund ten years of establishment of the proposed sanctuary.

Recommendation on the Proposal

18. In supporting the proposal DOC considers that:

- sources of funding for planning, fence construction and long-term maintenance of the project should be obtained independent of DOC's existing funding streams
- leadership of development, operation, and governance to remain with GWRC or perhaps an entity created by GWRC, mana whenua and other partners
- no further funds are required from the DOC for the planning, establishment, or operation of the proposed sanctuary, outside of targeted management for kākāpō.

Risk assessment – Aronga tūraruā

19. In supporting the intent of the proposal, the key conservation risk lies with making a commitment that could draw funding away from existing high priority conservation commitments and damaging the outcomes of those. However, this risk can be mitigated by the key messages provided above.

20. Qualified support that excludes the use of your Department's existing funds, risks a level of stakeholder frustration. 9(2)(g)(i) [redacted] However continued transparency about why support is qualified (contained in the messages above), reduces this risk.

21. 9(2)(g)(i) [redacted]

22. If multiple Ministers and local MPs are petitioned about the proposal, there is a risk their responses could convey mixed messaging. However, your office may assess the level of risk and mitigation needed.

Treaty principles (section 4) – Ngā mātāpono Tiriti (section 4)

23. While the briefing unites your Office and DOC in responding to GWRC, there are two iwi entities also actively involved in this proposal. These are Te Runanganui o Taranaki Whānui and, with respect to kākāpō and rowi, Ngāi Tahu.

24. Appropriate iwi partnership is led by GWRC, but we should endeavour to be responsive to feedback from iwi, especially Ngāi Tahu, about our position taken.

Consultation – Kōrero whakawhiti

25. DOC has not initiated third-party consultation because the process to develop the proposal is being led by GWRC and they are consulting with numerous parties. DOC's active role has instead been to contribute to the feasibility analysis.

Financial implications – Te hīraunga pūtea

26. Noting that the petition from GWRC seeks >$40 million over ten years, there are financial implications for DOC if you support the proposal and don't take a position of qualified support.

27. Taking a position of qualified support means that financial implications for DOC would be avoided.

28. However, GWRC have signalled they would like DOC to seek Crown funding through appropriate means. DOC is not able to assess the financial implications of this bid for you at this stage OR until the feasibility study and a more complete budget is completed in November.

Next steps – Ngā tāwhaitanga

29. If you agree the recommendation, then DOC will aid your Office to prepare a communications plan to manage the potential confusion from contact with multiple Ministers by GWRC about the proposal. This will include a response to the letter received from GWRC.

30. The recommended action likely foreshadows GWRC tabling the completed feasibility analysis due November 2021. In jointly responding to this, DOC's position is likely to remain as briefed.

Wainuiomata Fenced Sanctuary Proposal

Assessment of Possible Benefits to Biodiversity

Completed by the Terrestrial Science Unit in Biodiversity Group, Department of Conservation, September 2021

Department of Conservation
Te Papa Atawhai

New Zealand Government

Material within this report was provided by various team members from within the Department of Conservation. Recovery Groups provided information to support the species specific information that has been included.

Maps were provided by Jim Lynch, Project Lead for the Wainuiomata Sanctuary proposal.

Collated and Written by Nikki Pindur
Northern Terrestrial Science Manager,
Terrestrial Science unit, Biodiversity Group

Approved by Mark Fitzpatrick –
Director Terrestrial Science Unit,
Biodiversity Group

Cover: Vegetation from within the site. *Photo: Jim Lynch*

DOC - 681459

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1 Detailed Assessment of the Proposal - Benefits to Species" Recovery.

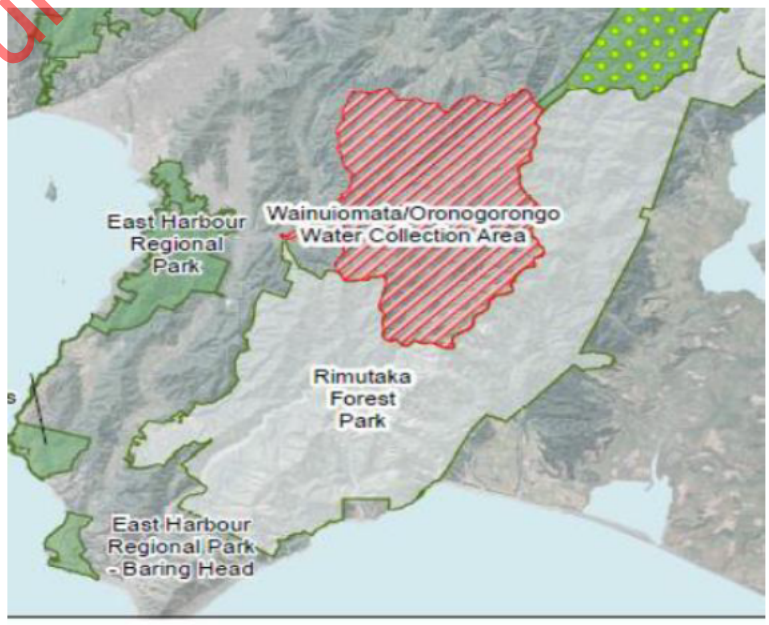
1.1 The Site

1.1.1 The Wainuiomata water catchment is located two kilometres east of Wainuiomata township (part of Lower Hutt City). It is the headwaters of the Wainuiomata River. The water catchment consists of the west and east branches of the river with many tributary streams including Sinclair's Creek and Georges Creek. It is the western section of the 7,373-hectare Wainuiomata/Orongorongo Water Collection Area which includes the headwaters of the neighbouring Orongorongo River.

1.1.2 The Water Collection Area is part of a major complex of protected natural areas totalling approximately 40.000 ha which includes the neighbouring Wainuiomata/Lower Hutt City and private reserves, the East Harbour Regional Park (2,250 ha), Pakuratahi Forest (8,000 ha) and Remutaka Forest park (23,000 ha).

1.1.3 The site is roughly triangular and is approximately 3,350 hectares in size. It is enclosed by ridges separating it from three neighbouring valleys to the west (Moore's valley), north (Whiteman's Valley) and east (Orongorongo valley). The Wainuiomata Recreation Area, from where the catchment is accessed via Whitcher Grove and Reservoir Road, is immediately to the south.

1.1.4 The Remutaka Forest Park, which is adjacent to the site is managed by DOC. Greater Wellington Regional Council (GWRC) manages the Wainuiomata water catchment as part of Wellington's water supply infrastructure and the public has limited access to a small portion for recreational purposes. GWRC's investment at this site is significant, including control of ungulates, mustelids, rats, and possums to low levels across the Catchment.



1.2 Benefits to Fauna

1.2.1 The site supports a full range of more common native species such as NI rifleman, bellbird, shining cuckoo, Australian harrier, yellow-crowned parakeet, long-tailed cuckoo, NZ falcon, grey warbler, kereru, welcome swallow, whitehead, morepork, pied tit, tui, NI fantail, NZ kingfisher, and silvereye.

1.2.2 It is proposed to introduce rarer species such as hihi, rowi and kākāpō, once the fence is built.

1.2.3 Table one shows an analysis of all the species that have been proposed within the Wainuiomata Project Document. We have assessed if a fence is required for each species to be translocated, the potential change (if any) of the threat status over time, and if the site is required for persistence.

1.2.4 The current recommendation for three species; rowi, kakapo, and hihi are that they are put into fenced sanctuaries or offshore islands to ensure they are not predated. It is likely that if translocations of rowi and hihi are successful and the populations establish at this site, the threat status of these species would improve over time.

Table 1. Species that could be translocated into the Wainuiomata Proposed Site							
Species	Current NZTCS Status	a) Is site suitable for a viable population?	b) Is a pest fence essential?	c) Required for persistence?	d) Lead to NZTCS status improvement?	No of pairs or individuals*	Comments
Kakapo	Threatened-Nationally critical	Yes	Yes	Yes	Yes, a change over time to Nationally Vulnerable	150 individuals	The Wainuiomata Catchment meets the criteria for a kākāpō breeding site in terms of size, habitat quality, lek display areas and, most importantly, the presence of large areas of rimu dominant forest, which is essential for successful breeding.
Rowi kiwi	Threatened – Nationally Vulnerable	Yes	Yes, at this stage as no other proven management prescription	Yes	Yes, once a population I secure and breeding	Site will hold 70-100 pairs, but NI brown kiwi must be removed first	Currently do not have a proven in-situ predator management prescription for this species, so a fenced sanctuary offers a good opportunity for growing the population until a proven management prescription is in place.
Hihi	Threatened – Nationally Vulnerable	Likely	Yes	Yes, but dependent on a large population establishing, which has some uncertainty associated	Yes, potential to move into relict (from Threatened to At Risk)	100-2000 individuals	Waiting on report from expert assessment which will give a better assessment of the site's potential.
NI Kokako	At Risk-recovering	Yes	No	No	No	420 pairs	Already recovering
NI Saddleback	At Risk-Recovering	Yes	Yes	No	No	Hundreds-low thousands of individuals, but dispersal post translocation is a risk	Already recovering and likely to be assessed as relict in next assessment.
NI kaka	At Risk - Recovering	Yes	No	No	No	Hundreds-low thousands of individuals	Already recovering, but unlikely this project alone would put in relict.
NI Robin	At Risk-Declining	Likely, but previous translocation failed, possibly due to dispersal	No	No	No	0-9000 pairs. Previous translocation failed so this depends if another is successful	Large population declining NZTCS status. This project could help but would be unlikely alone to make enough difference. Also, establishment uncertainty because of dispersal.
Red crown parakeets	Relict	Likely	Yes	No	No	Hundreds to low thousands but may not introduce due to competition with yellow crowns	Red-crowned = relict

Table 1 cont. Species that could be translocated into the Wainuiomata Proposed Site							
Species	Current NZTCS Status	a) Is site suitable for a viable population?	b) Is a pest fence essential?	c) Required for persistence?	d) Lead to NZTCS status improvement?	No of pairs or individuals*	Comments
Giant weta (Cook Strait)	At Risk-Relict	Likely	Yes	No	No	Unknown, but estimate low thousands	We have other mainland sanctuary options for this species.
Fernbird	At Risk-Declining	Uncertain	No	No	No	Uncertain	Large population declining NZTCS status. This project might help but would be unlikely alone to make enough difference.
Brown teal	At Risk-Recovering	Uncertain	No	No	No	Uncertain	Not much wetland to provide suitable habitat
Blue duck	Threatened – nationally Vulnerable	Unlikely - uncertain how much of the catchment contained within the planned fence is suitable.	No	No	No	Uncertain – no technique for translocation	No technique for translocating whio to new sites unless highly isolated
Bittern	Threatened-Nationally Critical	Unlikely – too small, but could contribute a small amount of protected habitat for a highly mobile species	No	No	No	1 intermittent pair	
Banded rail	At Risk - Declining	Unlikely – too small	No	No		Uncertain	
Hamilton's frog	Threatened – Nationally Vulnerable		?	?		Uncertain	This species very likely requires mouse control
Takahe	Threatened-Nationally Vulnerable	No	Yes	No	No	1 or 2 pairs as ambassador birds only	Ambassador birds could go there only – habitat unsuitable
Yellow crown	Not threatened	Natural population present	No	No	No	Hundreds-low thousands	Yellow crowned+ not threatened

*These figures are an estimate only.

1.3 Kākāpō Recovery

1.3.1 There are currently 208 kākāpō, held on predator free, offshore islands. The species urgently requires more breeding habitat and returning birds to large areas of their former natural range is of highest priority. DOC and Ngāi Tahu's shared vision is to restore the mauri of the kākāpō. Rakiura and mainland Fiordland are preferred reintroduction sites, due to the whakapapa links of today's kākāpō population to these areas. Until these are ready for kākāpō, other sites are needed to grow the population.

1.3.2 Based on an initial site visit and information supplied, the Wainuiomata catchment meets the criteria for a kākāpō breeding site in terms of size, habitat quality, lek display areas and, most importantly, the presence of large areas of rimu-dominant forest, which is essential for successful breeding. If the catchment had a suitable predator-proof fence that kept kākāpō contained, it may prove to be an excellent site for kākāpō breeding. Wainuiomata could house up to 150 kākāpō.

1.3.3 DOC and Ngāi Tahu recognise that potential breeding sites of the quality that Wainuiomata offers are extremely rare. However, suitability of the site for kākāpō can only be determined with certainty by moving birds to the location. It would take many years to truly establish the site's potential. So, its suitability for kākāpō should be subject to ongoing assessment if the proposal progresses.

1.4 Rowi Recovery

1.4.1 Rowi are one of the most threatened kiwi taxa. The population estimate is at around 600 birds across two sites in New Zealand (Blumine Island and Mana Island; 2018-2028 Kiwi Recovery Plan).

1.4.2 The site could support 70-100 pairs of rowi. Currently do not have any other sites we can put rowi that provide security to the species by being pest free. One of the benefits of this site is that it falls within the historic known range of rowi. A predator free site of this size that is secured with a fence is currently not available for rowi and could provide significant benefits for the species.

1.4.3 Within the footprint of the site there could be some north island brown kiwi that would need to be removed from the site to stop them intermixing.

1.5 Hihi Recovery

1.5.1 The Hihi Recovery Group aims to increase the number of self-sustaining hihi populations to five, by establishing populations at new sites through translocation. If a successful translocation were to

occur, and a population of hihi established, the result would be an improvement in the threat status of hihi.

1.5.2 The Hihi Recovery Group has completed a site visit on 15 July. They have informally said that the site is looking really promising for hihi and will be able to provide more information on the benefits to hihi in the near future. Their preliminary view is that the site does have potential and is of interest.

1.5.3 If Hihi were to be translocated into the site, there is no clear mechanism to fund their management, which would need to be planned. Hihi require supplementary feeding in nearly every site they are in. At this stage advice form the Recovery Group is that supplementary feeding would be required for the first 5 years after a translocation is completed. One of the benefits of supplementary feeding is that it does provide a mechanism for monitoring.

1.5.4 Supplementary feeding is currently carried out by the community groups that have raised money for the translocations to occur in the different locations in the north island where this has taken place. Feeders need to be changed every two days to reduce the chance of diseases

1.5.5 The recovery group estimates that the site could hold around 1500 hihi.

1.5.6 The Wainuiomata proposal provides a fenced site that is at a scale with habitat quality that we currently don't have for hihi populations.

1.6 Costs and management of species moved to the site

1.6.1 DOC will need to maintain oversight and management of kākāpō populations that are moved into the area. The kākāpō team have confirmed they are able to support and fund any work on the ground that is specific to kākāpō.

1.6.2 Hihi will require supplementary feeding at the site for at least 5 years after they are translocated into the site. Currently, supplementary feeding (changing nectar every two days) is run by the community groups, or sanctuaries that have received hihi. There is not funding that sits alongside hihi recovery that could be used to pay personal if hihi are moved to this site.

1.6.3 Rowi populations could be monitored once moved into the site, but do not require specialised support, other than pest free status being maintained at the site.

1.6.4 All species would be vulnerable to pest incursions, so maintenance and checking of the fence becomes a core expectation of translocations and management of this site.

1.7 Benefits to Flora

1.7.1 The catchment is part of the Tararua Ecological district and consists primarily of lowland rimurata/tawa-kamahi forest. This is typical of central and southern North Island lowland forest on better soils. While it is not a particularly threatened forest type at a national level, it has been

substantially depleted by land clearance (19% remaining) and a lot of the remaining area has been degraded by logging, fire and browsing (Manaaki Whenua/Landcare -2004).

1.7.2 Rimu and kahikatea dominate in the valley bottoms and rimu/miro on higher ground. Matai is scattered throughout, and silver and red beech predominate on the highest perimeter ridgetops. The canopy consists primarily of hinau, tawa and kamahi. (O. Spearpoint 2020 see vegetation map at end). This forest type was once the dominant vegetation in the Wainuiomata and Hutt lowlands and valleys and the Wellington peninsula.

1.7.3 The Wainuiomata catchment represents a unique remnant outlier of this almost lost rimu/rata lowland ecosystem.

1.7.4 A feature of the forest is the extent of rimu which covers about 85% of the site and dominates the canopy with numerous emergent rata, which needs rimu as its primary host. The forest structure (emergents, canopy, subcanopy, shrub, lianes, floor) is largely intact except for parts of the shrub and floor layers which have been damaged by historical herbivore browsing.

1.7.5 21. Table 2 summarises different flora species that are known to be within the proposal site. There are both some potential risks (e.g., myrtle rust spread that would be considered during the Resource Consent stage) as well as benefits of the proposal to the flora in the area.

1.7.6 There has not been a botanical assessment completed at the site to determine what plants would benefit from complete removal of mammalian pests. However, based on knowledge of some team members we have been able to complete a high-level assessment on the benefits of the site.

1.7.7 We expect the understory to continue to regenerate with the permanent removal of goats, deer, and possums. This will provide food for invertebrates and birds within the area.

Table 2. Assessment of flora

Species	Description	Significance to DOC
Species of the **Myrtaceae** family CONSERVATION STATUS: 'Threatened-Nationally Vulnerable' (de Lange et al. 2018) due to their vulnerability to myrtle rust	· There is a healthy population of ramarama (*Lophomyrthus bullata*) · The forest is dominated by northern rata (*Metrosideros robusta*) · Rata vine is also abundant (e.g., *Metrosideros perforata*) · A few swamp maire (*Syzygium maire*) is present and significant as this species is uncommon in the Wellington region. DOC and Otari Wilton Bush are researching ways to conserve seeds of this species (seed banking project). · Kanuka (*Kunzea robusta*?) and manuka (*Leptospernum scoparium*) are present.	· DOC should consider the protection and vulnerability of these species. · The building of fence and infrastructure could threaten these populations by spreading Myrtle rust in the area (see additional risk below).

Brachyglottis kirkii* var. *kirkii CONSERVATION STATUS: 'Threatened-Nationally Vulnerable' (de Lange et al. 2018) Regionally 'Endangered' (Crisp 2020)	· Wainuiomata catchment is a strong hold for this species. · GWRC is currently working with Otari Wilton Bush nursery in conserving and propagating this species. · This species could benefit from removal of grazers (deer and possum)	· This species is currently not managed by DOC
Mistletoe species *Korthalsella salicornioides* CONSERVATION STATUS: 'Threatened-Nationally Critical' (de Lange et al. 2018) *Tupeia antarctica* CONSERVATION STATUS: 'At Risk-Declining' (de Lange et al. 2018) *Ileostylus micranthus* CONSERVATION STATUS: 'Not Threatened' (de Lange et al. 2018)	· The three suggested species are suitable for the area. · Suitable habitat for these species might currently be limited and planting of host tree/shrub species might be needed prior to translocation. · *Peraxilla* species were not included in the list as there might not be good beech habitat within the proposed fence boundaries.	· Translocation of threatened species of mistletoe in Wainuiomata is not a priority for DOC. · Conservation efforts should focus on the natural populations on DOC land in the Wellington regional region (e.g., Kapiti Island). o These populations are not monitored due to lack of resources. o It is however critical to ensure the genetic diversity of the species.

1.8 The Halo

1.8.1 The proposal suggests regular pest control in a 'halo' around the fenced site. The long-term goal is stated as "to have 10,000 hectares surrounding the area that is under sustained pest control".

1.8.2 The proposal estimates $1.5 million is required for the first year of management, with $1 million required annually to maintain the halo. The halo provides more security for any species that leave the fenced sites as they would be moving into an area that is receiving pest control.

1.8.3 It is not clear who would be expected to fund or execute this management, however large portions of it are PCL thus it may fall to DOC. This would be an additional deviation of funding allocation, from that determined through current prioritisation processes.

1.9 Relationships Considerations

1.9.1 In discussions with the Sanctuaries of New Zealand Chair, feedback was that while there is not necessarily a relationship risk for DOC if this bid is supported, or funding provided, other sanctuaries could ask us to provide technical support for their restoration plans and translocations in the same

way we provide support to Wainuiomata. This is not something DOC currently resources, and such work would require a reprioritisation of technical advice.

1.9.2 There is already some public interest, and interest from Ministers in this proposal progressing. There are likely to be reputational risks if DOC doesn't support a proposal where three species would see their threat status change over time with the establishment of populations at this site.

1.9.3 Mana Whenua Taranaki Whānui ki te Upoko o te Ika strongly support the project. They have a close working relationship with GWRC as the land manager and have been engaged to complete a Cultural Impact Assessment by the Project Lead.

1.10 Alignment to other DOC work programmes.

Te Mana o te Taiao

1.10.1 The proposal aligns with four of the outcomes within Te Mana o te Taiao.

1.10.2 Outcome 1 "Ecosystems from mountain tops to the ocean depths are thriving

1.10.3 Outcome 2 "Indigenous species are their habitats across Aotearoa New Zealand and beyond are thriving."

1.10.4 Outcome 3 "People's lives are enriched through their connection with nature."

1.10.5 Outcome 4 Treaty partners, whanau, hapu and iwi are exercising their full role as Rangatira and kaitiaki

1.10.6 While the implementation plan for Te Mana o te Taiao is still being developed it is easy to see that projects that are looking to provide protection the native flora and fauna align to this kaupapapa.

Optimised Landscape Scale Projects

1.10.7 Doc has an Optimised Landscape Scale Portfolio Work (OLSP) programme where sites are assessed and prioritised for management. The fenced area proposal for Wainuiomata did not rank in the top 10 sites for management. The site is also not an existing EMU (ecosystem management unit) that DOC is managing.

1.10.8 What this means is that the OLSP work programme would not be an appropriate source of funding for this project as the site did not fall within the top ten sites that are being progressed. It is not uncommon for sanctuaries to site alongside the work of DOC, and to not necessarily align directly with our work priorities. This is because the proposals are often community led and have a community of interest that sites behind it.

DOC's use of fences

1.10.9 DOC does use fences to protect different species in specific locations. Some examples include where we may have fenced a peninsula to protect some sea birds; a fence for a particular population of invertebrates, for instance snails; fences for populations of lizards. This is done on a case-by-case

basis and is most commonly done to protect a population or species. Therefore, this proposal does align with other management DOC has put in place, and proposals from community groups that DOC may have supported in the past.

1.11 Conclusion

1.11.1 The proposal is highly likely to have a positive benefit to the threat status of at least three species of birds, as well as plants, invertebrates, and reptiles.

1.11.2 The close proximity to a large urban centre could help in raising the funds necessary to build and run the facility, as well as volunteers that may be required for different aspects of operating the site.

1.11.3 There would be significant de-investment in current conservation projects if DOC was to fund this proposal.

1.11.4 Such de-investment could see some species which are already threatened decline to the detriment of their current threat status.

1.11.5 Therefore, the recommendation is that DOC provide in-kind technical support for this proposal only.

STATUS REPORT UPDATE

Wainuiomata fenced sanctuary proposal – Recommending DOC position

- Further to the status update provided the week beginning 14 June 2021: Greater Wellington Regional Council (GWRC) has led the development of a proposal to build a predator proof fence over a 3,400ha forest area of the Wainuiomata Catchment near Wellington, and subsequent restoration actions.
- DOC is assisting GWRC with the development of a 10-year programme feasibility study due for completion November 2021.
- As part of this we have conducted a thorough assessment internally, to establish a DOC position on the proposal which is now complete.
- A briefing outlining DOC's position, recommending a level of support and seeking to align DOC and your Office over this issue is being provided (reference 21-B-0758).

Contact: [redacted]

>>

Read	

Events Memo
Wainuiomata Sanctuary Visit

Department of Conservation
Te Papa Atawhai

GS ref: 21-M-0172
DOCCM: 6812618

In Confidence

Date: **26 November 2021**

To: Minister of Conservation

From: Kris Ramm, Acting Director Operations Lower North Island

Subject: Wainuiomata Sanctuary Visit on Tuesday 30 November 2021

Executive summary – Whakarāpopoto ā kaiwhakahaere

1. On Tuesday 30 November 2021, you have been invited by the Chair of the Greater Wellington Regional Council (GWRC) to visit the Wainuiomata/ Orongorongo water catchment area and discuss the proposal to create the Wainuiomata Mainland Sanctuary.
2. You will meet at 1.00pm at the Lower Dam Ranger Office, Wainuiomata Recreation Area, 10 Whitcher Grove, Wainuiomata, Lower Hutt.
3. You will then travel up into the water catchment area and depart the site at approximately 4.30 pm.
4. You will be meeting staff and councillors from GWRC, representatives from iwi, Taranaki Whānui and Ngāi Tahu, along with Jim Lynch the sanctuary advocate.
5. s.9(2)(a) and s.9(2)(a) will bring you and your supporters on.
6. There will be an opportunity for you to make some introductory remarks in the welcome stages of the field trip.
7. Media - Andrea Vance from Stuff and Anna Fifield Editor of the Dominion Post are expected to be present.
8. You will be accompanied by DOC staff members Kris Ramm (Acting Director Operations, Lower North Island), Ian Angus (Director Terrestrial Science) and Angus Hulme-Moir (Operations Manager – Kapiti Wellington District).
9. Ginny Anderson (MP for Hutt South) will be attending.

Purpose – Te aronga

10. The purpose of this memo is to provide you with context and supporting material for the visit on Tuesday, 30 November 2021.
11. A draft run sheet has been provided by GRWC and is attached as **Appendix A**.

Background and context – Te horopaki

12. A proposal has been developed to build a 29-kilometre predator proof fence around 3,400 ha of forest that is vested in the Greater Wellington Regional Council as part of the 8,000-hectare Wainuiomata/Orongorongo water collection area. The leadership of the project sits with GWRC.

13. The proposal has strong support from mana whenua Taranaki Whānui ki te Upoko o te Ika and GWRC councillors. Support in principle has also been garnered from the Ngāi Tahu and the Department of Conservation (DOC) kākāpo recovery group and the rowi and hihi recovery teams. It will potentially provide a valuable opportunity to aid kākāpo, rowi and hihi recovery. This is particularly significant for critically endangered kākāpo.

14. The cost estimate for this sanctuary over a period of 10-years is $46.75 million. In addition to the sanctuary costs, the long-term goal is to have a 10,000-hectare halo surrounding the sanctuary under sustained control at an additional estimated annual cost of $1-1.5 million per annum.

15. The initial proposal states a dependency on the Department of Conservation to provide financial support through both the establishment and operating phases.

16. Previous Director-General (Lou Sanson) was invited by GWRC to conduct a site visit. During this visit, the DG offered to provide $30,000, as well as in-kind support, toward the feasibility study for the proposal.

17. The Terrestrial Science Unit has completed a report assessing the proposal and provided a recommendation for the DOC Position, to the DDG-Biodiversity. You have received a briefing that outlined key messages and an agreed position for DOC. (**Appendix B**)

18. GWRC are seeking that DOC be responsible for driving the budget bid for this proposal. GWRC have also taken Minister Shaw and Minister Robertson to the site. We understand GWRC are seeking a budget bid, led by DOC, to be included in the upcoming government budget round. Most recently (20 September 2021), the chair of GWRC (Daran Ponter) wrote to you and Minister Robertson a letter providing an update on the feasibility study stating it "…may be used for pre-Budget planning processes"

19. Taranaki Whānui have been engaged to complete a Cultural Impact Assessment.

Risk assessment – Aronga tūraru

20. In supporting the intent of the proposal, the key conservation risk lies with making a commitment that could draw current base line funding away from existing high priority conservation commitments, damaging the outcomes of those.

21. Qualified support that excludes the use of your Department's current baseline funds may risk a level of stakeholder frustration. The local and regional DOC operations team have a strong working relationship with GWRC staff and councillors including shared governance of $12 million of Jobs for Nature funds.

22. 9(2)(g)(i) [redacted] This briefing, and your decision on its recommendation, should mitigate that risk.

23. If multiple Ministers and local MPs are petitioned about the proposal, there is a risk their responses could convey mixed messaging.

24. Ngāi Tahu and other iwi may not wish for taonga species such as rowi, kākāpō and hihi to be relocated out of their rohe. Because these three species are the main drivers of the fence it is advisable that GWRC have agreement in principle for the translocations before the proposal progresses to ensure that they can be

moved. This could take some time if there are concerns that need to be resolved to have agreements in place from the respective iwi.

25. A safety briefing prior to the field trip will be undertaken. This will cover off all known risks at the site. Because this is a 'low-key' event there is unlikely to be any security concerns.

26. You will require suitable walking shoes/boots, warm clothing, and a raincoat. There is inconsistent cell phone coverage within the water catchment area so you may need to have access to a satellite phone.

Attachments – Ngā Tāpiritanga

- Attachment A - Greater Wellington Regional Council (GWRC) draft run sheet - 24 November 2021
- Attachment B - Departmental Briefing Proposed Wainuiomata fenced Sanctuary -RecommendedMinisterial position - 29 September 2021
- Attachment C - Recommendations and acceptance of a DOC Position regarding the proposed Wainuiomata Sanctuary- 23 September 2021
- Attachment D - Summary Sheet for Visit for Wainuiomata sanctuary Visit Tuesday 30 November 2021
- Attachment E - Talking Points for Wainuiomata Sanctuary visit Tuesday 30 November 2021
- Attachment F - Key Messages for Wainuiomata Sanctuary visit Tuesday 30 November 2021

Contact for queries: Kris Ramm, Acting Director Operations Lower North Island.
Phone: s.9(2)(a) [redacted]

MEMO ENDS

Attachment A

Wainuiomata Sanctuary Ministerial Visit – draft run sheet

Date and time: Tuesday 30 November, 1 – 4.30pm
Location: Lower Dam Ranger Office, Wainuiomata Recreation Area,
10 Whitcher Grove, Wainuiomata, Lower Hutt 5373
(drive through the security gates and up to the Lower Dam office)

Please note:

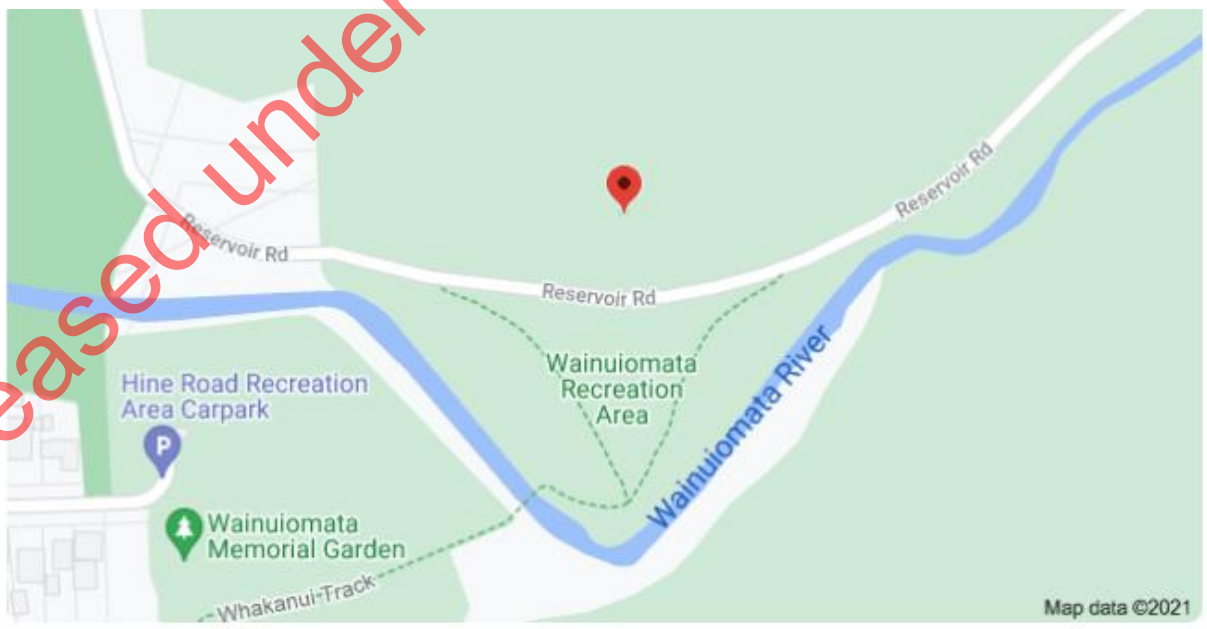
- visitors should wear suitable walking shoes/boots and bring a raincoat as it can often be cold and wet at the top of the catchment
- to protect our water collection area, anyone with stomach upsets/diarrhoea in the two weeks prior, will not be able to enter the site
- any gear used in the South Island in the previous two months needs to be cleaned and dried before this visit.

Time	What	Who
1.00pm	Arrive at car park	**All**
1.05-1.35pm	Pōwhiri at base	**Taranaki Whānui** **GW kaumatua**
1.35-2.05pm	Mihimihi, introductory remarks	**Hon Kiritapu Allan** Minister of Conservation **Cr Daran Ponter** Chair Greater Wellington
2.05-2.15pm	Safety briefing	**Ricky Clarkson, Principal Ranger**
2.15-4.00pm	Load into vehicles and travel to helipad Short walk up Georges Creek on way back if time Safe haven for threatened species, relocation of Kākāpō talk - Dell	**As per vehicle seating plan (see next page)** **All vehicles** **Jim Lynch, sanctuary advocate** **Tane Davis, Ngai Tahu**
By 4.30pm	Return to base and close	**All**

Attendees

Name	Organisation	Title
Hon Kiritapu Allan	DOC	Minister of Conservation
Sarah Campin-Fordham	Minister Allan's office	Private Secretary (Conservation)
Kris Ramm	DOC	Acting Director Operations, Lower NI
Ian Angus	DOC	Director Terrestrial Science
Angus Hulme-Moir	DOC	Operations Manager, Kapiti Wellington District
Ginny Anderson		MP – Hutt South
s.9(2)(a)	Ngai Tahu	Mana whenua expert guest
s.9(2)(a)	Taranaki Whānui	Mana whenua
TBC (2)	Taranaki Whānui	Mana whenua
Campbell Barry	HCC	Mayor
s.9(2)(a)	GW (not on trip)	Kaumatua & kuia (to bring the Minister and entourage on)
Jim Lynch	Independent	Sanctuary advocate & advisor
Danielle Shanahan	Zealandia	Incoming CE
s.9(2)(a)	Zealandia	Volunteer
Daran Ponter	GW	Council Chair
Thomas Nash	GW	Councillor
Nigel Corry	GW	Chief Executive
Amanda Cox	GW	Advisor to the Chair
Jimmy Young	GW	Manager Parks
Ricky Clarkson	GW	Principal Ranger
Vlad Macovicuic	GW	Park Ranger
Bruce Brewer	GW	Biosecurity Officer (Pest Animals)
Pauline Hill	GW (not on trip)	Senior Maori Advisor

Map and directions to Whitcher Grove



10 Whitcher Grove, Wainuiomata, Lower Hutt 5373
Follow the main road through Wainuiomata and turn left at the roundabout into Moores Valley Road. Take the first turn right into Whitcher Grove and follow this to the Recreation Area.

Attachment B

Read

Departmental Briefing

Department of Conservation
Te Papa Atawhai

In Confidence

GS ref: 21-B-0758
DOCCM: 6788889

To: Minister of Conservation **Date:** 29 September 2021

Subject: **Proposed Wainuiomata fenced sanctuary – Recommended Ministerial position**

Action sought: Agree recommendation.

Time Frame: Deadline Friday 15 October 2021.

Risk Assessment: Excluding the use of your Department's existing funds, while otherwise being supportive of the proposal may frustrate stakeholders and the perception it may weaken any funding opportunities.

Department's Priority: High

Level of Risk: Medium

Contacts

Name and position	Cellphone	First contact	Principal author
Marie Long, DDG Biodiversity	s.9(2)(a)	✓	
Mark Fitzpatrick, Director Terrestrial Science			✓

Executive summary – Whakarāpopoto ā kaiwhakahaere

1. This briefing provides an update on the assessment that DOC has completed about the benefits to biodiversity of the proposed Wainuiomata Fenced sanctuary. The proposal seeks to fence a significant area in the Wainuiomata catchment, similar in concept to Zealandia. Within this briefing is DOC's recommendation on the position we would like you to endorse.

2. DOC's strategic approach for managing predators to protect species is through non-fenced landscape pest control operations, rather than fenced sanctuaries. Large landscape predator-controlled areas provide habitat that can sustain translocated populations and enable management of critically threatened species. There is great potential to progress Predator Free 2050 work and create appropriate habitat for kākāpō and rowi in parts of Fiordland, Rakiura, for example. These are programmes already being considered and progressed.

3. The proposal may have ongoing financial implications.

4. The Department has undertaken a detailed assessment of the proposal and has established a position of support, but only in principle and with clearly defined limitations.

5. The proposal provides an important opportunity to aid kākāpō, rowi and hihi recovery. This is particularly significant for critically endangered kākāpō. It also continues to build the spectrum of societal connections to nature demonstrated regionally at Zealandia.

6. In supporting the proposal DOC considers that:

   - sources of funding for planning, fence construction and long-term maintenance of the project should be obtained independent of DOC's existing funding streams.
   - leadership of development, operation, and governance to remain with GWRC or perhaps an entity created by GWRC, mana whenua and other partners.
   - no further funds would be required from the DOC for the planning, establishment, or operation of the proposed sanctuary, outside of targeted management for kākāpō.

7. DOC also notes, that Daran Ponter, Chair of Greater Wellington Regional Council (GWRC), has written to you and Hon. Grant Robertson promoting the proposed Wainuiomata fenced sanctuary.

8. The correspondence from Daran presents a preview of key points in favour of the sanctuary and an approximate cost estimates from a draft feasibility analysis sponsored by GWRC and DOC. A full analysis is due in November 2021. The correspondence includes a cost estimate of $46.75 million over ten years for "pre-Budget planning processes". DOC will prepare a response to Daran that reflects your position once you have considered the recommendations contained within this briefing and have made your decisions.

We recommend that you … (Ngā tohutohu)

		Decision
(a)	**Agree** the following messages in principle in any further meetings and correspondence about the Wainuiomata fenced sanctuary proposal:	
	1. The proposal is a potentially valuable opportunity to aid kākāpō, rowi and hihi recovery. This is particularly significant for critically endangered kākāpō.	Yes / No
	2. This is a valuable opportunity to continue building the spectrum of societal connections to nature demonstrated regionally at Zealandia.	Yes / No
	3. There is a potential cost burden on DOC that would undermine the biodiversity gains of existing programmes developed nationwide across ecosystem, species, and pest priorities.	Yes / No
	4. Sources of funding should be obtained independent of the Department's existing funding streams.	Yes / No
	5. We respect the project leadership shown by GWRC and recommend that you direct the Department to participate with reasonable in-kind support.	Yes / No

s.9(2)(a)

/ /

Marie Long
Deputy-Director General, Biodiversity
For Director-General of Conservation

Hon Kiritapu Allan
Minister of Conservation

Purpose – Te aronga

1. To provide context on DOC's position on the Wainuiomata fenced sanctuary proposal that enables you to form a position that DOC and your office can communicate to external stakeholders.

Background and context – Te horopaki

2. A proposal has been developed to build a fence around 3,400 ha of forest that is vested in the Greater Wellington Regional Council as part of the 8,000-hectare Wainuiomata/Ōrongorongo water collection area.

3. The key premise of the proposal is to provide another secure, predator-free environment that will ensure the long-term persistence of a handful of forest birds currently threatened with extinction. Top candidates include kākāpō, hihi and rowi (kiwi). These threatened birds have shown strong recovery in recent decades, but further population growth is hampered by a lack of suitable pest-free islands, fenced sanctuaries, or mainland sites

with effective pest control. As at Zealandia, other birds, bats, reptiles, invertebrates, plants, and vegetation pattern would also likely benefit within the proposed sanctuary and within a halo of influence beyond the fence.

4. The initial proposal states a dependency on the Department of Conservation to provide financial support through both the establishment and operating phases. Previous Director-General (Lou Sanson) was invited by Greater Wellington Regional Council (GWRC) to conduct a site visit. During this site visit, the DG offered to provide $30,000, as well as in-kind support, toward the feasibility study for the proposal.

5. The timing of this briefing follows the completion of an assessment on the benefits to biodiversity of the proposed sanctuary. DOC is seeking to protect its committed resources while supporting the overall concept of this proposal.

6. In addition, you have received a letter from Daran Ponter - Chair GWRC, dated 20 September 2021, petitioning you and Hon Grant Robertson with a preview of a feasibility analysis due to be completed in November 2021.

7. GWRC are seeking that DOC be responsible for driving the budget bids for this proposal through government.

8. s.9(2)(a) [redacted]

9. Some benefits for species were outlined in support of the recent recommendation (21-M-0082) we made to accept an invitation to visit the proposal site.

Potential impacts of the Proposal

10. Seventeen species were evaluated by DOC for translocation potential into the proposed sanctuary. Analysis showed that the conservation status of three - hihi, rowi and kākāpō - would most likely improve over time if translocations into the site are successfuland populations establish within the sanctuary. While a change in conservation status is unlikely be the case for the other 14 species evaluated, their populations would gain some benefits from the protection provided by a large predator free area.

11. With a proposal to enclose a 3,500-hectare catchment, 15 times the size of Zealandia, the Wainuiomata sanctuary would challenge any New Zealand agency to fund the establishment and ongoing costs.

12. Greater Wellington Regional Council administers the catchment, but its leadership anticipates a shared vision with DOC and others because the DOC leads bird species conservation nationally (including much technical expertise and numerous partnerships).

13. Potentially, sharing the vision and forming a partnership could leverage at least some of the funds required for success. However, re-allocating funding from DOC's existing programme commitments would undermine a range of existing national conservation priorities. Due to the clear benefits for the species mentioned above however, it would be appropriate for DOC to provide in-kind support in the form of advice on translocations and monitoring, and associated plans for critical species. We do note that any translocations and management of kākāpō is funded by the kākāpō programme.

14. The proposal falls outside the most relevant of the Department's prioritisation processes (e.g., for ecosystems, for species management locations or for wide-scale pest control). DOC has an Optimised Landscape Scale Portfolio Work (OLSP) programme where sites are assessed and prioritised for management. The fenced area proposal for Wainuiomata did not rank in the top 10 sites for management. The site is also not an existing ecosystem management unit (EMU) or species management unit (SMU) that DOC is managing. EMU and SMU prioritisation is the way that we manage resources and ensure that we are delivery our highest priority work programmes.

15. Because of the substantial costs associated with this project, tensions may arise between GWRC as the regional agency holding a regional objective that has merit and, DOC's country-wide remit which is already balancing numerous competing biodiversity, cultural, historic, recreation and tourism objectives.

16. The large projected cost also means that a well organised fund-raising effort is needed and a government budget bid in this case is seen by GWRC as a potential solution.

17. This briefing does not address the merit of developing or supporting a specific Cabinet level budget bid to fund ten years of establishment of the proposed sanctuary.

Recommendation on the Proposal

18. In supporting the proposal DOC considers that:

- sources of funding for planning, fence construction and long-term maintenance of the project should be obtained independent of DOC's existing funding streams
- leadership of development, operation, and governance to remain with GWRC or perhaps an entity created by GWRC, mana whenua and other partners
- no further funds are required from the DOC for the planning, establishment, or operation of the proposed sanctuary, outside of targeted management for kākāpō.

Risk assessment – Aronga tūraruā

19. In supporting the intent of the proposal, the key conservation risk lies with making a commitment that could draw funding away from existing high priority conservation commitments and damaging the outcomes of those. However, this risk can be mitigated by the key messages provided above.

20. Qualified support that excludes the use of your Department's existing funds, risks a level of stakeholder frustration. s.9(2)(g)(i) [redacted] However continued transparency about why support is qualified (contained in the messages above), reduces this risk.

21. s.9(2)(g)(i) [redacted] This briefing and your decision on its recommendation should mitigate the risk.

22. If multiple Ministers and local MPs are petitioned about the proposal, s.9(2)(g)(i) [redacted]. However, your office may assess the level of risk and mitigation needed.

Treaty principles (section 4) – Ngā mātāpono Tiriti (section 4)

23. While the briefing unites your Office and DOC in responding to GWRC, there are two iwi entities also actively involved in this proposal. These are Te Runanganui o Taranaki Whānui and, with respect to kākāpō and rowi, Ngāi Tahu.

24. Appropriate iwi partnership is led by GWRC, but we should endeavour to be responsive to feedback from iwi, especially Ngāi Tahu, about our position taken.

Consultation – Kōrero whakawhiti

25. DOC has not initiated third-party consultation because the process to develop the proposal is being led by GWRC and they are consulting with numerous parties. DOC's active role has instead been to contribute to the feasibility analysis.

Financial implications – Te hīraunga pūtea

26. Noting that the petition from GWRC seeks >$40 million over ten years, there are financial implications for DOC if you support the proposal and don't take a position of qualified support.

27. Taking a position of qualified support means that financial implications for DOC would be avoided.

28. However, GWRC have signalled they would like DOC to seek Crown funding through appropriate means. DOC is not able to assess the financial implications of this bid for you at this stage OR until the feasibility study and a more complete budget is completed in November.

Next steps – Ngā tāwhaitanga

29. If you agree the recommendation, then DOC will aid your Office to prepare a communications plan to manage the potential confusion from contact with multiple Ministers by GWRC about the proposal. This will include a response to the letter received from GWRC.

30. The recommended action likely foreshadows GWRC tabling the completed feasibility analysis due November 2021. In jointly responding to this, DOC's position is likely to remain as briefed.

Attachment C

Department of Conservation
Te Papa Atawhai

File Ref: DOC-67897603

Date: 23 September 2021

To: Marie Long (DDG-Biodiversity)

From: Mark Fitzpatrick (Director, Biodiversity Group)

Subject: Recommendation and Acceptance of a DOC Position regarding the proposed Wainuiomata Sanctuary

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Context

A proposal has been developed to build a fence around 3,400 ha of forest that is vested in the Greater Wellington Regional Council as part of the 8,000-hectare Wainuiomata/Orongorongo water collection area. The initial proposal states a dependency on the Department of Conservation to provide financial support through both the establishment and operating phases.

Previous Director-General (Lou Sanson) was invited by Greater Wellington Regional Council (GWRC) to conduct a site visit. During this site visit, the DG offered to provide $30,000, as well as in-kind support, toward the feasibility study for the proposal.

The previous DG assigned SPA to develop a DOC position on the proposal, as well as engage in the feasibility study, to the previous DDG-Biodiversity (Jacquelyn Shannon). Jacquelyn assigned this to TSU Director (Mark Fitzpatrick) who has attended ongoing monthly governance meetings. The Terrestrial Science Unit has also completed a report assessing the proposal and providing a recommendation for the DOC Position, to the DDG-Biodiversity.

GWRC have been positioning the responsibility for driving the proposal as sitting with DOC, including engagement with Minister Shaw, Minister Allan and Minister Robertson, as well as through verbal statements in public meetings. We understand they are seeking a budget bid, led by DOC, to be included in the upcoming government budget round. Most recently (20 September, 2021), the chair of GWRC (Daran Ponter) wrote to Minister Allan and Minister Robertson a letter providing an update on the feasibility study stating it *"…may be used for pre-Budget planning processes*". The following table outlines the costs stated in the letter. The letter also states Minister Allan is conducting a site visit in the coming few weeks, along with an invite for Minister Robertson to visit for a second time.

Total project cost

Year	1	2	3	4	5	6	7	8	9	10	Total
Capex ($m)	0.5	6.75	9.75	7.75	5.0						$29.75
Opex ($m)	0.5	0.5	0.5	0.5	0.5	2.5	3.0	3.0	3.0	3.0	$17.0

It is important the Department now establishes a final position on the proposal and communicates this position to the relevant parties including the Minister of Conservation, GWRC and the members of the Feasibility Study Governance Group which includes Mana Whenua.

Recommendation and Overview of Findings

Appendix 1 of this Memo provides an assessment of the benefits to biodiversity. It does not include any sort of assessment on the economic benefits of the proposal, nor the benefits of this site over others, when considering DOC's carbon neutrality goal[1].

Based on information gathered and assessed, we recommend the DDG Biodiversity accept and maintain the following as the DOC position regarding this proposal:

DOC should support this proposal, but with the following three limitations and conditions:

1. **An independent entity being established that 'owns' the proposed sanctuary and its operation in partnership with mana whenua and GWRC.**
2. **Agreement that DOC's involvement would only extend to the provision of in-kind support.**
3. **Agreement that no further funds would be required from DOC for the planning, establishment, or operation of the proposed sanctuary**

The reason for this recommendation include:

- The proposal enables recovery efforts to be increased for some of our threatened species; namely kākāpō, rowi and hihi.
- This fenced location provides the security these species need when on the mainland. The proposal also enables DOC to manage kakapo genetics and breeding which is essential to ensure the recovery of this species continues.
- While we support this proposal for the above reasons, we recommend DOC does not lead the proposal, and that any support is offered conditional upon it obtaining a funding stream, independent of the Department.
- The most pertinent reasons for this recommendation are:
    - The site and proposal falls outside the most relevant of our prioritisation processes (e.g. Ecosystem Management Units (EMU);

1 Being on the mainland and close to a major city, it would offer easy, low-cost and low-carbon access for breeding management as well as excellent opportunities for kākāpō advocacy. Similar benefits are expected for hihi and kiwi.

Species Management Unit (SMU); landscape scale predator control) with the exception of threatened species management; and

- DOC's strategic positioning is to support landscape predator free approaches that sustain themselves without the need for fencing; and
- The species that would benefit most substantially from this programme, have alternate options available to the; and
- Funding this proposal would divert funds from existing prioritised work programmes, which could result in a net reduction of biodiversity benefit from our investment.

Formalisation of DOC Position

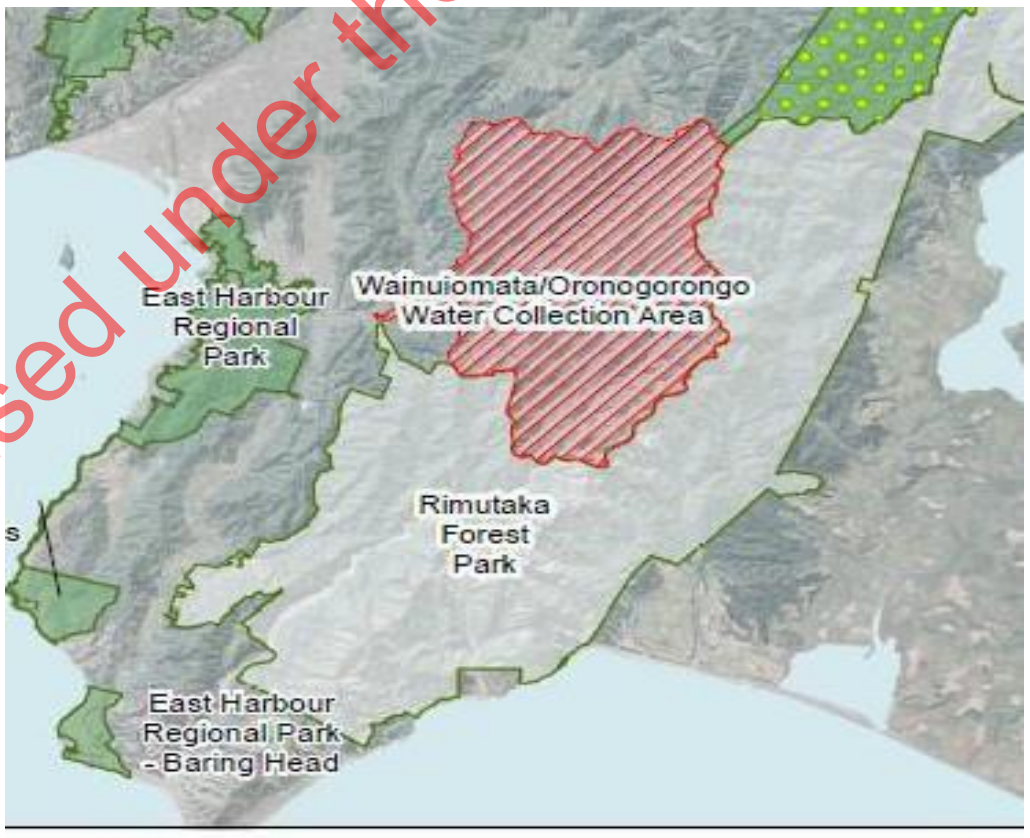
Decision	Confirmation (Yes/No)
The recommendation stated above in this memo is accepted as the DOC position and can now be communicated externally as such.	Yes
Signature	s.9(2)(a) [redacted]
	Marie Long
Date	30 September 2021

Appendix 1: Detailed Assessment of the Proposal

Benefits to Species' Recovery

The Site

1. The Wainuiomata water catchment is located two kilometres east of Wainuiomata township (part of Lower Hutt City). It is the headwaters of the Wainuiomata River. The water catchment consists of the west and east branches of the river with many tributary streams including Sinclair's Creek and Georges Creek. It is the western section of the 7,373-hectare Wainuiomata/Orongorongo Water Collection Area which includes the headwaters of the neighbouring Orongorongo River.
2. The Water Collection Area is part of a major complex of protected natural areas totalling approximately 40.000 ha which includes the neighbouring Wainuiomata/Lower Hutt City and private reserves, the East Harbour Regional Park (2,250 ha), Pakuratahi Forest (8,000 ha) and Remutaka Forest park (23,000 ha).
3. The site is roughly triangular and is approximately 3,350 hectares in size. It is enclosed by ridges separating it from three neighbouring valleys to the west (Moore's valley), north (Whiteman's Valley) and east (Orongorongo valley). The Wainuiomata Recreation Area, from where the catchment is accessed via Whitcher Grove and Reservoir Road, is immediately to the south.
4. The Remutaka Forest Park, which is adjacent to the site is managed by DOC. Greater Wellington Regional Council (GWRC) manages the Wainuiomata water catchment as part of Wellington's water supply infrastructure and the public has limited access to a small portion for recreational purposes. GWRC's investment at this site is significant, including control of ungulates, mustelids, rats, and possums to low levels across the Catchment.



Benefits to Fauna

5. The site supports a full range of more common native species such as NI rifleman, bellbird, shining cuckoo, Australian harrier, yellow-crowned parakeet, long-tailed cuckoo, NZ falcon, grey warbler, kereru, welcome swallow, whitehead, morepork, pied tit, tui, NI fantail, NZ kingfisher, and silvereye.
6. It is proposed to introduce rarer species such as hihi, rowi and kākāpō, once the fence is built.
7. Table one shows an analysis of all the species that have been proposed within the Wainuiomata Project Document. We have assessed if a fence is required for each species to be translocated, the potential change (if any) of the threat status over time, and if the site is required for persistence.
8. The current recommendation for three species; rowi, kakapo, and hihi are that they are put into fenced sanctuaries or offshore islands to ensure they are not predated. It is likely that if translocations of rowi and hihi are successful and the populations establish at this site, the threat status of these species would improve over time.

Table 1. Species that could be translocated into the Wainuiomata Proposed Site							
Species	**Current NZTCS Status**	**a) Is site suitable for a viable population?**	**b) Is a pest fence essential?**	**c) Required for persistence?**	**d) Lead to NZTCS status improvement?**	**No of pairs or individuals***	**Comments**
Kakapo	Threatened-Nationally critical	Yes	Yes	Yes	Yes, a change over time to Nationally Vulnerable	150 individuals	The Wainuiomata Catchment meets the criteria for a kākāpō breeding site in terms of size, habitat quality, lek display areas and, most importantly, the presence of large areas of rimu dominant forest, which is essential for successful breeding.
Rowi kiwi	Threatened – Nationally Vulnerable	Yes	Yes, at this stage as no other proven management prescription	Yes	Yes, once a population I secure and breeding	Site will hold 70-100 pairs, but NI brown kiwi must be removed first	Currently do not have a proven in-situ predator management prescription for this species, so a fenced sanctuary offers a good opportunity for growing the population until a proven management prescription is in place.
Hihi	Threatened – Nationally Vulnerable	Likely	Yes	Yes, but dependent on a large population establishing, which has some uncertainty associated	Yes, potential to move into relict (from Threatened to At Risk)	100-2000 individuals	Waiting on report from expert assessment which will give a better assessment of the site's potential.
NI Kokako	At Risk-recovering	Yes	No	No	No	420 pairs	Already recovering
NI Saddleback	At Risk-Recovering	Yes	Yes	No	No	Hundreds-low thousands of individuals, but dispersal post translocation is a risk	Already recovering and likely to be assessed as relict in next assessment.
NI kaka	At Risk - Recovering	Yes	No	No	No	Hundreds-low thousands of individuals	Already recovering, but unlikely this project alone would put in relict.
NI Robin	At Risk-Declining	Likely, but previous translocation failed, possibly due to dispersal	No	No	No	0-9000 pairs. Previous translocation failed so this depends if another is successful	Large population declining NZTCS status. This project could help but would be unlikely alone to make enough difference. Also, establishment uncertainty because of dispersal.
Red crown parakeets	Relict	Likely	Yes	No	No	Hundreds to low thousands but may not introduce due to competition with yellow crowns	Red-crowned = relict

Table 1 cont. Species that could be translocated into the Wainuiomata Proposed Site							
Species	**Current NZTCS Status**	**a) Is site suitable for a viable population?**	**b) Is a pest fence essential?**	**c) Required for persistence?**	**d) Lead to NZTCS status improvement?**	**No of pairs or individuals***	**Comments**
Giant weta (Cook Strait)	At Risk-Relict	Likely	Yes	No	No	Unknown, but estimate low thousands	We have other mainland sanctuary options for this species.
Fernbird	At Risk-Declining	Uncertain	No	No	No	Uncertain	Large population declining NZTCS status. This project might help but would be unlikely alone to make enough difference.
Brown teal	At Risk-Recovering	Uncertain	No	No	No	Uncertain	Not much wetland to provide suitable habitat
Blue duck	Threatened – nationally Vulnerable	Unlikely - uncertain how much of the catchment contained within the planned fence is suitable.	No	No	No	Uncertain – no technique for translocation	No technique for translocating whio to new sites unless highly isolated
Bittern	Threatened-Nationally Critical	Unlikely – too small, but could contribute a small amount of protected habitat for a highly mobile species	No	No	No	1 intermittent pair	
Banded rail	At Risk - Declining	Unlikely – too small	No	No		Uncertain	
Hamilton's frog	Threatened – Nationally Vulnerable		?	?		Uncertain	This species very likely requires mouse control
Takahe	Threatened-Nationally Vulnerable	No	Yes	No	No	1 or 2 pairs as ambassador birds only	Ambassador birds could go there only – habitat unsuitable
Yellow crown	Not threatened	Natural population present	No	No	No	Hundreds-low thousands	Yellow crowned+ not threatened

*These figures are an estimate only.

Kākāpō Recovery

9. There are currently 208 kākāpō, held on predator free, offshore islands. The species urgently requires more breeding habitat and returning birds to large areas of their former natural range is of highest priority. DOC and Ngāi Tahu's shared vision is to restore the mauri of the kākāpō. Rakiura and mainland Fiordland are preferred reintroduction sites, due to the whakapapa links of today's kākāpō population to these areas. Until these are ready for kākāpō, other sites are needed to grow the population.
10. Based on an initial site visit and information supplied, the Wainuiomata catchment meets the criteria for a kākāpō breeding site in terms of size, habitat quality, lek display areas and, most importantly, the presence of large areas of rimu-dominant forest, which is essential for successful breeding. If the catchment had a suitable predator-proof fence that kept kākāpō contained, it may prove to be an excellent site for kākāpō breeding. Wainuiomata could house up to 150 kākāpō.
11. DOC and Ngāi Tahu recognise that potential breeding sites of the quality that Wainuiomata offers are extremely rare. However, suitability of the site for kākāpō can only be determined with certainty by moving birds to the location. It would take many years to truly establish the site's potential. So, its suitability for kākāpō should be subject to ongoing assessment if the proposal progresses.

Rowi Recovery

12. Rowi are one of the most threatened kiwi taxa. The population estimate is at around 600 birds across two sites in New Zealand (Blumine Island and Mana Island; 2018-2028 Kiwi Recovery Plan).
13. The site could support 70-100 pairs of rowi. Currently do not have any other sites we can put rowi that provide security to the species by being pest free. One of the benefits of this site is that it falls within the historic known range of rowi. A predator free site of this size that is secured with a fence is currently not available for rowi and could provide significant benefits for the species.
14. Within the footprint of the site there could be some north island brown kiwi that would need to be removed from the site to stop them intermixing.

Hihi Recovery

15. The Hihi Recovery Group aims to increase the number of self-sustaining hihi populations to five, by establishing populations at new sites through translocation. If a successful translocation were to occur, and a population of hihi established, the result would be an improvement in the threat status of hihi.
16. The Hihi Recovery Group has completed a site visit on 15 July. They have informally said that the site is looking really promising for hihi and will be able to provide more information on the benefits to hihi in the near future. Their preliminary view is that the site does have potential and is of interest.
17. If Hihi were to be translocated into the site, there is no clear mechanism to fund their management, which would need to be planned. Hihi require supplementary feeding in nearly every site they are in. At this stage advice form the Recovery Group is that supplementary feeding would be required for the first 5 years after a translocation is completed. One of the benefits of supplementary feeding is that it does provide a mechanism for monitoring.

18. Supplementary feeding is currently carried out by the community groups that have raised money for the translocations to occur in the different locations in the north island where this has taken place. Feeders need to be changed every two days to reduce the chance of diseases
19. The recovery group estimates that the site could hold around 1500 hihi.
20. The Wainuiomata proposal provides a fenced site that is at a scale with habitat quality that we currently don't have for hihi populations.

Costs and management of species moved to the site

21. DOC will need to maintain oversight and management of kākāpō populations that are moved into the area. The kākāpō team have confirmed they are able to support and fund any work on the ground that is specific to kākāpō.
22. Hihi will require supplementary feeding at the site for at least 5 years after they are translocated into the site. Currently, supplementary feeding (changing nectar every two days) is run by the community groups, or sanctuaries that have received hihi. There is not funding that sits alongside hihi recovery that could be used to pay personal if hihi are moved to this site.
23. Rowi populations could be monitored once moved into the site, but do not require specialised support, other than pest free status being maintained at the site.
24. All species would be vulnerable to pest incursions, so maintenance and checking of the fence becomes a core expectation of translocations and management of this site.

Benefits to Flora

25. The catchment is part of the Tararua Ecological district and consists primarily of lowland rimurata/tawa-kamahi forest. This is typical of central and southern North Island lowland forest on better soils. While it is not a particularly threatened forest type at a national level, it has been substantially depleted by land clearance (19% remaining) and a lot of the remaining area has been degraded by logging, fire and browsing (Manaaki Whenua/Landcare -2004).
26. Rimu and kahikatea dominate in the valley bottoms and rimu/miro on higher ground. Matai is scattered throughout, and silver and red beech predominate on the highest perimeter ridgetops. The canopy consists primarily of hinau, tawa and kamahi. (O. Spearpoint 2020 see vegetation map at end). This forest type was once the dominant vegetation in the Wainuiomata and Hutt lowlands and valleys and the Wellington peninsula.
27. The Wainuiomata catchment represents a unique remnant outlier of this almost lost rimu/rata lowland ecosystem.
28. A feature of the forest is the extent of rimu which covers about 85% of the site and dominates the canopy with numerous emergent rata, which needs rimu as its primary host. The forest structure (emergents, canopy, subcanopy, shrub, lianes, floor) is largely intact except for parts of the shrub and floor layers which have been damaged by historical herbivore browsing.
29. Table 2 summarises different flora species that are known to be within the proposal site. There are both some potential risks (e.g., myrtle rust spread that would be considered during the Resource Consent stage) as well as benefits of the proposal to the flora in the area.
30. There has not been a botanical assessment completed at the site to determine what plants would benefit from complete removal of mammalian pests. However,

based on knowledge of some team members we have been able to complete a high-level assessment on the benefits of the site.

31. We expect the understory to continue to regenerate with the permanent removal of goats, deer, and possums. This will provide food for invertebrates and birds within the area.

Table 2. Assessment of flora

Species	Description	Significance to DOC
Species of the **Myrtaceae** family **CONSERVATION STATUS:** 'Threatened-Nationally Vulnerable' (de Lange et al. 2018) due to their vulnerability to myrtle rust	• There is a healthy population of ramarama (*Lophomyrthus bullata*) • The forest is dominated by northern rata (*Metrosideros robusta*) • Rata vine is also abundant (e.g., *Metrosideros perforata*) • A few swamp maire (*Syzygium maire*) is present and significant as this species is uncommon in the Wellington region. DOC and Otari Wilton Bush are researching ways to conserve seeds of this species (seed banking project). • Kanuka (*Kunzea robusta*?) and manuka (*Leptospernum scoparium*) are present.	• DOC should consider the protection and vulnerability of these species. • The building of fence and infrastructure could threaten these populations by spreading Myrtle rust in the area (see additional risk below).
Brachyglottis kirkii* var. *kirkii **CONSERVATION STATUS:** 'Threatened-Nationally Vulnerable' (de Lange et al. 2018) Regionally 'Endangered' (Crisp 2020)	• Wainuiomata catchment is a strong hold for this species. • GWRC is currently working with Otari Wilton Bush nursery in conserving and propagating this species. • This species could benefit from removal of grazers (deer and possum)	• This species is currently not managed by DOC

Mistletoe species
 	
Korthalsella salicornioides
CONSERVATION STATUS: 'Threatened-Nationally Critical' (de Lange et al. 2018)
 	
Tupeia antarctica
CONSERVATION STATUS: 'At Risk-Declining' (de Lange et al. 2018)
 	
Ileostylus micranthus
CONSERVATION STATUS: 'Not Threatened' (de Lange et al. 2018)
	• The three suggested species are suitable for the area.
	• Suitable habitat for these species might currently be limited and planting of host tree/shrub species might be needed prior to translocation.
	• *Peraxilla* species were not included in the list as there might not be good beech habitat within the proposed fence boundaries.
		• Translocation of threatened species of mistletoe in Wainuiomata is not a priority for DOC.
		• Conservation efforts should focus on the natural populations on DOC land in the Wellington regional region (e.g., Kapiti Island).
		  ○ These populations are not monitored due to lack of resources.
		  ○ It is however critical to ensure the genetic diversity of the species.

The Halo

32. The proposal suggests regular pest control in a 'halo' around the fenced site. The long-term goal is stated as "to have 10,000 hectares surrounding the area that is under sustained pest control".
33. The proposal estimates $1.5 million is required for the first year of management, with $1 million required annually to maintain the halo. The halo provides more security for any species that leave the fenced sites as they would be moving into an area that is receiving pest control.
34. It is not clear who would be expected to fund or execute this management, however large portions of it are PCL thus it may fall to DOC. This would be an additional deviation of funding allocation, from that determined through current prioritisation processes.

Relationships Considerations

35. In discussions with the Sanctuaries of New Zealand Chair, feedback was that while there is not necessarily a relationship risk for DOC if this bid is supported, or funding provided, other sanctuaries could ask us to provide technical support for their restoration plans and translocations in the same way we provide support to Wainuiomata. This is not something DOC currently resources, and such work would require a reprioritisation of technical advice.
36. There is already some public interest, and interest from Ministers in this proposal progressing. 9(2)(g)(i) [redacted]
37. Mana Whenua Taranaki Whānui ki te Upoko o te Ika strongly support the project. They have a close working relationship with GWRC as the land manager and have been engaged to complete a Cultural Impact Assessment by the Project Lead. .

Alignment to other DOC work programmes.

Te Mana o te Taiao

38. The proposal aligns with four of the outcomes within Te Mana o te Taiao. Outcome 1 "Ecosystems from mountain tops to the ocean depths are thriving Outcome 2 "Indigenous species are their habitats across Aotearoa New Zealandand beyond are thriving."
    Outcome 3 "People's lives are enriched through their connection with nature."
    Outcome 4 Treaty partners, whanau, hapu and iwi are exercising their full role as Rangatira and kaitiaki
39. While the implementation plan for Te Mana o te Taiao is still being developed it is easy to see that projects that are looking to provide protection the native flora and fauna align to this kaupapapa.

Optimised Landscape Scale Projects

40. Doc has an Optimised Landscape Scale Portfolio Work (OLSP) programme where sites are assessed and prioritised for management. The fenced area proposal for Wainuiomata did not rank in the top 10 sites for management. The site is also not an existing EMU (ecosystem management unit) that DOC is managing.
41. What this means is that the OLSP work programme would not be an appropriate source of funding for this project as the site did not fall within the top ten sites that are being progressed. It is not uncommon for sanctuaries to site alongside thework of DOC, and to not necessarily align directly with our work priorities. This is because the proposals are often community led and have a community of interest that sites behind it.

DOC's use of fences

42. DOC does use fences to protect different species in specific locations. Some examples include where we may have fenced a peninsula to protect some sea birds; a fence for a particular population of invertebrates, for instance snails; fences for populations of lizards. This is done on a case-by-case basis and is most commonly done to protect a population or species. Therefore, this proposal does align with other management DOC has put in place, and proposals from community groups that DOC may have supported in the past.

Conclusion

43. The proposal is highly likely to have a positive benefit to the threat status of at least three species of birds, as well as plants, invertebrates, and reptiles.
44. The close proximity to a large urban centre could help in raising the funds necessary to build and run the facility, as well as volunteers that may be required for different aspects of operating the site.
45. There would be significant de-investment in current conservation projects if DOC was to fund this proposal.
46. Such de-investment could see some species which are already threatened decline to the detriment of their current threat status.
47. Therefore, the recommendation is that DOC provide in-kind technical support for this proposal only.

Attachment D

Summary Sheet – Field event about the proposed Wainuiomata Sanctuary with Greater Wellington/DOC staff, Iwi and other key individuals on 30 November 2021

Event/Meeting with staff from Greater Wellington Regional Council and representatives from Taranaki Whānui, Ngāi Tahu and Jim Lynch (Sanctuary advocate & advisor).

Wainuiomata Sanctuary Field Trip. Meeting at Lower Dam Ranger Office, Wainuiomata Recreation Area, 10 Whitcher Grove, Wainuiomata, Lower Hutt 5373.

Visit on Tuesday 30 November 2021. Arriving at 1.00pm and leaving at 4.30pm.

DOC staff accompanying: Kris Ramm (Acting Director Operations, Lower North Island, Tel s.9(2)(a)); Ian Angus (Director Terrestrial Science, Tel s.9(2)(a)); and Angus Hulme-Moir (Operations Manager, Kapiti Wellington, Tel s.9(2)(a)).

Purpose – Te aronga

- The purpose of the event is to visit the proposed Wainuiomata Sanctuary site, meet with, and discuss the proposal with the key people involved.
- There will be an opportunity for you to provide introductory remarks during the welcome.

You will be meeting

Name	Organisation	Title
Ginny Anderson		MP – Hutt South
s.9(2)(a)	Ngāi Tahu	Iwi representative kākāpo recovery group
s.9(2)(a)	Taranaki Whānui	Mana whenua
TBC (2)	Taranaki Whānui	Mana whenua
s.9(2)(a)	GW	Kaumatua for Greater Wellington Regional Council. (Te Aitanga-a-Mahiki, Rongowhakaata, Tuhoe, Te Arawa)
s.9(2)(a)	GW	Kuia for Greater Wellington Regional Council. (Ati Awa)
Campbell Barry	Hutt City Council	Mayor
Jim Lynch	Independent	Sanctuary advocate & advisor
Danielle Shanahan	Zealandia	Incoming Chief Executive

s.9(2)(a) [redacted]	Zealandia	Volunteer
Daran Ponter	GW	Council Chair
Thomas Nash	GW	Councillor
Nigel Corry	GW	Chief Executive
Amanda Cox	GW	Advisor to the Chair
Jimmy Young	GW	Manager Parks
Ricky Clarkson	GW	Principal Ranger
Vlad Macovicuic	GW	Park Ranger
Bruce Brewer	GW	Biosecurity Officer (Pest Animals)
Pauline Hill	GW	Iwi liaison

Attachment E

Talking Points for the proposed Wainuiomata Sanctuary with Greater Wellington/DOC staff, Iwi and other key individuals on 30 November 2021

Hon Kiritapu Allan, Minister for Conservation Meeting staff from Greater Wellington Regional Council and representatives from Taranaki Whānui, Ngāi Tahu and Jim Lynch (Sanctuary advocate & advisor).

Tuesday 30 November 2021. Arriving at 1.00pm and leaving at 4.30pm.

Venue – Field event starting at the Lower Dam Ranger Office, Wainuiomata Recreation Area, 10 Whitcher Grove, Wainuiomata, Lower Hutt 5373.

Topic	Talking points
Comments on the people/ organisation being met	Acknowledge the work that GWRC has done in the Water Catchment to control pests to low levels and protect this significant stand of remnant forest. Acknowledge the collaboration with iwi both mana whenua and Ngāi tahu. Indicate interest in the cultural impact assessment once completed. Acknowledge the significant amount of work that has been undertaken on both developing the proposal and completing the feasibility study.
Financial support from DOC	DOC committed $30k and in-kind support to assist the parties to develop the feasibility report. Indicate interest in seeing the completed report.
The project / work / species programme	Acknowledge significant undertaking to create the sanctuary and the challenges of securing the long-term funding Acknowledge the leadership shown by Jim Lynch and Greater Wellington regional Council in progressing this work. Highlight need for robust governance and interest in how this will be achieved. Acknowledge the value that this project could have for several threatened species, particularly kākāpō.
If any questions are raised on funding	Acknowledge potential cost burden on the Department that would undermine nationally driven biodiversity work. Indicate interest in understanding funding streams been considered.
If any follow up questions are raised about	n/a
Tourism recovery	n/a

Attachment F

Wainuiomata Fenced Sanctuary Proposal

Key Messages

1. The Department of Conservation is currently completing due diligence on the proposal for a fenced sanctuary in Wainuiomata, Lower Hutt, and will work through the feasibility study that Greater Wellington Regional Council have commissioned

2. The proposal seeks to fence a significant area (3350 hectares) of native bush in Wainuiomata, similar in concept Wellington's Zealandia wildlife sanctuary in Karori. The Wainuiomata sanctuary would be approximately 15 times larger than Zealandia.

3. The proposed sanctuary would provide a valuable opportunity to aid kākāpo, rowi, and hihi recovery. This is particularly significant for the critically endangered kākāpō, of which only 201 survive today; this sanctuary could provide a home for up to 150 kākāpō.

4. The area is important as of few places that meet ideal conditions needed to support breeding kākāpō, including mature Rimu trees. It is also located near both Remutaka Forest Park and Pakuratahi Forest, which would allow recovered species to spread out and repopulate these sites through a halo effect.

5. The Department of Conservation's kākāpō team and Ngāi Tahu had been involved in early discussions about the project. Greater Wellington Regional Council is leading the proposal and DOC is providing some in-kind support in the early stages of the project. This includes the feasibility study commissioned by GWRC.

Read	

Departmental Briefing

Department of Conservation
Te Papa Atawhai

In Confidence

GS ref: 21-B-1022
DOCCM: **DOC-6873367**

To: Minister of Conservation **Date:** 15 December 2021

Subject: **Wainuiomata Wildlife Sanctuary Budget Bid Pathway**

Action sought: Consider and decide on most suitable budget bid pathway

Time Frame: 16 December 2021

Risk Assessment: 9(2)(g)(i) [redacted]

Department's Priority: High

Level of Risk: Medium

Contacts

Name and position	Cellphone	First contact	Principal author
Mark Fitzpatrick; Director, Biodiversity	s.9(2)(a) [redacted]	✓	
Rachel Bruce; DDG, Corporate Services	s.9(2)(a) [redacted]		✓

Executive summary – Whakarāpopoto ā kaiwhakahaere

1. A budget bid has been requested for the construction of a 3,313ha fenced ecosanctuary in Wainuiomata, on land owned by Greater Wellington Regional Council (GWRC).
2. Three options outside of the Natural resource Cluster (NRC) process have been identified for your consideration.
3. All three options rely on the ongoing maintenance and operational costs of the proposal, being met by Greater Wellington Regional Council (GWRC).
4. All three options include the funding required to build the fence.
5. Option 1 includes enough OPEX to fund the initial pest eradication requirements.
6. Options 2 and 3 do not include OPEX for eradication. Rather they recommend the Provincial Growth Fund and GWRC, respectively, as the potential source of these funds.
7. We recommend Option 1 because the Provincial Growth Fund (PGF) and GWRC have not been confirmed as viable pathways for funding. 9(2)(g)(i) [redacted]
8. Should you agree to our recommendation, we will submit a budget bid (**Appendix A**) to the Minister of Finance for consideration, no later than 12pm Friday 17 December 2021. This budget bid would need to be accompanied by a letter from you (**Appendix B**) stating your support for the initiative.

We recommend that you … (Ngā tohutohu)

		Decision
(a)	Agree that we proceed with Option 1 **(recommended)**: *"DOC submits a budget bid, outside the NRC process, to fund the building and fencing of the sanctuary, that includes enough opex to fund the initial pest eradication requirements – estimated to be $31.2m."*	Yes / No
(b)	Agree that we proceed with Option 2 (not recommended): *"DOC submits a budget bid, outside the NRC process, only for the funding required to fund the building and fencing of the reserve – estimated to be **$19.2m** - and the GWRC seeks funding for pest eradication from the Provincial Growth Fund (PGF)"*	Yes / No
(c)	Agree that we proceed with Option 3 (not recommended): *"DOC submits a budget bid, outside the NRC process, only for the funding required to fund the building and fencing of the reserve – estimated to be **$19.2m** - and the GWRC fully funds the cost of pest eradication"*	Yes / No

s.9(2)(a) [redacted]

Rachel Bruce
DDG Corporate Services
For Director-General of Conservation

Hon Kiritapu Allan
Minister of Conservation

Purpose – Te aronga

1. This briefing provides you with a high-level overview of funding options for the Wainuiomata Wildlife Sanctuary, outside of the Natural resource Cluster (NRC) process.

2. The proposal is to fund the construction of a 28.8 km pest proof fence and associated infrastructure and pest eradication works, to develop and run a pest free sanctuary for critical nationally endangered species (including kākāpō, rowi and hihi) on 3,313ha of land owned by Greater Wellington Regional Council (GWRC), in Wainuiomata.

Background and context – Te horopaki

3. There are three options for seeking funding outside of the NRC process, all three require DOC to submit a budget bid:

   I. DOC submits a budget bid, outside the NRC process, to fund the building and fencing of the sanctuary, that includes enough opex to fund the initial pest eradication requirements – estimated to be **$31.2m**

   II. DOC submits a budget bid, outside the NRC process, only for the funding required for the construction of the building and fencing of the sanctuary – estimated to be **$19.2m** – and the GWRC seeks funding for pest eradication from the Provincial Growth Fund (PGF)

   III. DOC submits a budget bid, outside the NRC process, only for the funding required for the construction of the building and fencing of the sanctuary – estimated to be **$19.2m** - and the GWRC fully funds the cost of pest eradication

4. For all three options, DOC would expect the GWRC to cover the ongoing costs of maintenance and pest control for the sanctuary.

Risk assessment – Aronga tūraru

5. Option 1 is recommended as it is the only currently known pathway that will enable the proposal to proceed, at this stage.

6. Assessments for the potential of either the PGF 9(2)(g)(i) [redacted] to fund the eradication, have not been undertaken and are considered unlikely, although still possible.

7. Accordingly, should Option 2 or Option 3 be selected, there is a medium to high likelihood the budget bid will not sufficiently fund the proposal to make the initiative viable.

Treaty principles (section 4) – Ngā mātāpono Tiriti (section 4)

8. The mana whenua is Taranaki Whānui, represented by the Port Nicholson Block Settlement Trust (PNBST) and two local marae (Waiwhetu and Wainuiomata). They have participated in this proposal from its genesis and support it.

9. Ngāi Tahu are the kaitiaki of kākāpō and rowi, two of the more significant species that would benefit from this proposal. Ngāi Tahu have been involved in the proposal to date, including a site visit by the kākāpō species representative (Tane Davis) who provided verbal support for the initiative.

10. Because the proposal includes the translocation of taonga species to Wainuiomata, continuing to work collaboratively with Taranaki Whānui, Ngāi Tahu, and any other

whānau, hapū, iwi who hold interests in those taonga, will be essential to the success of this project.

Financial implications – Te hīraunga pūtea

11. The financial implication of this proposal is the reliance on Crown funding for the establishment of the sanctuary.

Next steps – Ngā tāwhaitanga

12. If you agree to the recommendation of Option 1, the budget bid will be submitted to the Minister of Finance for consideration, no later than 12pm Friday, 17 December 2021.

13. The budget bid will be accompanied by a letter from you to the Minister of Finance, stating your support for the initiative and the funding required to establish the sanctuary.

14. Further work on the budget bid may be required in January, pending a review by Treasury.

Attachments – Ngā tāpiritanga

15. Attached as **Appendix A** is an indicative budget bid, produced on the assumption that Option 1 would be the most suitable. This initiative will need to be submitted to the Minister of Finance for consideration no later than 12pm Friday, 17 December 2021.

16. Attached as **Appendix B** is a letter from you to the Minister of Finance, which will require your signature and will accompany the budget bid.

ENDS

Budget 2022 Initiative Summary – Main Budget Process

Puketahā - Wainuiomata Ecosanctuary

Section 1: Overview

This section must be completed for all initiatives.

Section 1A: Basic Initiative Information

Lead Minister	Minister of Conservation					
Department	Department of Conservation					
What type of initiative is this?	Critical cost pressure initiative		Manifesto commitment initiative	X	Health and Disability System Reform initiative	
	Climate Emergency Response Fund initiative		Savings initiative		Non-Spending initiative	
Initiative description [max 800 Characters]	This initiative will fund the construction of a 28.8 km pest proof fence and associated infrastructure and pest eradication works to develop and run a 3,313ha pest free sanctuary for critical nationally endangered species (including kākāpō, rowi kiwi and hihi) on land owned by Greater Wellington Regional Council.					
Is this a Cross-Vote initiative?	N					
Department contact	Freya Love - flove@doc.govt.nz Ph. s.9(2)(a)					
Treasury contact	Jinal Mehta – Jinal.mehta@treasury.govt.nz – Vote Conservation analyst Tim Stevenson - Tim.Stevenson@treasury.govt.nz – Ph. s.9(2)(a)					

Section 1B: Total Funding Sought (ten Years)

Capital funding sought ($m)	2021/22	2022/23	2023/24	2024/25	2025/26 & outyears	Total
	Nil	Nil	Nil	Nil	Nil	Nil

Operating funding sought ($m)	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31	Total
	0.350	0.300	1.700	6.358	10.997	7.514	4.030	0.000	0.000	0.000	31.249

Section 1C: Initiative Classifications

Is this initiative seeking funding from the Climate Emergency Response Fund (CERF)? [max 300 characters in CFISnet].	**N**	
Is this initiative climate-related, but not seeking funding from the CERF? [max 300 characters in CFISnet].	**Y**	This initiative will contribute to carbon storage at a local scale through the removal of introduced herbivores within the project area. This allows carbon to sequester unimpeded by the impacts of browsing animals and therefore assists with net emissions targets. Ongoing management of kākāpō at this site would generate a lower carbon footprint relative to alternate sites, due to the central location, close to Wellington.
Does this initiative align with the Crown's obligations under the Treaty of Waitangi?	**Strong**	The initiative is intended to be a co-governance and co-management partnership with iwi, Greater Wellington Regional Council (GWRC), and Department of Conservation (DOC). Taranaki Whānui support the initiative as a means to establish lost taonga species and/or strengthen the security of taonga species.

Specify if this initiative will help reduce child poverty and describe the impact [max 300 characters in CFISnet].	**Indirect impact**	The initiative is anticipated to provide economic value added to a low socio-economic area (Wainuiomata) of circa $100 million over 10 years and create 47 three-year FTE and 12 permanent FTE in the locality.								
Does this initiative align with the Child and Youth Wellbeing Strategy?	**N**									
Does the initiative include funding to procure from NGOs?	**N**	.								
Does the initiative include funding to support digital and data related investments?	**N**									
Is this a regulatory or legislative initiative (according to the guidance provided)?	**N**									
	N									
	N									
	N									
Is this a significant investment initiative per the definition at section 4.8 of the Budget 2022 guidance?	**Y**									
		Data / Digital / ICT		Physical Infrastructure	X	Organisational Transformation		Specialised Equipment		
	See Annex A for further questions – mandatory to complete for all significant initiatives									

Section 2: Cost pressure information [THIS SECTION IS NOT APPLICABLE]

This section must be completed for all cost pressure initiatives. Skip this section for Manifesto Commitment, Savings, Non-Spending, Health and Disability System Reform (HDSR), Climate Emergency Response Fund (CERF) and Pre-Commitment initiatives.

*See **section 4.2** of the Budget 2022 guidance for more information on cost pressure initiatives.*

Answers must not exceed 1-2 paragraphs per section.						
Cost pressure driver		Volume		Price		Personnel (driven by volume/price)
Cost pressure description	*Provide evidence of what caused the pressure (e.g. population growth, price increases, wage pressures including FTE changes). This should correspond to the further detail provided in the 'funding sought by component' table in Section 5 of this document.*					
	*Indicate whether this cost pressure is **critical** (i.e. are there significant delivery or legal risks if funding is not provided? Could funding be deferred to future Budgets?)*					
Cost pressure management	*Provide an overview of why the pressure cannot be funded from baselines and what steps have been taken to manage the pressure.*					
Case for funding	*Explain how additional funding will mitigate or resolve the pressure, and provide an overview of what outputs it is purchasing.*					

Section 3: Value

Section 3 must be completed for all initiatives, unless exempted by the Minister of Finance in the invitation letter. Further information on the questions in this section can be found at ***Annex Two*** *of the Budget 2022 guidance.*

This section explains the initiative's value, drawing on elements of He Ara Waiora (section 3A) and the Living Standards Framework (Section 3D). For explanations of these two frameworks, please see the accompanying guidance.

Explanation

Intervention logic terms such as outputs, impacts, and goals can have different definitions. Please see table below for how the Treasury defines these concepts.

Explanation Table		
This explanation table is for your reference only. Do not fill out the sections.		
	Definition	**Example**
Outputs	The good or service the initiative is purchasing.	
Impact	The direct effect of the initiative.	
Goals	What this initiative aims to achieve.	

Section 3A: Opportunity/Problem

Opportunity/Problem

The Problem

There are a significant number of nationally threatened and at risk forest species which require predator-free habitat. Due to breeding success, we need to find new habitat to continue their population growth trajectory. Many of these species are not found on islands but do have mainland sustainable populations. For those that do not, it is critical that mainland locations are available to home these threatened species to provide sufficient suitable habitat to ensure long term security of the species (e.g., kākāpō, rowi kiwi, kiwi pukupuku, hihi, tīeke, tuatara, Cook Strait giant wētā).

The Opportunity

The case for predator fencing Wainuiomata rests primarily on its habitat potential for a significant number of these critically endangered indigenous species. The unique features of Wainuiomata that make it important for threatened species management is its size (3,313 ha), the quality of the habitat (largely unmodified lowland podocarp, broadleaf forest) and its accessibility (30 minutes from downtown Wellington). Sites of the quality of Wainuiomata are very rare and often remote.

Wainuiomata is rare in being uniquely configured for and efficient to predator fencing and has particular value for the following species:

- **Kākāpō**. (*Strigops habroptilus*). As of 2021, there are 201 kākāpō (conservation status - Nationally Critical) in existence and availability of secure habitat is becoming a problem.
- **Kiwi**. The indigenous kiwi of Wellington are the little spotted kiwi (*Apteryx owenii*) (conservation status - At Risk – Recovering), and the rowi kiwi (*Apteryx rowi*) (conservation status – Nationally Vulnerable). Both are in need of additional secure habitat.
- **Hihi**. (Stitchbird, *Notiomystis cincta*). Hihi (conservation status - Nationally Vulnerable) are the only member of a deeply endemic NZ family, indigenous to the North Island, whose closest relations are the NZ wattlebirds. The only secure population not dependent on supplemental feeding is on Little Barrier Island.

There are many other species which are nationally threatened or at risk, and could improve their status and increase their range, through the establishment of a large area of safe breeding habitat (tīeke/saddleback, whio/blue duck, kōkako, kākā, kākāriki, toutouwai/NI robin, pāteke/brown teal, etc).

Section 3B: He Ara Waiora

Tikanga- decisions are made by the right decision-makers, following a tikanga process, according to tikanga values	Te ao Māori perspectives and values, specifically those of Taranaki Whānui, have been sought from the start of the project. The mana whenua is Taranaki Whānui, represented by the Port Nicholson Block Settlement Trust (PNBST) and two local marae (Waiwhetu and Wainuiomata). They have participated in this proposal from its genesis and support it. Ngāi Tahu are the kaitiaki of kākāpō and have been fully involved in the proposal to date, including a site visit by the kākāpō species representative along with verbal support for the initiative. Continuing to work with Ngāi Tahu will be essential to the success of this project if it is to be home to kākāpō and rowi.
Manaakitanga- focus on improved wellbeing and enhanced mana for iwi and Māori, and for other affected communities and groups, demonstrating an ethic of care and mutual respect	The initiative is intended to be a co-governance and co-management model in partnership with mana whenua, GWRC and DOC. A Cultural Safety Report has been commissioned and received from PNBST and this will guide the project as it moves forward.

Section 3C: Outputs – The good or service the initiative purchases

Output	Description
Pest free threatened species habitat	The initiative will provide 3,313 hectares of permanently pest-free, secure, and highest quality breeding habitat for three nationally endangered species and ten regionally threatened species in a highly accessible locality.
Partnership	The initiative will give effect to the ANZBS by providing a model of partnership between mana whenua, DOC, and territorial authority (GW) and the community.

Landscape improvement	The initiative will not only improve the habitat within the fenced sanctuary, but it will enhance birdlife and seed dispersal in the surrounding Remutaka range and increase the biodiversity of the wider environment.

Section 3D: Impacts – The direct effect of the initiative		
Impact 1	**Description of the impact**	Improvement in the conservation status and security of kākāpō, rowi kiwi and hihi – with the potential to significantly increase their current populations.
	Quantification	The kākāpō population may increase from 201 (2021) to more than 350 . The rowi population may increase from 650 (2012) to more than 1,000. The hihi population may increase by up 30% to 40% and this could happen without the need for supplementary feeding.
	Supporting Evidence	Feasibility study and DOC report, including recovery group assessments. Lynch (2021)
	Gaps in Evidence	Data on hihi population and the habitat potential for hihi at Wainuiomata is an assessment by expert operators based on a site visit.
	Assumptions	That these species will establish and breed at Wainuiomata. That the site is fenced and cleared of pests and kept clear of pests.
	Implications	All risks have been assessed by relevant experts based on precedent and best practice.
Impact 2	**Description of the impact**	Improvement in the conservation status and security of nine other at risk or threatened species which will establish in the fenced area
	Quantification	Reintroduced species, along with their conservation status: • tīeke/saddleback (At Risk – Recovering), • kōkako (At Risk – Recovering), • kākā (At Risk – Recovering), • red crowned kākāriki (At Risk – Relict), • toutouwai/NI robin (At Risk – Declining), • pāteke/brown teal (At Risk – Recovering), • whio/blue duck (Nationally Vulnerable), • Cook Strait giant wētā (At Risk – Relict), • tuatara (At Risk – Relict) These species ccould increase their total populations by 20%-30% by establishing in the fenced area.
	Supporting Evidence	Feasibility study and DOC report, including recovery group assessments. Lynch (2021)
	Gaps in Evidence	Data on species populations and the habitat potential of Wainuiomata is an assessment by expert operators based on site visits and reports.
	Assumptions	That these species will establish and breed at Wainuiomata. That the site is fenced and cleared of pests and kept clear of pests.
	Implications	All risks have been assessed by relevant experts based on precedent and best practice.
Impact 3	**Description of the impact**	Expansion of the range of other nationally threatened or at-risk species.
	Quantification	Eight species have potential to establish and spread in the surrounding 40,000-hectare Remutaka Range: • tīeke/saddleback, • kōkako, • kākā, • red crowned kākāriki, • toutouwai/NI robin, • pāteke/brown teal, • Cook Strait giant wētā, • whio/blue duck.

	Supporting Evidence	Feasibility study and report in association with DOC and PF 2050 Ltd. Lynch (2021) Appendix P.
	Gaps in Evidence	Data on the 'halo' effect is very deficient and largely limited to Wellington City (cited in the above Appendix and study). This will represent a new opportunity to observe this effect in a large adjacent indigenous landscape.
	Assumptions	That these species will establish and breed at Wainuiomata. That the site is fenced and cleared of pests and kept clear of pests. That they will in time migrate and survive outside the fenced area.
	Implications	All risks have been assessed by relevant experts based on precedent and best practice.
Impact 4	**Description of the impact**	Restoration of mana, mātauranga Māori and kaitiaki of the area for local iwi.
	Quantification	There is one local iwi (Taranaki Whānui).
	Supporting Evidence	Feasibility study-Lynch (2021) and cultural safety report, (PNBS Trust).
	Gaps in Evidence	NA
	Assumptions	That the mana whenua will participate in the project. Mana whenua who are kaitiaki for taonga species are supportive of translocation of the taonga to this location (Ngāi Tahu are the kaitiaki of kākāpō and rowi)
	Implications	NA
Impact 5	**Description of the impact**	The creation of economic value added and jobs in a low socio-economic area and opportunities for the public to engage with and support species which are largely inaccessible.
	Quantification	Estimate $100 million plus EVA to the locality over ten years. The creation of 47 three-year FTEs and 12 permanent FTEs in a lower socio-economic area. The raising of funds through donations, grants, and pro-bono services, assessed as $3,400,000 over 10 years.
	Supporting Evidence	Feasibility study-Lynch (2021) and social and economic impact report. This assessed the impacts of a range of fenced sanctuaries.
	Gaps in Evidence	Wainuiomata socio-economic status.
	Assumptions	That the project will create interest in the wider community.
	Implications	Assumptions are based on twenty years of precedent and experience.

Section 3E: Goals – What this initiative aims to achieve

Goal 1	**Description**	A significant improvement for indigenous biodiversity.
	Quantification	Change of status for three nationally threatened species. Improved conservation status for seven other species. Extension of range for seven other species into the 40,000 ha Remutaka range. 3,313 ha free of pests.
	Timeframes	Long term. It takes 7 years to build the infrastructure and establishing species can take decades before they reach carrying capacity.
	Evidence and Assumptions	Please refer to the 2021 Feasibility study for the Wainuiomata Sanctuary.
	Implications	Risks have been fully assessed in the above study.
Goal 2	**Description**	Preservation of key aspects of our national identity.

	Quantification	Our national identity is closely identified with our unique forests, fauna, and landscapes and our indigenous heritage. This project has strong links to all of these as it will re-create a significant sizzed area to its (near) pre-European state.
	Timeframes	As for goal 1
	Evidence and Assumptions	Please refer to the 2012 Feasibility study for the Wainuiomata Sanctuary.
	Implications	Risks have been fully assessed in the above study.
Goal 3	**Description**	Empowerment and engagement of Māori in governance and management.
	Quantification	See 2021 Feasibility study.
	Timeframes	As for goals 1 and 2. Above.
	Evidence and Assumptions	See 2021 Feasibility study
	Implications	As for goals 1 and 2 above.
Goal 4	**Description**	Attitudinal shift in the wider community to increase support for our indigenous world.
	Quantification	Level of financial support from the community (donations, pro-bono services, grants. Assessed as $3.4 million over the first 10 years. Number of members (1,000 plus) and volunteers (300 plus). Longer term, visitors may be encouraged with care.
	Timeframes	As for goals 1 to 3 above.
	Evidence and Assumptions	• See 2021 Feasibility study
	Implications	• As for goals 1 and 2 above.

Section 3F: Distributional Analysis

Question 1: Does the initiative have the following types of distributional impacts for Māori?	A	Direct		**Indirect**	**X**	No Impact	
		If direct, please complete Question 1B. If indirect or no impact, please progress to Question 2.					
	B	Targeted and tailored for Māori		Disproportionate positive impact		Other *(explain)*	
		Please explain why the initiative falls under the category identified in B above [max. 300 characters in CFISnet].					
Question 2: Does the initiative have the following types of distributional impacts for Pacific Peoples?	A	Direct		Indirect		**No Impact**	**X**
		If direct, please complete Question 2B. If indirect or no impact, please progress to Question 3.					
	B	Targeted and tailored for Pacific Peoples		Disproportionate positive impact		Other *(explain)*	
		Please explain why the initiative falls under the category identified in B above [max. 300 characters in CFISnet].					
Question 3: Does the initiative have the following types of distributional impacts for children?	A	Direct		**Indirect**	**X**	No Impact	
		If direct, please complete Question 3B. If indirect or no impact, please progress to Question 4.					
	B	Targeted and tailored for children		Disproportionate positive impact		Other *(explain)*	
		Please explain why the initiative falls under the category identified in B above [max. 300 characters in CFISnet].					
Question 4: Does the initiative have direct impacts on any other population groups?	Y	The local population through positive employment opportunities in Wainuiomata.					

Question 5: What region is this initiative expected to impact?		*All of New Zealand*		*Gisborne*		*Northland*		*Tasman*
		Areas outside regions		*Hawke's Bay*		*Offshore*		*Waikato*
		Auckland		*Manawatu-Whanganui*		*Otago*	**X**	***Wellington***
		Bay of Plenty		*Marlborough*		*Southland*		*West Coast*
		Canterbury		*Nelson*		*Taranaki*		

Section 4: Alignment

Section 4 must be completed for all initiatives, unless exempted by the Minister of Finance in the invitation letter. Further information on the questions in this section can be found at ***Annex Two*** *of the Budget 2022 guidance.*

Section 4A: Strategic Alignment	
How does this initiative link with your strategic intentions/statement of intent?	This initiative aligns with Outcome 2 of the Aotearoa New Zealand Biodiversity Strategy (2020) (ANZBS), Indigenous species and their habitats across Aotearoa New Zealand and beyond are thriving and in particular the following Goals: 2025 Goal 10.7.1: There have been no known human-driven extinctions of indigenous species 2030 Goal 10.7.2: Populations of all indigenous species known to be at risk of extinction are being managed to ensure their future stability or an improving state 2050 Goal 10.7.3: Indigenous species have expanded in range, abundance and genetic diversity and are more resilient to pressures, including climate change The initiative also contributes to other Goals in the ANZBS: 2030 Goal 11.2.2: Introduced predators (ferrets, weasels, stoats, possums, and rats) have been eradicated from one inhabited island, one city or town, and 10 000 hectares of rural production land, and their eradication in 10 large mainland sites is underway 2030 Goal 13.1.2: Carbon storage from the restoration of indigenous ecosystems, including wetlands, forests, and coastal and marine ecosystems (blue carbon), contributes to our net emissions targets The initiative contributes to the Department of Conservation Stretch Goal: 90% of our threatened species across New Zealand's ecosystems are managed to enhance their populations.
Does this initiative link with other sectoral or whole-of-government strategies (e.g. the Pacific Wellbeing Outcomes Frameworks)?	No.
Does this initiative impact other agencies directly or indirectly? If so, how?	No.

Section 4B: Alignment to Government's goals	
The Government's goals for this term are: **1) Continuing to keep New Zealand safe from COVID-19** **2) Accelerating the recovery and rebuild from the impacts of COIVD-19** **3) Laying the foundations for the future, including addressing key issues such as our climate change response, housing affordability and child poverty**	
Alignment to Government goals	This initiative supports two of the three Government goals for this term. Accelerating the recovery and rebuild from the impacts of COVID-19 through two key pathways including a new and exciting tourism venture within the Wellington region attracting more visitors, as well as the creation of 47 jobs in the near term, for 3 years, followed by 12 permanent jobs in the long term. This initiative will contribute to our climate change response through enhanced biodiversity management, removal of ungulates and increased sequestration, along with a lower carbon footprint for the threatened species management programmes, particularly for kākāpō when compared to the carbon footprint of alternate sites.

Section 4C: Contribution to the Government's Wellbeing Objectives

The Government's five wellbeing Objectives are:

- **Just Transition:** supporting the transition to a climate-resilient, sustainable, and low-emissions economy.
- **Future of Work:** enabling all New Zealanders and New Zealand businesses to benefit from new technologies and lift productivity and wages through innovation
- **Physical and Mental Wellbeing:** supporting improved health outcomes for all New Zealanders, including protecting New Zealanders from the impacts of COVID-19.
- **Māori and Pacific:** lifting Māori and Pacific incomes, skills, and opportunities, including through access to affordable, safe, and stable housing
- **Child Wellbeing:** reducing child poverty and improving child wellbeing, including through access to affordable, safe, and stable housing.

Please note: these objectives have been agreed by Cabinet subject to wider consultation. The final versions of the objectives will be published in the Budget Policy Statement in December 2021.

Contribution to Wellbeing Objective(s)	Physical and Mental Wellbeing The identity of many New Zealanders is connected with the environment. This initiative would enablepeople to connect with native species they otherwise would not be able to. This is particularly the case for kākāpō which is currently only found in uninhabited offshore islands where few people visit. Having the kākāpō within an hour of Wellington, would makethis connection possible with relative ease. Given the protection of the site, and its scale, visitors would be able to experience native habitat in its untouched form, at a level not found elsewhere, particularly in such close proximity to a main centre.

Section 5: Delivery

*Section 5 must be completed for all initiatives. Further information on the questions in this section can be found at **Annex Two** of the Budget 2022 guidance.*

Section 5A: Fit with existing activity

The answer must not exceed 1-2 paragraphs.

How does the initiative link with existing initiatives with similar objectives?	*Not Applicable.*	
Is the initiative an expansion or a cost pressure for an existing initiative?	*N*	***If yes, provide a concise overview of how this initiative will expand on or maintain existing services.***
		If no, move on to section 5B.

Provide an overview of existing funding levels for this initiative, and/or initiatives with similar objectives, in the two tables below.

	Operating Funding profile ($m)										
	21/22	**22/23**	**23/24**	**24/25**	**25/26**	**26/27**	**27/28**	**28/29**	**29/30**	**30/31**	**Total**
Existing funding for this/similar initiatives	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total funding sought for this initiative	0.350	0.300	1.700	6.358	10.997	7.514	4.030	0.000	0.000	0.000	31.249
% change between existing funding and funding sought	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Comments (optional)	There is no existing baseline for this initiative.										

Section 5B: Funding sought by input

Provide a breakdown of what the requested funding will purchase. Briefly explain the formula used, or key assumptions made, to calculate the cost of each output. Add additional rows to the table as needed to capture each output separately. Please include which Vote(s) will be impacted by each component.

Formula and assumptions underlying costings	*Costings built on(a) indicative prices from potential contractors and/or standard values for asset construction items. (b) GWRC labour formula for labour and wages ($62 per hour) AND (c) historical costs for precedents and similar operations. The eradication and operating has been provided by the GWRC biosecurity and pest management team and DOC technical experts. .*

FTE-specific Input Information (if applicable)						
New FTE funding						6.3
New contractor funding						
Additional FTE overhead funding						
Total						6.3
# of FTE's (employees and/or contractors)						
What's the % increase in FTE compared to baseline FTE numbers						

Input – Operating	**Funding profile ($m)**										
	21/22	**22/23**	**23/24**	**24/25**	**25/26**	**26/27**	**27/28**	**28/29**	**29/30**	**30/31**	**Total**
Eradication - Labour	0.000	0.000	0.000	0.000	1.823	1.823	1.823	0.000	0.000	0.000	5.468
Eradication - Materials	0.000	0.000	0.000	0.000	1.682	1.682	1.682	0.000	0.000	0.000	5.046
Fence - Office	0.000	0.000	0.000	0.625	0.000	0.000	0.000	0.000	0.000	0.000	0.625
Fence - Field Base	0.000	0.000	0.000	0.375	0.000	0.000	0.000	0.000	0.000	0.000	0.375
Fence - road weir	0.300	0.265	1.500	1.500	0.000	0.000	0.000	0.000	0.000	0.000	3.565
Fence - Construction	0.000	0.000	0.000	3.029	6.058	3.029	0.000	0.000	0.000	0.000	12.115
Contingency	0.050	0.035	0.200	0.829	1.434	0.980	0.526	0.000	0.000	0.000	4.054
Total Costs	0.350	0.300	1.700	6.358	10.997	7.514	4.030	0.000	0.000	0.000	31.249

Appropriations	*Funding will be given to GWRC to deliver the eradication work. DOC will build the predator proof fence, but these costs will be expensed as the fence will be transferred to GWRC upon completion.*

Section 5C: Options analysis

The answer must not exceed 1-2 paragraphs.

Options analysis	Reallocation of Existing Conservation Funding Streams A comprehensive analysis conducted by the Department of Conservation has concluded that the re-allocation of existing conservation fuds would come at the cost of higher priority initiatives than this proposal.
Counter-factual question	If the funding is not granted it is unlikely the proposal will proceed. This would mean that the recovery of species would not hold the immediate potential. This includes the kākāpō expansion effort seeking new sites for birds around the country. This would be limited in scale and locations would be limited to locations of less favourable proximity to New Zealanders.

Section 5D: Scaled option

The answer must not exceed 1-2 paragraphs.

Option overview	Given the nature of the landscape, the option to reduce the size of the fence is not available. If the scale of the proposal were to be reduced it would require the fence to be built in locations which would be more prone to reinvasion, thereby limiting the effectiveness of the site and potentially preventing the translocation of species to the site.

Provide a breakdown of what the minimum viable option would purchase. If the formula used or key assumptions made differ from those used for the primary option, briefly explain these. Add additional rows to the table as needed to capture each output separately.

Formula and Assumptions	***There is no scaled option***					
	Operating Funding profile ($m)					
Input - Operating	**2021/22**	**2022/23**	**2023/24**	**2024/25**	**2025/26 & outyears**	**Total**
Total						

	Capital Funding profile ($m)										
Input - Capital	**21/22**	**22/23**	**23/24**	**24/25**	**25/26**	**26/27**	**27/28**	**28/29**	**29/30**	**30/31**	**Total**
Total											

Appropriations	*Indicate whether this funding would increase existing appropriations, establish any new appropriations, or alter the scope of an existing appropriation with effect from 1 July 2022.*

Section 5E: Monitoring and Evaluation

The answer must not exceed 1-2 paragraphs.

The initiative will be governed by a charitable trust registered under the Charitable Trust Act and consisting of the partner agencies (Taranaki Whānui, DOC, GWRC). It will be governed and supervised by a partner-appointed board of trustees and subject to GW CCO reporting requirements for public bodies. Progress reporting and evaluation will be monthly with an annual report to partners. The board and General Manager will be responsible for reporting. Funds have been allocated for this purpose ($100k pa) but are not included in this capital bid. The first report back will be the annual report of 2022/23.

There will be a number of milestones to be achieved against the strategic and project plan including construction of buildings, road, weir, fence, and successful eradication. Financially there will be full projections and reporting of % Variance from agreed budgets. In the long-term success will be measured by ecological metrics also, including the translocation of species and ongoing successful management of their populations within the sanctuary.

Section 5F: Implementation readiness

The answer to each question must not exceed 1-2 paragraphs.

Workforce: Are additional FTEs or contractors required?	Yes	Managers (2 permanent), ecologists (consulting), engineers (consulting), building construction (15 contractors), road construction (10 contractors), predator-fence construction (15 contractors), pest eradication (45 temp X 3 years and 6 permanent), pest surveillance and control (4 permanent), species management (2 permanent), data, field technology and IT (1 permanent), community engagement (1 permanent).
	The contractors and personnel will largely be available locally or, if not, within New Zealand as these are skills which have developed from this area and there is a body of experience in this work. There may be a local shortage of some skills, but these can be acquired by training or recruitment from elsewhere in New Zealand.	

Workforce: Resourcing considerations	All labour and salaries have been assessed using the GWRC formulas for assessing remuneration. This formula allows for all standard pay requirements such as minimum wage, gender equality, training, conditions, and leave.
Timeframes	All capital works and the eradication are scheduled for completion by year seven. The project is dependent on the following: resource consents, water managers agreement, sequential completion of major works, labour availability, materials availability and weather. These have been factored into the timeframes. Risks have been identified and mitigation or risk reduction planned and budgeted for.
Delivery Risks	Partners not participating, funds not available, water managers object, resource consents not obtained, costs escalate, construction delayed, mast season delays, weather delays, residual pests. These have been factored into the timeframes, and risks have been identified and mitigation or risk reduction planned and budgeted for.
Market capacity	Availability of specialist skills. Only two predator fence suppliers. These have all been factored into the risk reduction assessments.
Previous delivery experience	There is a twenty-year body of experience in building and running eco-sanctuaries especially in this locality which is where the method evolved. This includes the successful construction and operation of Zealandia in Wellington. This body of knowledge has been drawn on to assess and manage risk and the proposed governance structures are tried and tested.

Hon Kiritapu Allan

MP for East Coast
Minister of Conservation
Minister for Emergency Management
Associate Minister for Arts, Culture and Heritage
Associate Minister for the Environment

Hon Grant Robinson
Minister of Finance

Budget 2022 Late Initiative: Puketahā - Wainuiomata Ecosanctuary

Dear Grant

I am writing to you to submit a new funding initiative, on behalf of Vote Conservation, as part of Budget 2022. I am submitting this initiative outside of the Natural resource Cluster (NRC) and do not expect it to be considered against the NRC funding envelope.

I am seeking $31.3 million in operating funding over 10 years to fund the construction of a 28.8 km pest proof fence and associated infrastructure and pest eradication works to develop and run a pest free sanctuary for critical nationally endangered species (including kākāpō, rowi kiwi and hihi) on land owned by the Greater Wellington Regional Council. After construction has been completed ownership of the fence and associated infrastructure will be transferred to the Greater Wellington Regional Council, who will be responsible for ongoing maintenance of the fence and running the sanctuary.

I consider this initiative to be an essential part of the fight to address the biodiversity crises and climate emergency in the greater Wellington area.

The indicative funding profile is below.

Operating funding sought ($m)	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31	Total
	0.350	0.300	1.700	6.358	10.997	7.514	4.030	0.000	0.000	0.000	31.249

My officials at the Department of Conservation will work on the details of the proposal with your officials at The Treasury.

Yours Sincerely

Hon Kiri Allan
Minister for Conservation

Private Bag 18041, Parliament Buildings, Wellington 6160, New Zealand
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Read	

Events Memo

Meeting with Jim Lynch

Department of Conservation
Te Papa Atawhai

GS ref: 22-M-0015
DOCCM: DOC-6916316

In Confidence

Date: 15 February 2022

To: Minister of Conservation

From: Mark Fitzpatrick, Director, Biodiversity Group

Subject: **Meeting with Jim Lynch to discuss wider conservation issues, date yet to be confirmed**

Executive summary – Whakarāpopoto ā kaiwhakahaere

1. Your office is arranging a meeting between you and Jim Lynch, the key proponent of the Wainuiomata Eco-Sanctuary initiative. The exact date will be confirmed by your office. This will be an opportunity to discuss conservation topics that interest you with one of the most notable conservationists in Aotearoa.
2. We suggest that during your conversation you confirm DOC's commitment to maintaining positive working relationships and open communications with all the Wainuiomata Eco-Sanctuary key parties.
3. We have provided responses to issues that may arise during the meeting. The main message is that we believe fenced sanctuaries are valuable conservation tool, and we support the Wainuiomata Eco-Sanctuary as demonstrated by the budget bid.

Potential discussion topics

4. In his email requesting a meeting with you, Jim Lynch mentioned discussion topics that you indicated are of interest to you. These were:
   - iwi engagement and co-management models
   - community conservation
   - Predator Free New Zealand (**PFNZ**) movement and the potential role of fenced eco-sanctuaries in national conservation strategies.
5. He has also offered to clarify any queries you may have regarding the proposed Wainuiomata Eco-Sanctuary.

Meeting objectives

6. In addition to discussing the topics of your interest, we suggest three main objectives for the meeting:
   - Continue establishing a positive working relationship with Jim Lynch. Thanking him for his continued efforts in conservation would be valuable in this regard.
   - Confirm DOC's commitment to working with the key parties of the Wainuiomata Eco-Sanctuary initiative – Jim Lynch, the Greater Wellington Regional Council, Taranaki Whānui ki te Upoko o te Ika and Ngāi Tahu.

- Confirm DOC's wish to maintain open communication lines with all the Wainuiomata Eco-Sanctuary key parties.

Three issues that may arise during the meeting

7. We have identified three issues, with suggested responses, that may be raised by Jim Lynch at the meeting based on the discussion topics.

Issue 1: The Wainuiomata Eco-Sanctuary budget bid

8. Jim Lynch may enquire about the status of the Wainuiomata Eco-Sanctuary budget bid, the likelihood of success, and the possible next steps depending on the budget bid outcome.

9. We have engaged with the Treasury to obtain an update on the bid. The Treasury analysts have submitted their assessment of the bid, but they can't share the assessment or any thoughts on the bid at this point. Given the current status of the process, there is nothing you can share with Jim Lynch at the time of this memo.

10. Should this situation change, we will update you via Status Report and with a revision to this memo.

Issue 2: PFNZ and the role of fenced sanctuaries

11. Jim Lynch holds a firm view that the PFNZ movement itself is not enough to save our threatened species, and that fenced sanctuaries are needed while we work towards the Predator Free 2050 (**PF2050**) goal.

12. Response:

- DOC is committed to the PF2050 goal. The work is progressing well. For example, the interim 2025 goal "*…predator eradication can be achieved in areas of mainland New Zealand of at least 20,000 hectares and that these areas can be defended from reinvasion without the use of fences"* has been achieved ahead of time in the Perth and Butler Valleys as part of the Predator Free South Westland project.
- Whilst DOC is focused on the long-term work of predator eradication, our position on the value of fenced sanctuaries has not changed. DOC believes that fenced sanctuaries have been, and continue to be, valuable tools for the preservation of our threatened species. They are a very suitable undertaking for our communities to lead.

Issue 3: Lack of support from us

13. Jim Lynch has raised concerns earlier about the perceived lack of support from DOC in progressing the Wainuiomata Eco-Sanctuary initiative.

14. Response:

- While the Wainuiomata Eco-Sanctuary initiative does not fit within DOC's current work prioritisation system, its potential value to many threatened species is recognised for wider landscape level restoration, and for communities, including mana whenua Taranaki Whānui ki te Upoko o te Ika.
- DOC's formal position is that we wholly support this proposal as a community-led initiative, that is not dependent on existing departmental funds.
- DOC's support is demonstrated most clearly through the budget bid.

Risk assessment – Aronga tūraru

15. We consider this to be a low-risk meeting. We have drafted responses to the main issues that may arise during the meeting.

Next steps – Ngā tāwhaitanga

16. We expect your office to advise us if you would like DOC officials supporting you at the meeting.

17. We will continue to provide updates on the Wainuiomata Eco-Sanctuary budget bid and related matters in Status Reports.

Contact: Mark Fitzpatrick; Director, Biodiversity Group; 9(2)(g)(i) [redacted]

ENDS

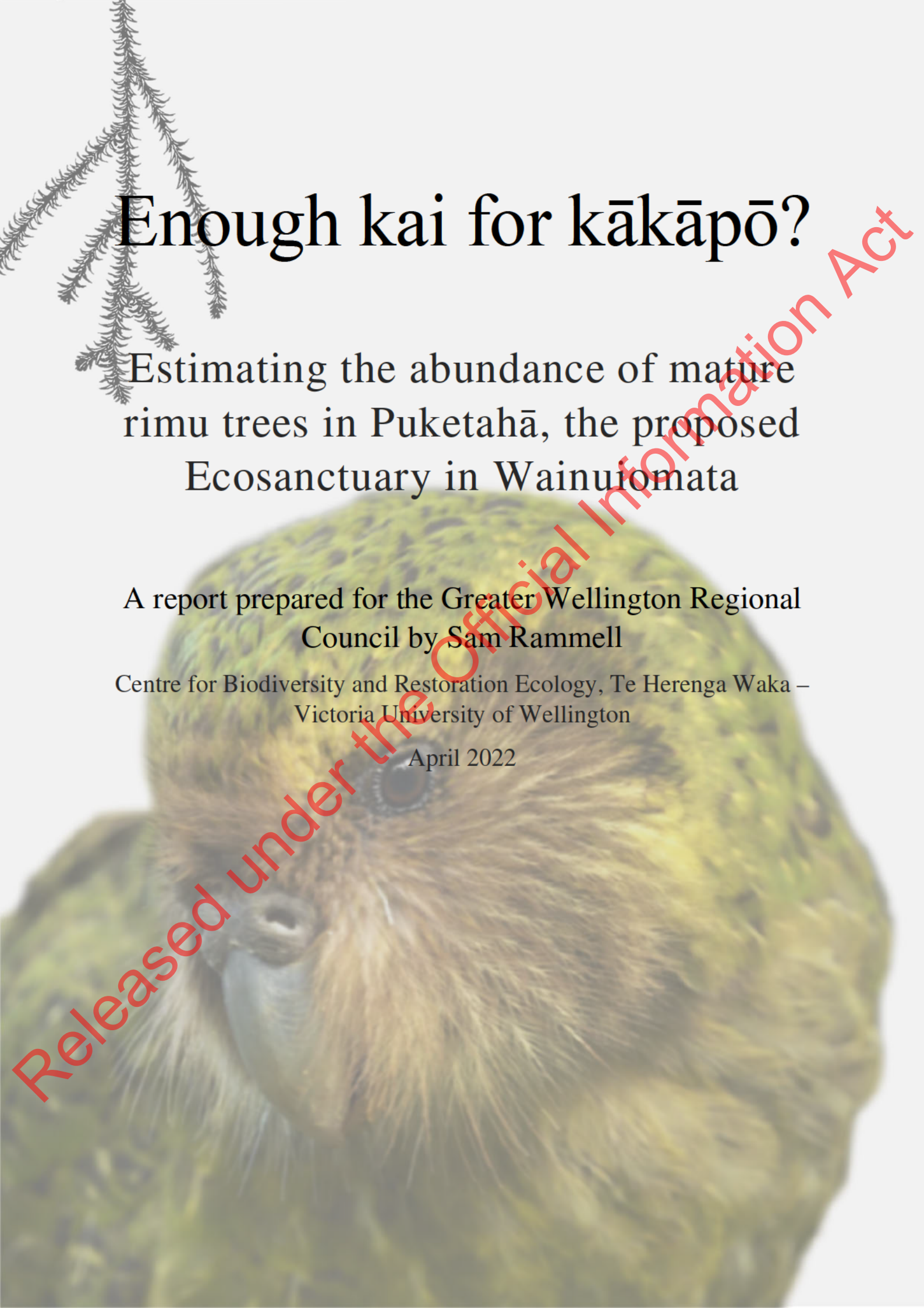
Enough kai for kākāpō?

Estimating the abundance of mature rimu trees in Puketahā, the proposed Ecosanctuary in Wainuiomata

A report prepared for the Greater Wellington Regional Council by Sam Rammell

Centre for Biodiversity and Restoration Ecology, Te Herenga Waka – Victoria University of Wellington

April 2022



Acknowledgements

Thank you to the Greater Wellington Regional Council for providing the funding necessary to complete this project through Victoria University of Wellington's summer scholar program.

Thank you to Stephen Hartley and Roger Uys for their guidance and assistance throughout the project, and their ability to recognise when I needed help and, more importantly, when they should leave me to try and figure a problem out myself.

A special thank you to Maarten Vink for accompanying me on all my field work in the catchment and pointing out the natural wonders of the proposed ecosanctuary area. Your enthusiasm for the flora and fauna of the catchment is infectious and your ability to ensure I didn't get lost impressive.

Contents

Executive summary

Kākāpō are a large, flightless bird, endemic to New Zealand. Predation by mammalian predators since the arrival of European settlers has led to the widespread destruction of their population and extirpation from the mainland. Conservation management of kākāpō over the last several decades has involved translocations to predator-free islands where they are safe from the harm caused by invasive mammalian predators. This strategy has been extremely successful, growing the population from 62 individuals in 1980 to an apogee of 214 individuals in 2019. However, suitable island sanctuaries are few and far between, and the return of kākāpō to the mainland serves a purpose equal parts spiritual, cultural, and ecological.

The success of modern ring-fenced predator-free sanctuaries provides hope for the possibility of returning kākāpō to the mainland. Unfortunately, no currently operational ring-fenced sanctuary contains the habitat required to sustain a large, breeding kākāpō population. However, the proposed Puketahā eco-sanctuary in the Wainuiomata water catchment area is of a size suitable of containing well over 100 kākāpō and is thought to contain high quality kākāpō habitat predominantly consisting of rimu-rata forest. Rimu fruit is an important food source for kākāpō in breeding years, and understanding it's abundance is key to estimating the viability of breeding populations.

The first step in assessing the suitability of any habitat suggested as a possible kākāpō translocation site is to gain an understanding of the number of mature rimu present and an estimate of their fruit production. Here, we used LiDAR data to estimate the abundance and density of rimu in the proposed Wainuiomata ecosanctuary area. LiDAR data collected across the sanctuary area were used to create a virtual model of the forest, delineating all large tree crowns and calculating metrics related to tree size, shape, and spectral characteristics. 388 trees were sampled across 6 sites from which a Support Vector Machine classifier was constructed capable of distinguishing rimu from 5 other tree species with a user's accuracy of 69.2%, producer's accuracy of 64.8% and a specificity of 86.3%.

Using this classifier, applied across the entire sanctuary area, we estimate a total abundance of 13,211 mature rimu at a density of 3.94 individuals per hectare with a mean crown size of 183 m^2, an estimated mean DBH of 1.75 metres, and a mean basal area of 2.39m^2 per individual. Using these metrics, we estimate that total seed production per hectare in the proposed sanctuary area is similar to that observed on Codfish Island which currently sustains the largest breeding kākāpō population in New Zealand. In addition, the sanctuary area was found to contain a large abundance of species known to be important supplementary food sources for kākāpō, including 704 kahikatea, 2,753 miro, and 6,573 rata.

Based upon these results we suggest that a pest-free eco-sanctuary at Puketahā could sustain a population of up to 200 kākāpō with the capability of breeding success equal to that of Codfish Island. This would mark the return of one of New Zealand's most charismatic and unique species to the mainland, restoring the mana of the forest and securing the future of the kākāpō population for decades to come.

Introduction

Kākāpō

Kākāpō (*Strigops habroptilus*) are a large (males 1.6 – 3.6kg, females 0.9 – 1.9kg (Higgins, 1999)), flightless bird that is endemic to New Zealand (Powlesland et al., 2006). Like many other oceanic island endemics, kākāpō followed an evolutionary trajectory that favoured gains in thermodynamic efficiency and competitive advantage over traits desirable for predator evasion or high levels of fecundity (Baeckens & Van Damme, 2020). Kākāpō exhibit 'island tameness', allowing predators, including humans and their associated hitchhikers, to get extremely close without displaying the aversion tactics commonly observed in their continental counterparts (Powlesland et al., 2006). In addition to these predictable traits, kākāpō have also acquired a range of traits unique among parrots, being one of only three nocturnal species (Chambers & Worthy, 2013), the only flightless species (Clout & Merton, 1998), and the only flightless bird species to display lek behaviour (Merton et al., 1984). Kākāpō, like much of New Zealand's avifauna, also display the peculiar trait of being especially stinky owing to the predominantly visual predation systems of the predatory avifauna that historically habituated New Zealand (Powlesland et al., 2006).

Subfossil remains of the distribution of kākāpō throughout New Zealand suggest that these traits made them extremely well suited to habituating a wide range of ecotones throughout the country (Horn, 1983; Wood, 2006). In pre-human times they maintained a large population throughout the length and breadth of New Zealand, persisting in a variety of habitats, from lowland podocarp forest through to alpine scrubland (Powlesland et al., 2006). However, the same traits that made kākāpō such effective competitors on their island home made them especially vulnerable to introduced mammalian predators, which would have resulted in their extinction in the late 20th century were it not for the admirable conservation work being conducted at the time (Clout & Merton, 1998; Lloyd & Powlesland, 1994; Powlesland et al., 2006).

Translocations of 62 individuals from Rakiura/Stewart Island to predator free offshore islands between 1980 and 1997 preserved what was left of the kākāpō population, with them being declared extinct in their home range after the final sighting of a wild kākāpō on Stewart Island in 1997 (Powlesland et al., 2006). Despite these tribulations, the tame nature and competitive advantage of kākāpō has made them the ideal species for translocation, with mortality after early translocations only 1.3% per annum (Powlesland et al., 2006). Early translocations were conducted to five offshore islands; Codfish Island (Whenua Hou), Chalky Island (Te Kākahu-o-Tamatea), Maud Island (Te Pākeka), Little Barrier Island (Te Hauturu-o-Toi), and Anchor Island (Pukenui), with translocations to all five islands being successful (Lloyd & Powlesland, 1994; Powlesland et al., 2006). Birds from both Maud and Chalky Islands were moved to more suitable habitats in 2003 and 2006 respectively (Conservation; Conservation). Currently, kākāpō can be found on three offshore islands: Codfish, Little Barrier, and Anchor (Figure 1).

Codfish island is located 3 kilometres west of Stewart Island (Figure 1). It has a total area of 1396 ha, covered mostly in broadleaf-podocarp forest dominated by rimu (*Dacrydium cuppressinum*), southern rata (*Metrosideros umbellata*), hall's totara (*Podocarpus hallii*), miro (*Prumnopitys ferruginea*), and kamahi (*Weinmannia racemosa*) (Sedgeley, 2006). Possums (*Trichosurus vulpecula*) were eradicated in 1987, and kiore (pacific rat, *Rattus exulans*) in 1998, with the island remaining free of introduced predators since (Conservation). Successful breeding occurred on the island in 2002, 2009, 2016, and 2019 (Conservation), with another breeding season currently underway (Conservation).

Anchor island is located in Fiordland National Park near the entrance to Dusky Sound (Figure 1). It has a total area of 1140 ha, consisting of both rimu dominated and beech dominated forest

(Conservation). Stoats (*Mustela erminea*) were eradicated in 2001, though reinvasion is an ongoing risk factor as the island lies within a stoats swimming range (~1.1 – 2.0km) of the mainland (Elliott et al., 2010). Since the eradication of stoats from the island, it has remained predator free. Successful breeding occurred on the island in 2016 and 2019 with another breeding season currently underway in which every female has mated (Conservation).

Little Barrier Island is located to the north-east of Auckland City, near the top of the North Island (Figure 1). It has a total area of 3083 ha, and is covered in a mixture of forest types, including kauri (*Agathis australis*), pohutukawa (*Metrosideros excelsa*), and kohekohe (*Dysoxylum spectabile),* puriri (*Vitex lucens*), and taraire (*Beilschmiedia taraire*), as well as hard beech (*Fuscospora truncata*), which predominantly dominates on ridges (Conservation). Notably, Little Barrier Island lacks the rimu known to be important for kākāpō breeding. However, successful breeding has occurred on the island, and has been found to coincide with a high abundance of female kauri cones (Stone et al., 2017). Cats were successfully eradicated from the island in 1980 and kiore in 2004 making the island one of New Zealand's prime predator free habitats (Conservation).

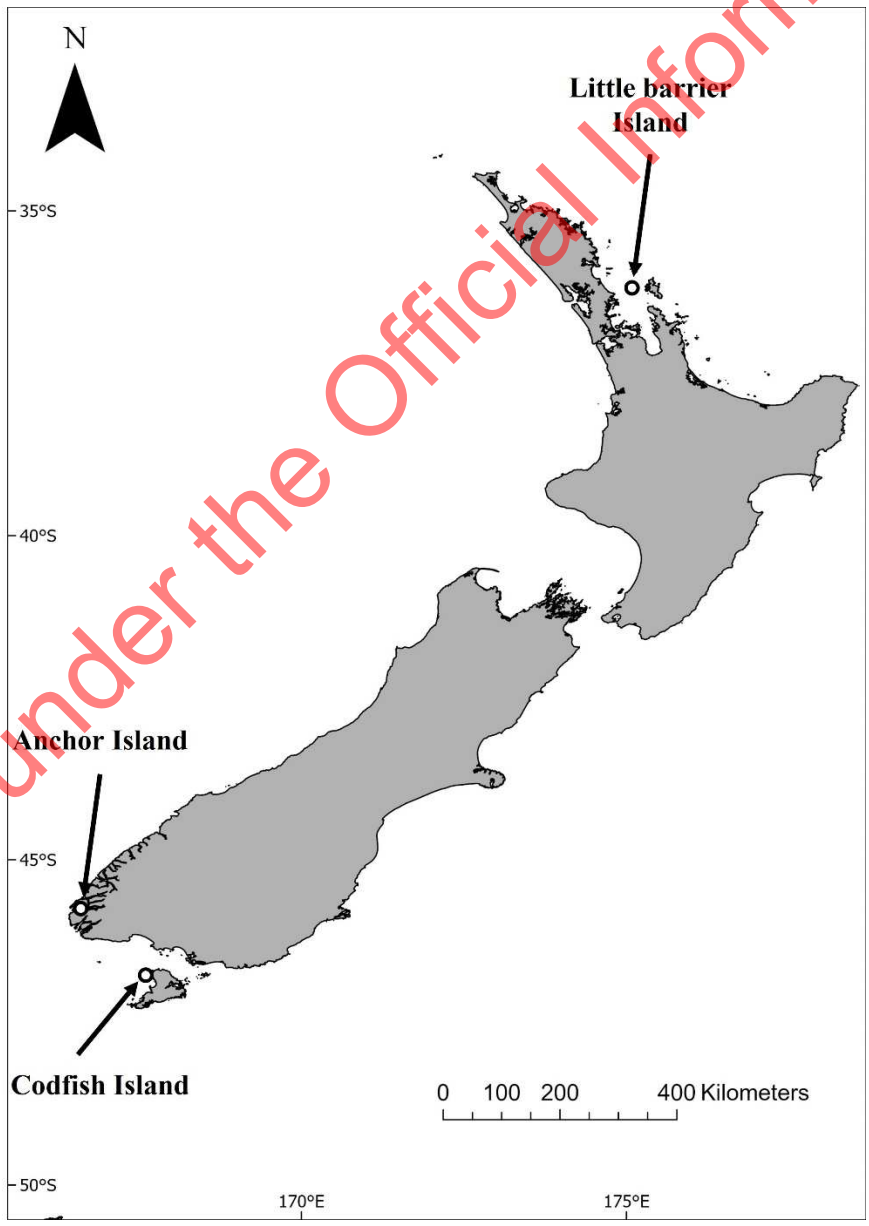


Figure 1 - Locations of the three current island homes of kākāpō: Codfish/Whenua hou, Little Barrier/Te Hauturu-o-Toi, and Anchor/Pukenui.

The current kākāpō population stands at 202 individuals, dropping from an apogee of 214 in 2019 (Conservation, 2022). The population has steadily increased over the last 20 years due to intensive population and breeding management. Unfortunately, both Codfish and Anchor islands appear to be at or near their carrying capacity (Conservation, 2019), and the potential of Little Barrier Island as a productive breeding ground is thus far unknown. Aside from these three island refuges there are no other locations where wild populations of kākāpō can be found. Therefore, finding new habitat is of the utmost importance for the future conservation of kākāpō.

“

“The kākāpō population has grown 70% in the last 5 years and we’re starting to reach carrying capacity on the two main breeding islands: Anchor and Whenua Hou [Codfish]. We need to find new suitable habitats for the growing population, which is a great problem to have.”

Deidre Vercoe

DOC kākāpō operations manager

Habitat Requirements

Suitable habitat for kākāpō must have three characteristics:

(1) It must be free of introduced predators.

Kākāpō can persist and to an extent breed in the presence of introduced predators, as evidenced by their persistence on Stewart Island despite the presence of cats, and their successful translocation to Little Barrier Island in 1984 despite the threat of kiore remaining until 2004 (Conservation). However, cats on Stewart Island were thought to pose an existential threat to kākāpō, and introduced predators outside of kiore push populations to extinction if left unchecked. In addition, breeding success, which is of the utmost importance for a population of only 202 birds, is significantly enhanced when kiore are removed (Elliott, 2006). Therefore, any future site for kākāpō translocation must be free of introduced predators.

(2) There must be an abundant supply of mature rimu trees.

Successful kākāpō breeding is tightly linked to a large supply of mature rimu fruit. Kākāpō predominantly breed in mast years, when there is a super abundance of rimu fruit and, when the supply is great enough, the diet of young chicks will consist of them in its entirety (Clout & Merton, 1998; Powlesland et al., 2006). When food supply is low females whose home ranges contain more large, mature rimu are able to breed whilst individuals with less do not make an attempt (Whitehead et al., 2012). In fact, it has been found that kākāpō will only attempt mating in years where more than 8% of rimu tips are fruiting (Conservation, 2021). Whilst the link between kākāpō breeding and rimu fruiting is well established, the underlying mechanism remains unknown. Multiple hypotheses have been put forward to explain the phenomena, such as the presence of high levels of calcium and vitamin D (Von Hurst et al., 2016), pre-sensitising egg yolks to the effects of breeding-specific hormones (Fidler et al., 2008), or an ability to predict the future abundance of an important food source combined with a chemical or nutritional effect on chicks (Cottam, 2010). Regardless of the mechanism linking the two processes, an abundance of rimu fruit is required for successful raising of chicks. Consequently, the presence of high densities of mature rimu trees is a prerequisite for any future kākāpō refuge.

(3) It must be of a sufficient size to host over 100 individuals

All current populations of kākāpō consist of less than 100 individuals, with Codfish Island having the largest individual population of ~75 individuals (Digby, 2021). Successful breeding in the last four breeding seasons has increased the population from below 100 individuals in 2009 to 202 individuals in 2021 (Conservation, 2009), with 32 chicks raised in 2016 and 71 chicks raised in 2019 (Conservation, 2019). With another breeding season in full swing, numbers are sure to rise steeply again, reaching carrying capacity on the current islands and requiring extensive habitat for new individuals. Increases of this magnitude every season would quickly overwhelm any new habitat with space for fewer than 100 individuals. Therefore, finding a large habitat, ideally capable of supporting well over 100 kākāpo is extremely important.

Potential habitat

The strategy for kākāpō conservation over the last 50 years has been to move them to predator free offshore islands. This strategy works and continuing to increase the number of islands that harbour kākāpō is a worthy pursuit. However, of the predator free islands suitable for kākāpō translocation, none are large enough to harbour over 100 individuals (Conservation). Therefore, future suitable island habitat would need to be cleared of introduced predators before kākāpō translocation could take place. Alternatively, kākāpō could be moved to one of New Zealand's many mainland islands.

Translocating a population of kākāpō to a mainland fenced sanctuary has a number of benefits over translocation to an island sanctuary. The ability of fenced sanctuaries to garner public support for conservation and public participation has been well documented (Campbell-Hunt et al., 2010; Innes et al., 2019; Marques et al., 2019) and the surge of projects such as Wellington's 'Sanctuary to Sea' based around fenced sanctuaries illustrates their positive social impact (Zealandia, 2017). Whilst island sanctuaries do garner public support and engagement (Taylor et al., 2020), their ability to engage the public on a day-to-day level is limited. Translocating kākāpō to a fenced mainland sanctuary also has the added benefit of returning a taonga species to its native range. Kākāpō once roamed throughout the New Zealand mainland, and whilst their presence on Stewart Island is noted prior to European colonisation, they appear to have been transported there sometime after Maori settlement (Powlesland et al., 2006). Thus restoration of a significant kākāpō population to the mainland has significant ecological, social, and cultural benefits.

There is one significant negative aspect to the translocation of a kākāpō population to a mainland fenced sanctuary rather than to an offshore island. Mainland sanctuaries are not as secure. The risk of reinvasion by introduced predators to mainland sanctuaries is constant (Connolly et al., 2009), and predator control programmes within sanctuaries are commonly required to ensure any invaders are rapidly caught (Innes et al., 2019). On the other hand, island sanctuaries face reinvasion risk only from individuals willing to swim or float to them. Whilst this does occasionally occur (Clout, 2005; Veale et al., 2012), the risk of reinvasion to islands more than 3 kilometres from the mainland is minimal (Veale et al., 2012), incursions are often only of one individual (Veale et al., 2012), and can be isolated and dealt with rapidly. Therefore, the risk posed by introduced predators to vulnerable native species is lower on islands than in mainland fenced sanctuaries, though it should be noted that no translocation to a mainland ring-fenced sanctuary has failed as a result of predator incursions.

Kākāpō have been found to occupy home ranges anywhere from 15ha up to 50ha, depending on which habitat the home range was estimated from (Powlesland et al., 2006). Currently, the densest population resides on Codfish Island where ~75 birds are present across the 1,396 ha, giving a density of 1 bird for every ~19 hectares (Conservation; Digby, 2021). Assuming a similar habitat and

management program, the minimum viable size for a 100 strong kākāpō population would be ~1900 ha.

Of the existing ring-fenced ecosanctuaries on the mainland only Maungatautari Ecological Island in the Waikato meets this criterion at 3240 ha in size (Innes et al., 2019). Based on size alone, this site has the potential to harbour up to ~170 kākāpō, 84% of the total current population. However, vegetation analyses of the sanctuary have found that only 235.4 ha (7%) of the site are suitable for kākāpo, indicating that the maximum carrying capacity of Maungatautari would be somewhere between 5 and 15 kākāpō (Hurley, 2017). In addition, 77% of Maungatautari was found to be unsuitable for kākāpō breeding and the total sanctuary had an average density of only 1.113 rimu/ha, less than 1% that of the density on Codfish Island (117.0 rimu/ha) (Hurley, 2017; Sedgeley, 2006). Clearly, Maungatautari Ecological Island is not a suitable habitat for the long-term success of a breeding kākāpō population.

Where then, do we turn?

A proposed ecosanctuary in Wainuiomata

One viable location for a sanctuary to harbour kākāpō is the Wainuiomata water catchment area in the hills east of the Hutt Valley in Wellington (Figure 2). Currently, the 3,350-ha area is used to supply water to Wellington City, and has performed this role since 1883 (Cooke, 2007). The link between disease such as cholera and tainted water supplies had been discovered earlier that century. As such, the central government set the area aside as a reserve and the Wellington City Council bought and protected the land from private endeavours, such as logging or farming, in 1878 (Cooke, 2007). Today, the area is still used as a water catchment for Wellington City and public access is restricted to preserve water quality and native wildlife in the area (Council).

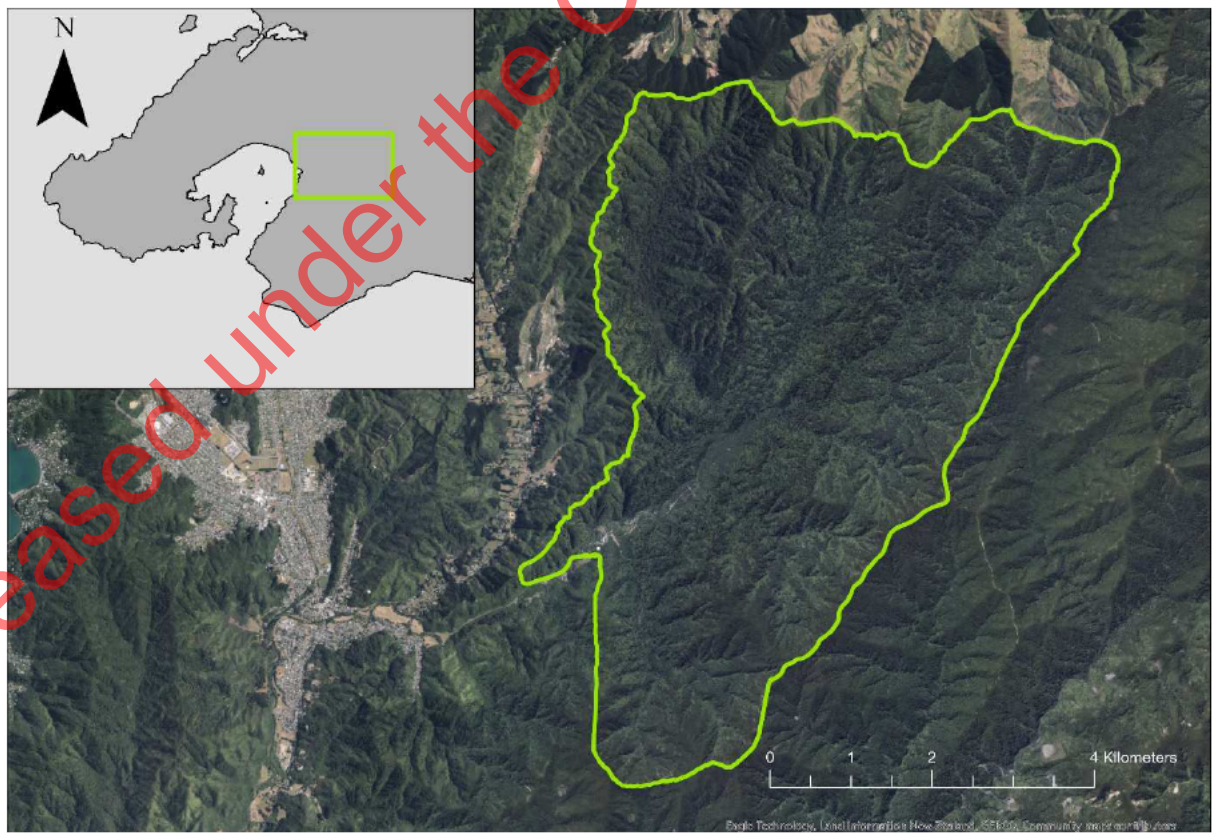


Figure 2 - Approximate location and extent of the proposed ring-fenced ecosanctuary in the Wainuiomata water catchment area.

The site is now jointly managed as a part of the Greater Wellington Regional Councils (GWRC) Key Native Ecosystem framework (KNE), which aims to protect and restore areas of high biodiversity value, and Wellington Water Limited, who manage the water supply and associated infrastructure (Council, 2020). The Mana Whenua partners for the site are Taranaki Whānui and Ngāti Toa. Since 2005, a 1200 ha segment in the north-western portion of the site has been managed as a 'mainland island' with high-intensity, sustained predator control continuously undertaken and monitoring of the area conducted yearly (Council, 2020). Predator control is also undertaken more broadly throughout the area as part of The Remutaka Conservation Trusts North Island brown kiwi (*Apteryx mantelli*) management project.

As the site has been protected and managed for water collection and ecological significance for an extended period of time it provides a representative example of the forest that covered the region in pre-human times. It is one of the largest intact forests in the Wellington region and plays a key role as a refuge for a number of threatened or endangered native species including, but not limited to, North Island rifleman (*Acanthisitta chloris*), North Island brown kiwi (*Apteryx mantelli*), and the New Zealand falcon (*Falco novaeseelandiae*) (Council, 2020). The forest provides one of the finest examples of emergent rimu and northern rata (*Metrosideros robusta*) dominated forest and contains a number of other forest giants including kahikatea (*Dacrycarpus dacrydioides*), matai (*Prumnopitys taxifolia*), and miro (*Prumnopitys ferruginea*) (Council, 2020).

These factors make the catchment a tantalising option for the construction of a large, predator-free sanctuary that could harbour not only kākāpō, but a full suite of the extant species that would have inhabited the area in pre-human times. Currently, there is a proposal in the works to do just this, fencing 3,350 ha of the catchment with a predator-proof fence and removing all introduced mammalian species including deer (*Cervus spp.*), goats (*Capra hircus*), pigs (*Sus scrofa*), rats (*Rattus spp.),* possums (*Trichosurus vulpecula*), hedgehogs (*Erinaceus europaeus*) and mustelids (*Mustela spp.)* (Green, 2020; Lynch, 2021). As the forest has not been significantly altered by human activity, removal of introduced species and translocation of extirpated native species to the site could result in restoration of the forest to its natural state within only 50 years (Lynch, 2021). A key aspect of this restoration would be the translocation of a population of kākāpō to the sanctuary.

At 3,350 ha the site is easily large enough to harbour a population in excess of 100 individuals. In fact, assuming equivalent quality habitat and density of kākāpō as Codfish Island, the proposed sanctuary could host a population of ~176 kākāpō, 87% of the current total population. Assuming all introduced predators are removed from the site this would mean that two of our three criteria have been achieved. The final criterion for a site to receive kākāpō is that there is a sufficient number and density of mature rimu trees to allow for successful breeding. Whilst expert opinion suggests this is the case (Uys, 2021), no quantitative study has been undertaken to understand the density and number of mature rimu trees in the catchment.

Estimating tree abundance over large areas

Traditionally, tree species abundance has been measured across large areas using manual methods, the most common of these involving setting out plots of a pre-specified size and extrapolating counts to the total area. This method is effective but requires a significant amount of field work and is sensitive to the choice of plot size and location (Gimaret-Carpentier et al., 1998). As such, it requires care when extrapolating abundance estimates more broadly such as to areas of indeterminate forest type. Another common manual method of estimating tree species is distance sampling (Buckland et al., 2015). Distance sampling requires the researcher to walk a transect counting all the trees within a certain distance of the transect. Analyses can then be conducted to estimate the density and abundance of the species (Buckland et al., 2015). Hurley (2017) used this method to estimate the abundance of rimu at Maungatautari Ecological Island to understand whether a translocation of kākāpō to the area would be

feasible. This method has many of the same pitfalls as the plot-based method; large amounts of field work are required and selection of transect location and size has a significant effect on the final estimates (Thomas et al., 2010).

With the advent of remote sensing and the abundant data it provides we now have the capability to estimate species abundance across large areas with little manual input (Saatchi et al., 2008). Estimating the abundance of trees across a landscape with remote sensing has been conducted for some time now. In fact, within New Zealand the Wellington region has been surveyed using LiDAR (Light Detection And Ranging) to estimate the abundance of trees over 20 metres tall (Zörner et al., 2018), and the abundance of kauri (*Agathis australis*) and the impact of kauri dieback has been estimated in Northland (Meiforth et al., 2020). Estimates of the abundance of multiple tree species using LiDAR data has also been conducted in southern Victoria, Australia (Zhang & Liu, 2013).

Classification of tree species first requires that we delineate individual crowns from one another. This can be achieved using a number of software packages and in a number of similar ways (Kwak et al., 2007; Lu et al., 2014). However, the general process used is similar. First, a digital surface model (DSM) and digital terrain model (DTM, sometimes called a digital elevation model) are interpolated from the point cloud. The digital terrain model is a model of the ground surface whilst the digital surface model in a vegetated area returns a model of the tops of the canopy. Subtracting the DTM from the DSM allows us to create a model of the height above ground of the canopy throughout the study site, known as a canopy height model (CHM) (Khosravipour et al., 2014). Individual trees can then be detected by finding the highest point within a moving window and adding nearby points that meet certain criteria (Dalponte & Coomes, 2016).

Following segmentation a set of metrics is computed on each tree crown, using LiDAR data alone (Zhang & Liu, 2013), a mix of LiDAR and aerial imagery (Wang et al., 2019), or a mix of LiDAR and hyperspectral imagery (Meiforth et al., 2020). Each species of tree is expected to have different characteristics associated with it and can therefore be classified using a classification algorithm. Classification can be conducted using unsupervised or supervised classification techniques. Unsupervised techniques classify features based upon the available data with no a priori information on the desired classes (Duda & Canty, 2002). Supervised classification relies on a priori knowledge of the feature classes. A training data set where each observation has been assigned to a class is presented to the algorithm which constructs a model based upon the feature set associated with the pre-classified groupings. This model is then tested on a novel data set without exposure to the true class of each observation to test the accuracy of the classification (Sen et al., 2020).

Several supervised classification algorithms exist. One of the most commonly used for the identification of tree species is the support vector machine (SVM). Support vector machines work by finding the optimal hyperplane to separate observations in each class from one another based upon a set of features (Pisner & Schnyer, 2020). For example, when attempting to classify tree species, tree height and return intensity may be used as features to separate two classes (e.g. rimu from rata). In this case we have 2 features and so our separating hyperplane is a 1-dimensional line separating classes that can be visualised as points on a 2d scatterplot. Increase the number of features to three and we separate classes in 3-dimensional space using a 2d hyperplane.

The ‘optimal’ hyperplane is defined as the hyperplane than maximises the margin between the closest points from either class. These closest points are referred to as ‘support vectors’ as they support the location of the optimal hyperplane (Pisner & Schnyer, 2020). SVM’s have been used successfully to identify tree species using RGB imagery (Heumann, 2011), hyperspectral imagery (Sabat-Tomala et al., 2020), LiDAR returns (Zhang & Liu, 2013), and a combination of these three data types (Colgan et al., 2012), and have been shown to achieve accuracies of as high as 90% when classifying tree species solely on LiDAR-generated intensity and shape metrics (Zhang & Liu, 2013).

Outline of this project

1. To estimate the abundance of mature rimu trees in the area of the proposed fenced sanctuary in Wainuiomata by identifying individual rimu trees using a support vector machine and tree metrics calculated from a LiDAR point cloud

2. To compare the number and density of rimu trees to other areas in which kākāpō successfully breed

3. To estimate the carrying capacity of the sanctuary for kākāpō

Methods

LiDAR data

Point cloud data for the area encompassing the Wainuiomata water collection area were obtained through the OpenTopography portal and were captured by Aerial Surveys for the Greater Wellington Regional Council in Summer 2013 (Surveys, 2013). Data were acquired using an Optech ALTM 3100EA LiDAR system at a flight height of 1000m AMGL with a scan frequency of 53Hz, a pulse rate of 100kHz, a scan angle of ± 18.8 degrees and a final density of 5.82 points/m^2 (For full details see Surveys (2013)). Data were original processed by Aerial Surveys with automated refinement of flight lines followed by mismatch correction based upon ground control surveys. Point cloud classification was conducted by Landcare Research using an automated scheme to classify each point into one of four classes: 1 – unassigned, 2 – ground, 4 – vegetation, and 9 – water. Data classified as unassigned and water were removed for the analysis. All data are in NZTM2000 and NZVD2016.

Tree segmentation

Tree segmentation was conducted using the lidR package in R which was developed for the analysis of airborne laser scanning data (Roussel et al., 2018). For each sampling area a digital terrain model (DTM) was constructed with a resolution of 1 metre x 1 metre[1] using k-nearest neighbours with inverse distance weighting using the default parameters included within the lidR package for the number of nearest neighbours, weighting, and the search radius. The point cloud was normalised using the DTM and a canopy height model (CHM) was constructed based upon the normalised point cloud.

The CHM was constructed using the pit-free algorithm developed by Khosravipour et al. (2014). Pits occur in CHM's when LiDAR first returns avoid higher vegetation and may return from the ground or low vegetation. The pit-free algorithm avoids these pits by constructing a CHM based upon all first returns as well as first returns above a set of thresholds throughout the canopy. All the constructed CHM's are then stacked atop one another to generate a single pit-free CHM (Khosravipour et al., 2014). This method has shown significant improvement over traditional CHM construction (Khosravipour et al., 2014). I used thresholds at 0 metres, 2 metres and in 5 metre increments from 5 through 50 metres with max edge lengths of 3 and 1.5, and a final resolution of 0.2 x 0.2 metres. Each point was also replaced with a circle composed of 8 points with a diameter of 0.2 metres to smooth the CHM and avoid empty cells.

Trees were segmented using the algorithm described by Dalponte and Coomes (2016). The algorithm requires that a set of seed treetops are first found. Treetops were located using a circular local maximum filter with a moving window and a radius of 10 metres. The highest return above 15 metres within the filter at any given point was marked as a tree. These treetops were used as the seed points for the segmentation of trees around them. The algorithm described by Dalponte and Coomes (2016) has four parameters for deciding whether a pixel can be included in the tree: 1- the treetop must be above a particular value (here 20m), 2 – the pixel must be above a set proportion of the height of the treetop (here 0.7), 3 – a pixel must be above the mean height of the tree times this value (here 0.55), and 4 – the tree crown cannot be larger than this value in pixels (here 107 pixels). The values for parameters 2 and 3 are the default values, whereas parameter 1 was altered to be 20 so as to only include trees above 20 metres in height, and parameter 4 to 107 pixels, to ensure that the largest and smallest trees would not be erroneously combined into one tree.

Following tree crown delineation all points that were not labelled as part of a tree were removed and convex hulls were constructed around each segmented tree. A suite of metrics were also constructed

[1] Upon completion of the manuscript it was realised that the DTM was constructed as a resolution of 0.2 metres, potentially impacting the accuracy of tree crown delineation

including the standard tree metrics, standard shape metrics, and standard metrics computed as a part of convex hull creation in lidR. The hulls and metrics were combined for use in further analyses.

Ground truth data

The polygons constructed from the tree segmentation were loaded into ArcGIS Field Maps (Figure 3). Field maps is an application that allows real time collection of spatial data on a smartphone or tablet that is linked to a high accuracy GPS (ESRI, 2022). We used a Septentrio altus NR3 survey grade GPS (Septentrio, 2021) linked to a smartphone running Field Maps to collect ground truth data at six sites on seven days across Summer 2021/2022 (Figure 4).. This allowed us to identify the species of individual trees on the ground and instantly assign this identification to a polygon in the field. Sampling locations were not sampled systematically as we did not extrapolate values from these regions out. Rather, all the large trees (over ~20 metres) were identified within each of these areas. Table 1 shows the number of individuals of each species observed at each site.

Table 1 - Number of mature individuals (above 20 metres) of each species found via ground-based surveys at each sampling site. Data collected from George's creek was not used for training the model.

Site	Hinau	Kahikatea	Kamahi	Miro	Other	Rata	Rimu	Total
West branch	1	4	4	7	33	20	33	102
Drummond ridge 1	0	0	0	1	20	19	24	64
Drummond ridge 2	0	0	0	3	15	19	7	44
Drummond ridge 3	1	0	0	0	8	1	15	25
George's creek	0	3	0	3	3	24	40	73
Skull gully	0	20	0	1	31	55	46	153
Total	2	27	4	15	110	138	165	461

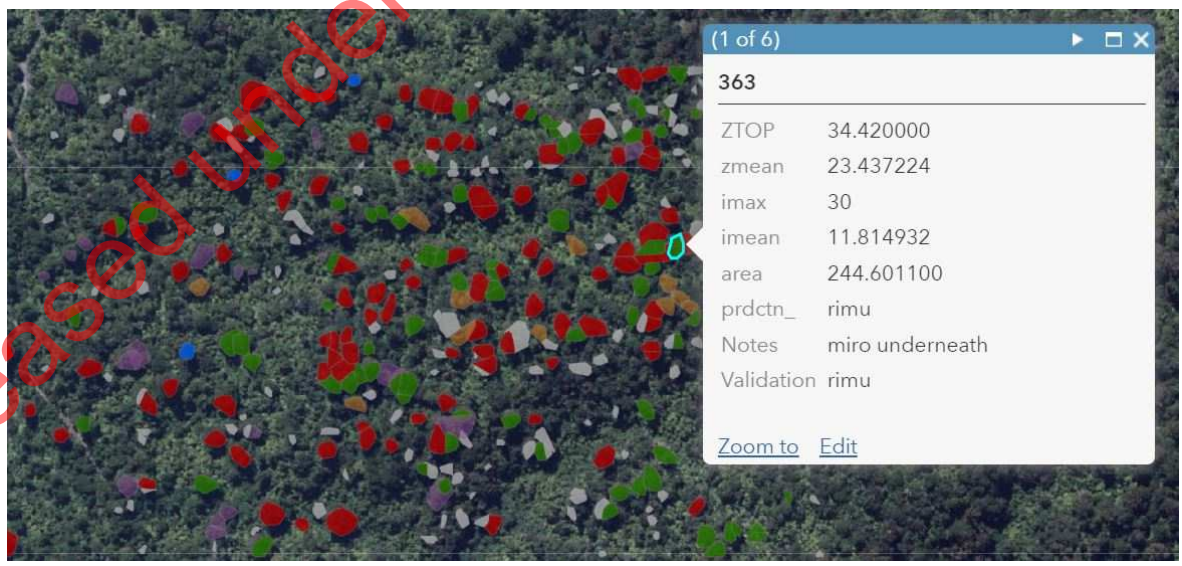


Figure 3 – Example map generated for Field Maps with associated prediction and validation. Polygons represent LiDAR generated canopies, colour coded by the predicted species where green is rimu, red is rata, blue is kahikatea, orange is kamahi, purple is hinau, and grey is 'other'.

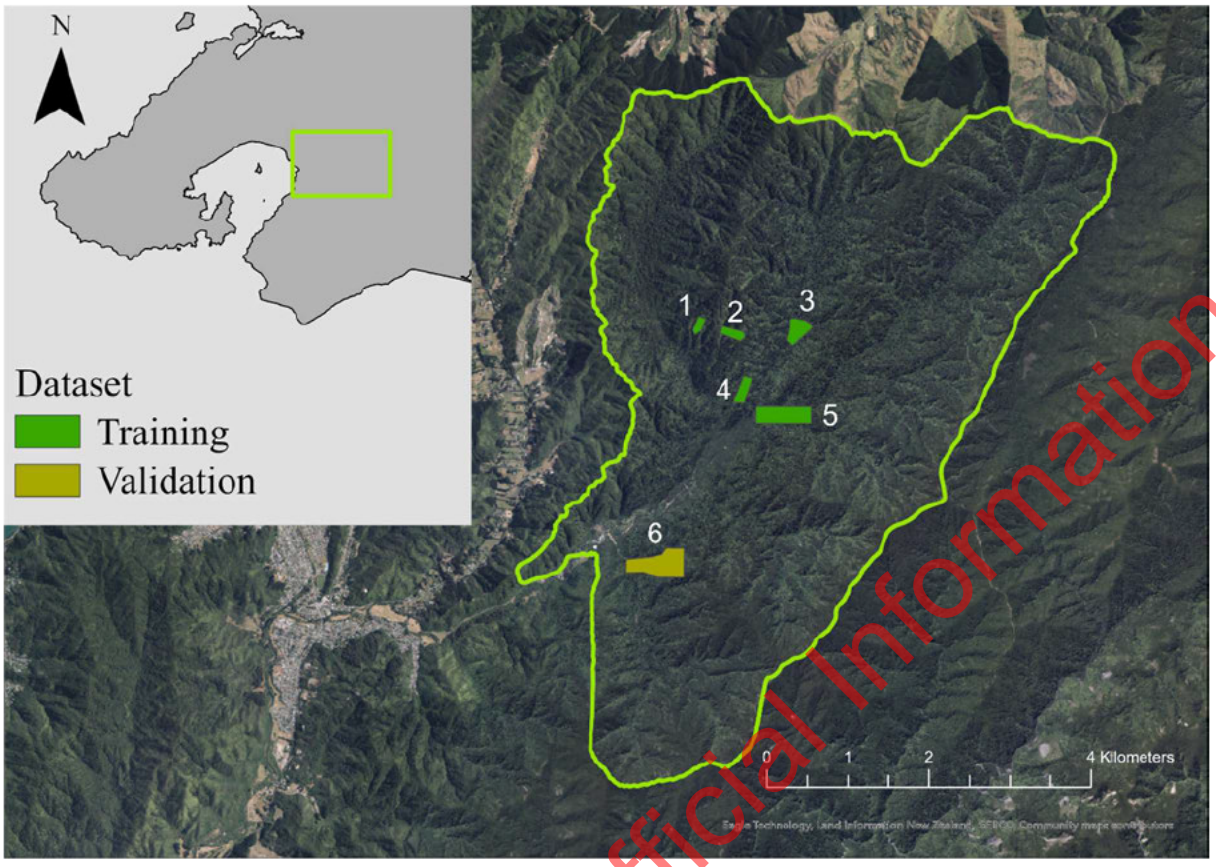


Figure 4 - Outline of the proposed sanctuary area showing the areas where test data were gathered (green) and where validation data were gathered (yellow). Sample sites are as follows: 1) Drummond ridge 1, 2) Drummond ridge 2, 3) West branch, 4) Drummond ridge 3, 5) Skull Gully, 6) Georges creek (validation site).

388 trees from six different species were found in the field and included in the test dataset. 'other' observations were also included and consisted of a mixture of noise and tree fragments. Data from the five training sites were combined, stratified by species, and split into eight partitions. Each partition contained a similar number of individuals and proportion of each species (Table 2). Data from the validation site were used only to determine whether beech trees were being erroneously classified as rimu as beech are known to be abundant throughout the catchment but were not sampled in any of the five training sites and so are not included in any partition.

Table 2 – Composition of tree species in each partition used in the training of the support vector machine

Partition	Hinau	Kahikatea	Kamahi	Miro	Other	Rata	Rimu	Total
Fold1	0	3	1	1	16	13	14	48
Fold2	1	3	0	2	12	16	15	49
Fold3	0	3	0	1	13	16	15	48
Fold4	1	2	0	2	10	14	19	48
Fold5	0	4	1	2	13	14	15	49
Fold6	0	4	1	1	16	14	13	49
Fold7	0	3	1	1	12	14	17	48
Fold8	0	2	0	2	15	13	17	49

Classification

Classification of tree species was conducted using a support vector machine (SVM) using the caret package in R (Kuhn, 2008). Prior to running the support vector machine extraneous variables needed to be removed from the analysis. First, all polygons with an area below 30 metres were removed as manual investigation showed that none of the training samples below 30 metres were labelled as a species of interest. A constrained correspondence analysis (CCA) was then run on the remaining variables with a community matrix constructed by converting species labels into binary variables and attributing each species to one column for each observation. Variables found to be significant ($p < 0.10$) using an ANOVA were filtered and included in subsequent analyses. Twenty-two of the sixty-six original variables were found to be significant and were included in subsequent analyses (Table 2).

Table 3 – Variables of significance based on Anova test run on CCA of various variables related to the identification of tree species using LiDAR delineated tree crowns for the Wainuiomata water catchment area. Variables where P < 0.10 are retained.

Variable	Chi Square	F	Pr(>F)
Max height (tree height)	0.279	17.918	0.001
Mean return height	0.065	4.184	0.001
SD of height dist.	0.046	2.972	0.008
Kurtosis of height dist.	0.027	1.713	0.083
Entropy of height dist.	0.039	2.523	0.042
Returns above mean height	0.033	2.143	0.043
Returns above 2nd quartile	0.033	2.152	0.055
5th quantile height dist.	0.034	2.156	0.044
10th quantile height dist.	0.033	2.147	0.050
30th quantile height dist.	0.029	1.883	0.098
Sum of returns to 3rd layer	0.076	4.868	0.001
Sum of returns to 6th layer	0.030	1.934	0.070
Total return intensity	0.128	8.232	0.001
Max return intensity	0.051	3.308	0.003
Mean return intensity	0.059	3.817	0.001
Return intensity SD	0.047	3.038	0.008
Return intensity skew	0.032	2.072	0.053
Return intensity kurtosis	0.045	2.891	0.012
Percentage of 1st returns	0.041	2.663	0.012
Area	0.062	4.018	0.005
Eigen large	0.076	4.857	0.005
Curvature	0.066	4.246	0.003

A support vector machine was then constructed based upon the significant variables. The support vector machine is a classification algorithm that has been used extensively in classification of biological entities including identifying tree species (Dalponte et al., 2012). SVM's are a type of non-parametric binary classifier that do not rely on the assumption of an underlying distribution (Pisner & Schnyer, 2020). Classification is conducted by finding the optimal separating hyperplane of the two classes of interest. The optimal hyperplane is defined as the plane that provides the maximum 'margin' between the points closest to the hyperplane, the 'support vectors'. Though SVM's are inherently binary, they can be extended to multiclass problems. Here, we implemented a multiclass SVM using a one-against-one approach where each class was compared against each other class individually and a voting scheme decided the final classification.

The use of a SVM requires the selection of a kernel function to apply to the data to allow the construction of a hyperplane on linearly inseparable data (Patle & Chouhan, 2013). With a large number of features a linear kernel is often sufficient and reduces computation time (Goel & Srivastava, 2016). However, the radial basis function kernel (RBF) can provide significant increases in accuracy (Goel & Srivastava, 2016). Therefore, stratified 8-fold cross validation was conducted with 2 versions of the linear kernel, an RBF kernel, and a polynomial kernel with the metric to be maximised set as the user's accuracy of rimu classification.

User's accuracy (or precision) is the accuracy of the classification from the point of view of the person using the output. In our case, maximising user's accuracy maximises the proportion of predicted rimu that are actually rimu, based on ground surveys (Equation 1). Producer's accuracy (or sensitivity) was also calculated as an alternate measure of accuracy expressing the proportion of actual rimu that are classified as such (Equation 2); and finally, specificity (or true negative rate) measures the proportion of non-rimu that were correctly identified as not rimu (Equation 3). High performing classifiers approach 100% on all three metrics.

$$UA = \frac{Correctly\ classified\ rimu}{Total\ predicted\ rimu}$$

Equation 1 – User's accuracy also referred to as precision

$$PA = \frac{Correctly\ classified\ rimu}{Total\ actual\ rimu}$$

Equation 2 - Producer's accuracy, also referred to as sensitivity

$$Specificity = \frac{Correctly\ classified\ non-rimu}{Total\ non-rimu}$$

Equation 3 - Specificity

A grid search was implemented to find the optimal parameters for each kernel and a final model was trained based upon the full sample set with the optimal parameters for each kernel (Table 3). The four resulting models were then manually inspected, and one model was selected to be used as the predictive model on the entire catchment area. Data from six of the sampling locations were included in the cross-validation set, with the seventh sampling location retained for use as a validation set.

Table 4 - Optimal parameters for each model based upon a grid search of likely values. Note that some models have different parameter requirements than others.

Kernel	Cost	Sigma	Scale	Degree
Linear 1	0.7			
Linear 2	0.8			
Radial	0.8	0.1		
Polynomial	0.2		4	1

Final predictions

Final analysis of the number of rimu trees in the catchment area was conducted using the model selected at the end of the previous step. The only significant change was that construction of the canopy height model and segmentation of canopies was conducted using an LAScatalog in the lidR package. The LAScatalog engine allows large point clouds to be separated into many smaller chunks and seamlessly stitched back together once computations have been conducted on each individual chunk (Roussel et al., 2018). Total counts for each species in the catchment area and a shapefile of the location of each individual of each species were computed. The density of rimu throughout the catchment was then calculated and compared with rimu density on known high quality kākāpō habitat to estimate the carrying capacity of the catchment.

Seed production estimates

We estimated rimu seed production per hectare for both locations using the maximum likelihood estimator developed by Canham et al. (2014) which describes total seed production (TSP) as a function of DBH (Equation 4). We assumed a value of α of 4.08 as in Canham et al. (2014), indicating that seed production increases at the fourth power of DBH.

$$g(DBH) = TSP_y \left(\frac{DBH}{30}\right)^{\alpha}$$

Equation 4- Reproduced from Canham et al. (2014)

We used the maximum DBH of any rimu sampled on Codfish Island by Elliot (2001) and compared this with the average DBH of all rimu identified in the catchment area. The average DBH in the catchment area was found by relating the average canopy area to basal area using the relationship derived by Norton et al. (2005) and subsequently converting basal area to DBH assuming a circular trunk (Equations 5 & 6). As no information is available on the sex ratio of the rimu in the catchment this was assumed to be equal to that of Codfish Island for the purposes of this analysis.

$$Basal\ Area = 0.013(Canopy\ Area)$$

Equation 5 - Relationship between Basal area and Canopy area as derived by Norton et al. (2005)

$$DBH = 2\left(\sqrt{\frac{Basal\ Area}{\pi}}\right)$$

Equation 6 - Relationship between DBH and Basal Area

Results

Canopy Height Model

Segmentation was observed to be moderately accurate, with multiple trees clumped into a single crown in some circumstance, whilst a single tree would be separated into multiple crowns in others. However, the extent of mismatches between predicted and actual crowns was not quantitatively assessed. Figure 5 shows examples of the DTM, DSM, and CHM, as well as crown segmentation overlaid on top of the CHM for a small area in Drummond ridge.

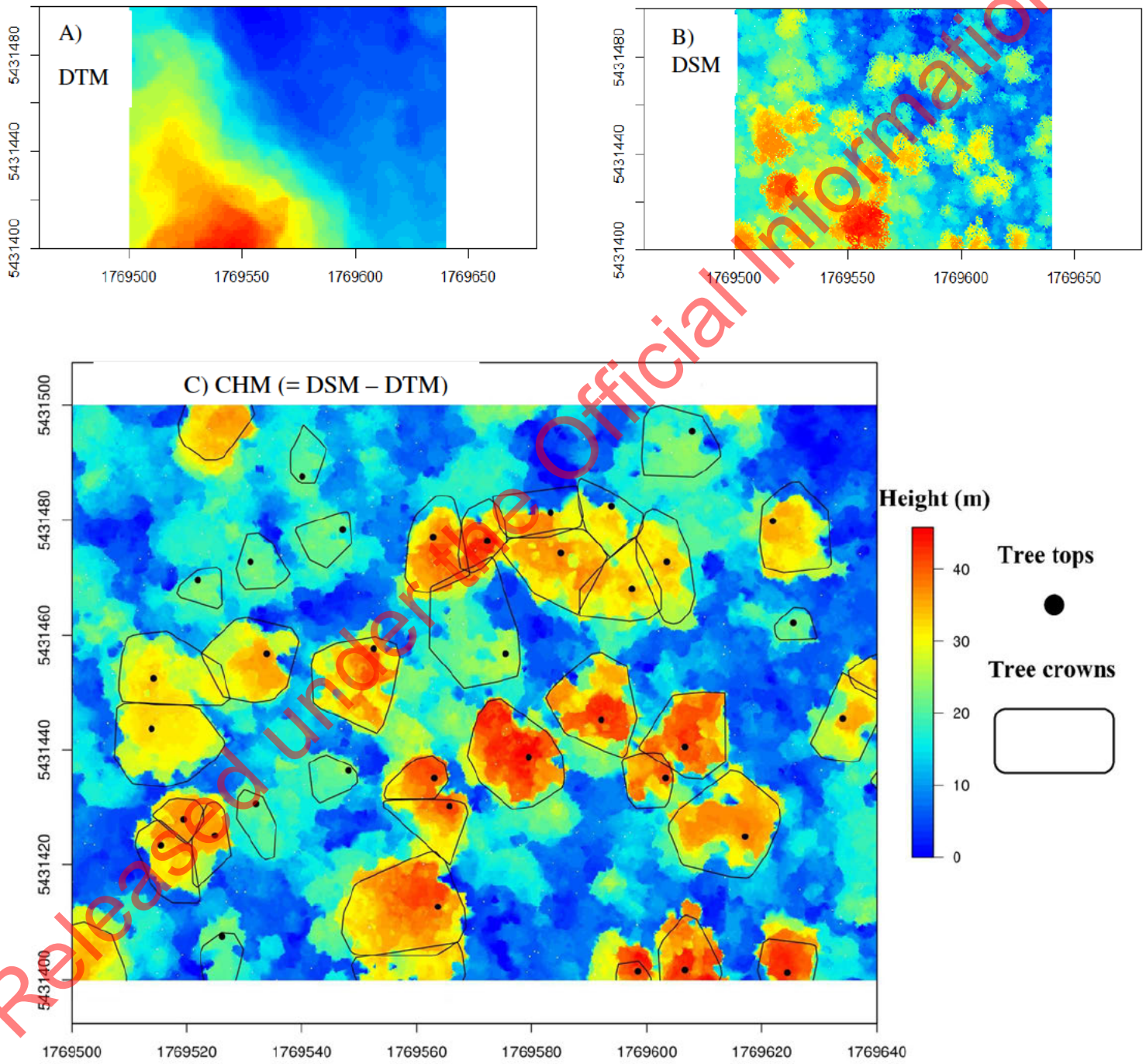


Figure 5 – Subtraction of the digital terrain model (A), from the digital surface model (B), provides us with a normalised canopy height model (C). Tree tops and tree crowns delineated based upon the CHM are shown in 5C.

Linear model 1with a cost value of 0.7 was found to have the highest accuracy, with a mean rimu user's accuracy of 69.4% (95% CI: 61.2% - 77.5%) across the eight partitions (Figure 6). This model also had the smallest standard error across the eight partitions and predicted a similar number of rimu as were observed in each partition, indicating that classification was consistent across data sets (Table 4). Mean model accuracy was similar for the polynomial model. However, this model requires multiple parameters and takes significantly longer to run and so was not used for the analysis. Thus, Linear model 1 was used for all subsequent analysis on the wider catchment area.

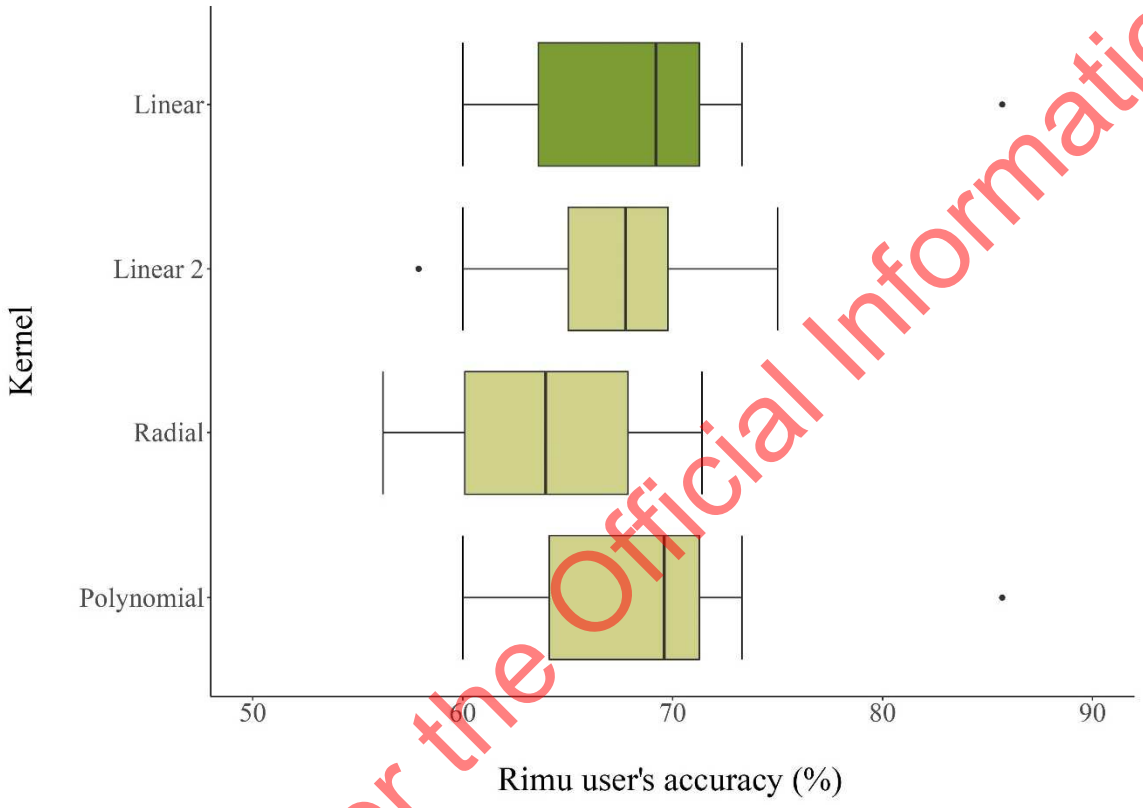


Figure 6 – SVM model comparison of 4 different kernels for classification of tree species in the Wainuiomata water catchment. n = 8 partitions.

Of the 388 individual trees used in the analysis, 251 were correctly classified, giving an overall accuracy of 64.7% (95% CI: 59.8% - 69.4%). The highest accuracy was obtained for rata where 83 of 114 individuals were correctly classified, providing a user's accuracy of 72.2% (95% CI: 70.9% - 73.5% and a producer's accuracy of 72.8% (95% CI: 68.6% - 76.9% (Table 7). Rimu classification accuracy was slightly lower, with 81 of 125 individuals correctly classified and 36 individuals misidentified as rimu (Tables 5 & 6). User's accuracy for rimu was estimated at 69.2% (95% CI: 60.9% - 77.5%) while producer's accuracy was slightly lower at 64.8% (95% CI: 56.3% - 73.3%) (Table 7). None of the predicted rimu in the validation site were found to be beech, indicating that erroneous classification of beech as rimu is not a significant problem. The kappa value for the model was 0.524 ($p < 0.001$) indicating that classification was performed significantly greater than expected by chance. The user's accuracy and producer's accuracy for rimu were similar indicating that the number of other species misclassified as rimu was similar to the number of rimu misclassified as other species. This suggests that the true number of rimu is similar to that predicted by the classifier, and this trend is consistent across partitions (Table 5). However, this will only apply to the catchment provided a similar proportion of each species is present.

Table 5 - Number of predicted and observed rimu for each partition of the training set. Similar values indicate that despite misclassifications the overall number of predicted rimu and actual rimu were similar for all partitions

Partition	True	Predicted	False positives	False negatives	Correct	UA (%)	PA (%)
Fold1	14	15	6	6	10	66.6	71.4
Fold2	15	14	5	3	13	92.9	86.6
Fold3	15	13	6	8	7	53.8	46.6
Fold4	19	16	6	9	6	37.5	31.6
Fold5	15	16	5	4	12	75.0	80.0
Fold6	13	14	6	7	8	57.1	61.5
Fold7	17	14	4	6	10	71.4	58.8
Fold8	17	15	5	6	10	66.6	58.8

Table 6 - Confusion matrix of the test data used to assess model accuracy for the identification of individual tree species in the Wainuiomata water catchment area. 388 trees in total were classified. Of 125 known rimu there were 81 true positive classifications,44 false negatives and 36 false positives (16 of which were rata), thus the predicted number of rimu (117) is a slight underestimate (93.6% of the true number)

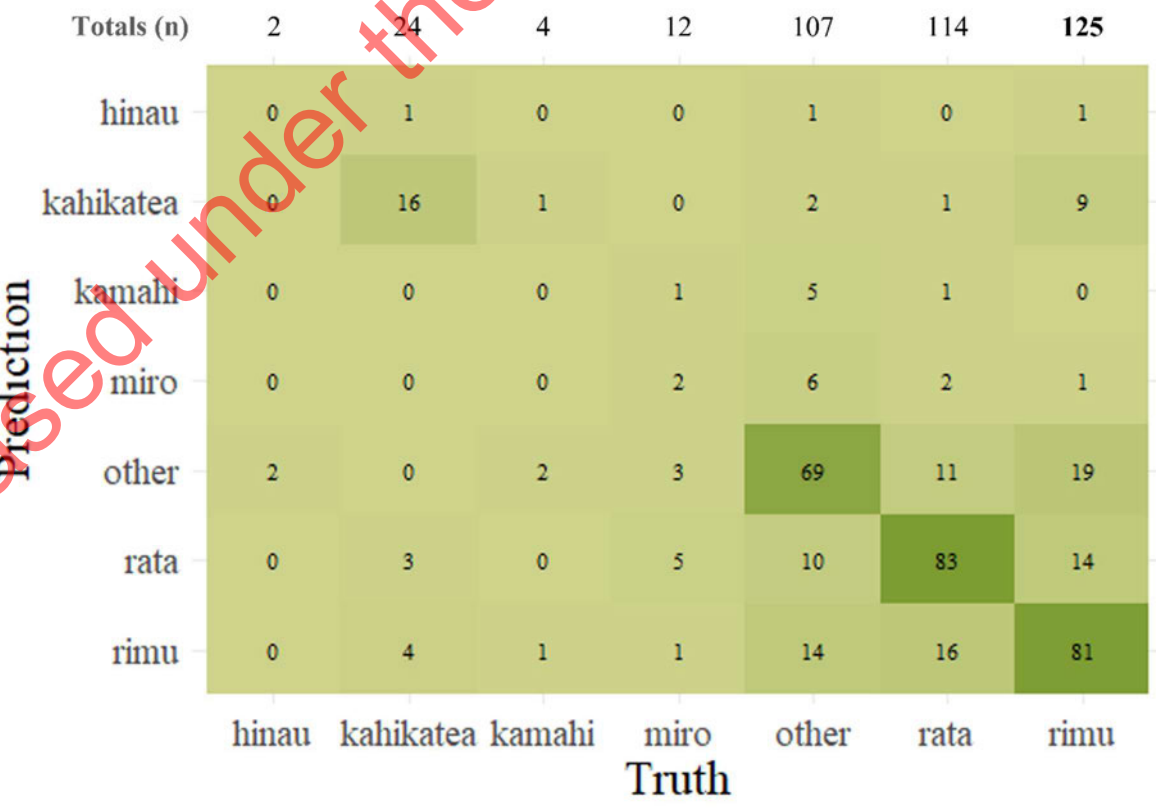


Table 7 - User's and producer's accuracy for the final model used for all species classified in the Wainuiomata water catchment area using a Support Vector Machine

Species	User's accuracy (Precision)	Producer's accuracy (Sensitivity)	Specificity
Hinau	0%	0%	100%
Kahikatea	55.2%	66.6%	96.4%
Kamahi	0%	0%	98.2%
Miro	18.1%	16.6%	97.6%
Other	65.1%	64.5%	86.8%
Rata	72.2%	72.8%	88.3%
Rimu	**69.2%**	**64.8%**	**86.3%**

Overall accuracy = 64.7% (95% CI: 59.8% - 69.4%) | Kappa = 0.524 | P < 0.001

Accuracy metrics were found to be similar across the three majority species rimu, rata, and other (Table 7). All three species had similar user's and producer's accuracy with the biggest difference between the two metrics being 5% for rimu. Specificity was high for all species. The lowest value was 86.3% for rimu, indicating that the majority of individuals predicted as something other than rimu were indeed not rimu. However, specificity increases as the number of classes increases. As such, we should maintain some caution when extrapolating these results out.

Rimu abundance

A total of 47,279 crowns were constructed, of which 10,002 were predicted as being rimu. Considering the user's accuracy of the model we would expect 6,921 (95% CI: 6,091 – 7,751) of these to be correctly classified as rimu. Based upon the results of our training data we expect that the number of predictions is a slight underestimate of the true number of rimu (Table 6). Assuming the same mixture of species is present across the catchment as that found in our training data, we would expect this estimate to be only 93.6% of the true total rimu abundance in the catchment. This would provide an estimated abundance of 10,686 rimu across the 3,350-hectare sanctuary area resulting in a density of ~3.19 rimu per hectare.

However, assuming the distribution of species throughout the sanctuary area is different to that of the test data this estimate will be inaccurate. Rather, we can use the expected number of individuals for each pairwise combination of predicted and actual species based upon the total number of individuals predicted and the ratio of predictions to observations calculated from Table 5. This method provides a significantly higher estimate of rimu abundance at 13,211 individuals (95% CI: 8,901 – 16,082) (Table 8) with a concurrent increase in average density to 3.94 rimu per hectare (95% CI: 2.66 – 4.80).

Table 8 - Estimates of true species abundance based upon pairwise combinations of predicted and actual numbers of species generated for the test data. Total = 47,279 crowns.

Prediction \ Truth	hinau	kahikatea	kamahi	miro	other	rata	rimu
Final estimate	465	1501	575	1684	20534	9309	**13211**
hinau	0	600	0	0	600	0	600
kahikatea	0	388	24	0	49	24	218
kamahi	0	0	0	114	571	114	0
miro	0	0	0	501	1502	501	250
other	465	0	465	698	16044	2558	4418
rata	0	171	0	286	572	4744	800
rimu	0	342	85	85	1197	1368	6924

Rimu density was roughly even across the sanctuary but there was a distinct lack of rimu near the proposed fence area around the outer ridgeline (Figure 8). There were also some areas of slightly higher density in the north-eastern and north-western regions, and density was generally higher in the northern half of the catchment. Rata has a similar distribution to rimu throughout the catchment, with a roughly even density throughout the area (Figure 9). However, unlike rimu, rata is more abundant in the middle of the catchment and is sparser in the Northern and Southern regions. Kamahi and Kahikatea are found at the lowest densities of the six species with a predicted 800 and 704 individuals present throughout the catchment respectively. Both species have a rather patchy distribution with the majority occurring in the central area of the catchment. Kahikatea especially appears to occur in clumps of individuals. Miro and hinau have larger populations but are distributed intermittently throughout the catchment. Miro appears to prefer the areas around the edges of the catchment whilst hinau occurs mostly as a distinct cluster in the North-western region, where the mainland island operation takes place.

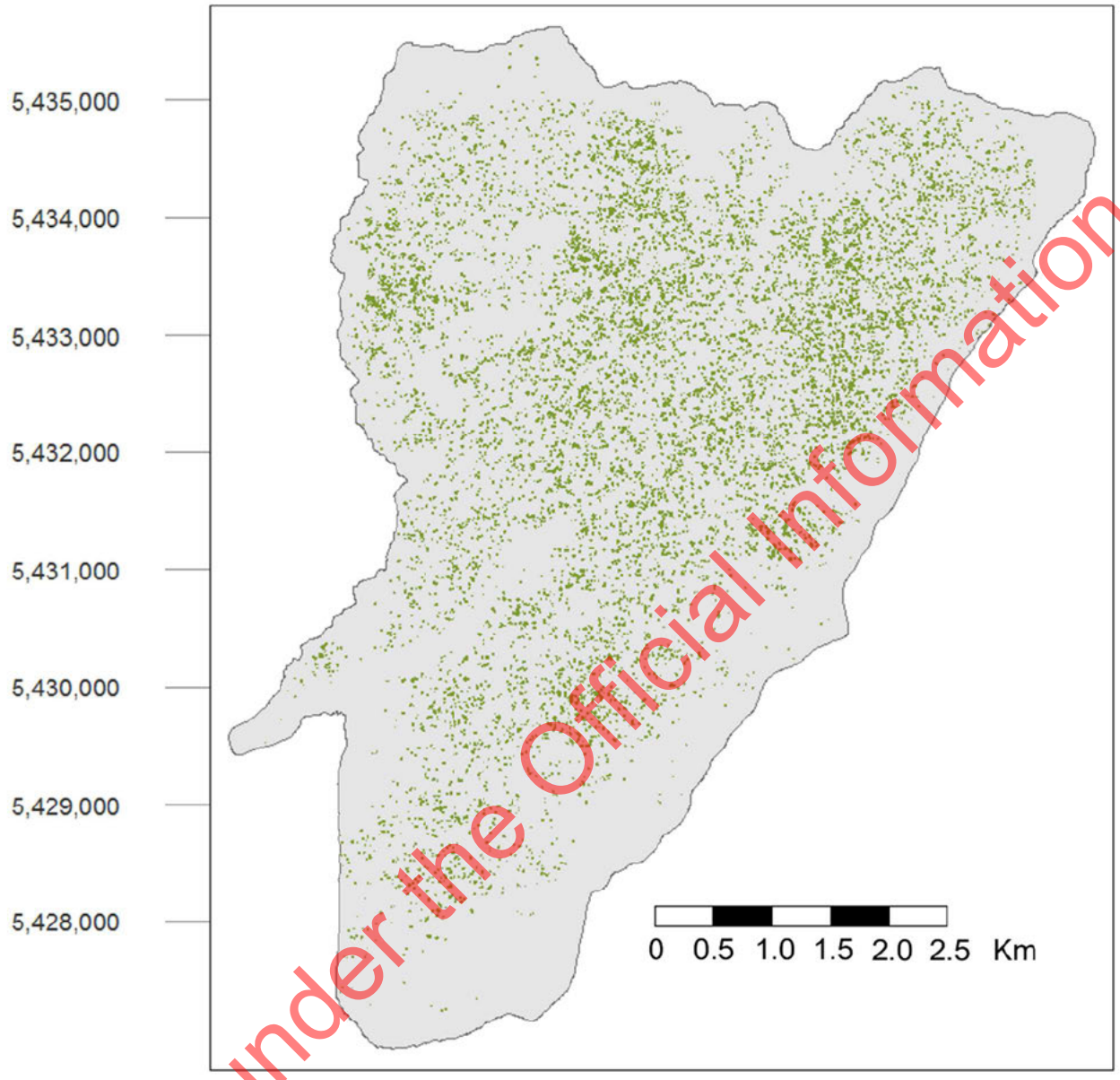


Figure 8 - Density and distribution of rimu throughout the proposed ecosanctuary area. Total number of crowns = 10,002. Note that this map does not account for any misclassifications

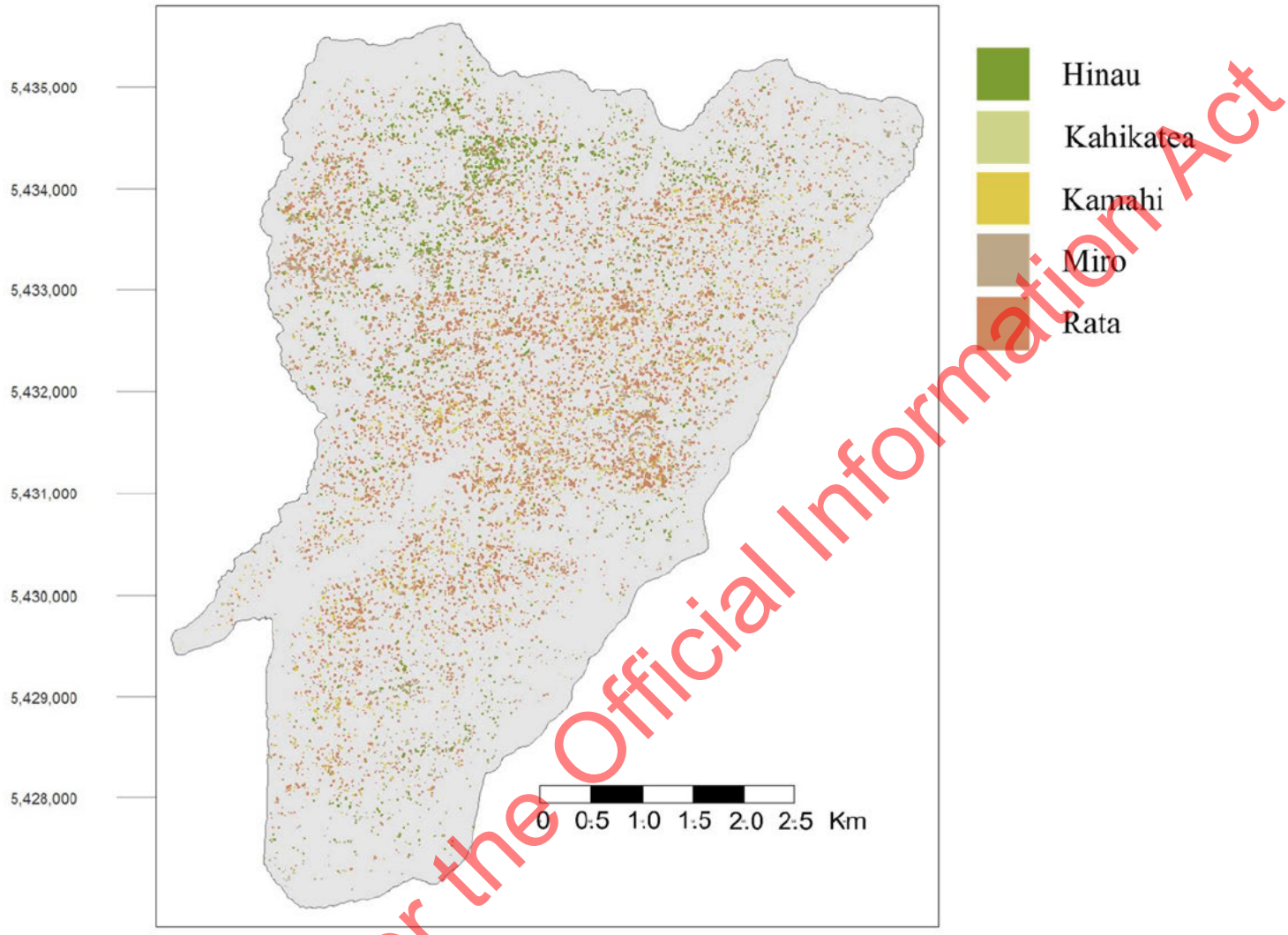


Figure 9 - Map of species occurrence for Hinau (1,799), Kahikatea (704), Kamahi (800), Miro (2,753), and Rata (6,573). Note that species occurrences here are based directly off predictions and do not take into account misclassifications.

Seed Production

The mean canopy area of the rimu found in the proposed ecosanctuary area is 183.9 m^2 per mature tree. Following the equation relating canopy cover to basal area found in Norton et al. (2005) I estimate an average basal area of 2.39 m^2 and an associated average DBH of 1.75 metres. The maximum DBH found by Elliot (2001) on Codfish Island was 97.5 cm, approximately 56% that of the catchment area. As seed production increases at slightly above the fourth power of DBH this indicates that seed production per tree in the sanctuary area is eleven times higher than seed production of the largest rimu sampled on Codfish Island.

Discussion

Enough kai for kākāpō?

Rimu appear to be highly abundant throughout the area in which the proposed ecosanctuary would be located. The lowest estimate produced suggests a total abundance of 6,091 individuals throughout the catchment at a density of 1.84 individuals per hectare. However, this estimate was based on the assumption that rimu were mis-classified as other species but other species were never mis-classified as rimu, an assumption that is unlikely to be accurate given the estimated accuracy produced via cross-validation. Incorporating misclassifications of other species as rimu provides a significantly higher estimate of rimu abundance, at 13,211 individuals at a density of 3.94 individuals per hectare. This estimate is considered to be a more accurate representation of true rimu numbers throughout the catchment.

Rimu were generally more abundant in the Northern half of the sanctuary, with a distinct reduction in density around the GWRC offices and in the Southern quarter of the catchment. Translocations are more successful in regions with high quality habitat (White Jr et al., 2012) and successful breeding in kākāpō populations is contingent on the supply of volumes of rimu fruit (Whitehead et al., 2012). Therefore, any translocations of kākāpō to the catchment area would be most successful if targeting the Northern half, where rimu densities appear to be significantly higher. This would also place the translocated population near the mainland island area where the forest remains most intact and so provides the highest quality habitat.

Rimu abundance was also low around the perimeter of the sanctuary. This could be due to the higher altitude of the ridgeline which may favour the growth of alternative trees such as the various species of beech (Wardle, 1983). However, this result could also be due to the model design. Any rimu growing along this ridgeline are likely stunted by the harsh environment, especially the high wind velocities common along exposed ridgelines. Our model only considered trees above 20 metres in height and so may have missed any stunted trees growing around the catchment's perimeter. Regardless of the reason, this provides some solace for the unfortunate reality that to protect the catchment some forested area around the perimeter would need to be removed. Larger trees produce the bulk of the fruit and so removing any stunted trees, if they are present, is not likely to have a significant impact on any attempted translocation.

Kākāpō require high densities of rimu to successfully breed (Elliott, 2006; Fidler et al., 2008). Codfish Island, which currently holds the largest breeding kākāpō population, currently contains around 75 individuals and has consistently produced a number of chicks in each breeding season (Digby, 2021; Elliott, 2006). Productivity on the island is tightly linked to the amount of rimu fruit produced in the breeding season (Von Hurst et al., 2016) and codfish island has one of the highest densities of rimu trees anywhere in New Zealand, with 117 rimu per hectare across the island (Sedgeley, 2006). At this high density kākāpō can persist at densities of up to 1 individual per 19 hectares.

Rimu density in our study is far removed from 117 individuals per hectare at only 3.94 individuals per hectare. Assuming similar fruit output per tree as Codfish Island, at this density there would likely only be enough rimu for a population of 7 individuals in the catchment area, far below that required for successful breeding. However, the rimu of Codfish Island are significantly smaller than those in the proposed ecosanctuary area. The average DBH in the catchment is 1.79 times that of the maximum DBH on Codfish Island, indicating trees in the catchment area are eleven times more productive than the largest tree on Codfish Island. In addition, only 40% of the rimu on Codfish Island are over 12 metres and thus likely to have a DBH near the maximum size sampled. Therefore, only 47 of the 117 individuals per hectare on Codfish Island are potentially this large. With a density one-twelfth

that of codfish island but an 11-fold higher average fruit production per tree, likely fruit output per hectare would be roughly similar in the proposed sanctuary as on Codfish Island assuming relative sex ratios between the areas are the same, though a quantitative analysis of fruit production in the catchment would be required to confirm this.

While rimu fruit are essential for kākāpō breeding, maintenance of their population throughout non-breeding years depends on the provision of supplementary foods, which are often also utilised during breeding years when mating and raising chicks (Whitehead et al., 2012; Wilson, 2004). Rata leaf and the fruits of other podocarps besides rimu, such as kahikatea, miro, and matai, are all important supplementary foods in both breeding and non-breeding years (Wilson, 2004). Indeed, while rimu fruit is consistently consumed by female kākāpō during the breeding season, a similar increase in the consumption of rata leaf is observed for males (Wilson, 2004).

The proposed ecosanctuary is predominantly covered in mixed rata-podocarp forest with areas containing high abundances of kahikatea, miro, and matai (Council, 2020). Rata is ubiquitous throughout the catchment and our analysis suggested a total of 9,309 mature individuals (Figure 8), providing a significant supplementary food source for females in non-breeding years and males in breeding years. The abundance of other podocarps that could provide supplementary food is somewhat lower, with an 1501 mature kahikatea and 1684 mature miro predicted for the catchment (Figure 8), but would still provide a significant supplementary food source for the population. Although beech trees were not included in the analysis they are known to occur at relatively high abundances throughout the catchment. Kākāpō are known to inhabit beech forest and can form their track and bowl systems there when their favoured tussock habitat is unavailable (Johnson, 1976).

Assuming a similar density of kākāpō individuals in the proposed sanctuary as that found on Codfish Island, the sanctuary could maintain a breeding population of ~176 individuals, 87% of the total current kākāpō population. While offshore islands have provided a haven for kākāpō over the last five decades (Clout & Merton, 1998), they are now at their capacity and new habitats are required to ensure the persistence of the population. No suitable predator-free offshore islands remain and the only current eco-sanctuary capable of containing a sizeable population, Maungatautari does not contain the densities of rimu required for successful breeding (Hurley, 2017). Construction of the proposed Wainuiomata eco-sanctuary would provide a haven capable of maintaining a breeding population that would almost double the size of the nationwide kākāpō population.

Limitations & Recommendations

The primary limitation in this research is the accuracy, or lack thereof, of the tree species classification. Our final overall accuracy was only 64.7%. Other studies using crowns and metrics derived from LiDAR have achieved accuracies of up to 92.8% in similar forest types using support vector machines (Zhang & Liu, 2013). Indeed, while there is a positive linear relationship between point density and classification (Michałowska & Rapiński, 2021), Zhang and Liu (2013) achieved this higher accuracy with a lower point density of 4 points per square metre. Classification accuracy is often higher when discriminating between fewer species (Michałowska & Rapiński, 2021). Here, we attempted to discriminate between seven species while Zhang and Liu (2013) were only discriminating between two. In fact, Michałowska and Rapiński (2021) found that the median classification accuracy for studies attempting to classify 6 species was only 62.2%, although Li et al. (2019) achieved a classification accuracy of 79% when classifying 6 species by integrating LiDAR data with multispectral satellite imagery.

Integration of LiDAR based metrics with RGB hyperspectral imagery often produces higher classification accuracy than LiDAR metrics alone (Dalponte et al., 2012; Wang et al., 2019). In fact, the majority of studies looking to classify tree species use a combination of imagery and LiDAR to do

so (Michałowska & Rapiński, 2021). Classification using hyperspectral satellite imagery and LiDAR has been successfully applied in New Zealand to classify kauri trees (*Agathis australis*) and identify those trees impacted by root rot caused by the fungus *Phytophthora agathidicida* (Meiforth et al., 2020). The combination of LiDAR metrics and hyperspectral metrics achieved the greatest classification accuracy with 96.4% of dead or dying trees correctly classified. Future studies looking to classify indigenous tree species in New Zealand forests would likely benefit from the integration of LiDAR derived metrics with imagery derived metrics. Indeed, this is my key recommendation for any future research attempting to classify rimu trees in the Wainuiomata water catchment area.

Aside from the limitations derived from the type of data used in the analysis, other limitations were imposed due to the algorithms used to build the virtual model of the canopy. In this study we generated a custom DTM and DSM from which we derived a CHM. Unfortunately, the DTM and DSM were derived at different resolutions meaning the final CHM was mismatched. This is likely what produced the erroneous observations of virtual tree crowns that covered multiple real trees or multiple virtual tree crowns within a single tree. Luckily, this issue could be easily overcome in future work by ensuring that the resolution of both the DTM and DSM are equivalent.

Improvements could also be made to the algorithms dictating tree segmentation and delineation. We used a local maximum filter to detect treetops and segmented trees based on these tree tops using the algorithm described by Dalponte and Coomes (2016) implemented in the R package lidR (Roussel et al., 2018). This algorithm constructs a tree by following a set of rules based upon the starting point dictated by the previously identified treetop. Alteration of these rules alters the way in which the tree is constructed and so the shape and size of the resulting segmented trees. We used standard values for all the rules, but further optimisation may produce more accurate results.

In addition, this algorithm does not account for the effect of slopes on the derivation of metrics. Therefore, a tree growing at an angle over a cliff may be identified as being much larger than it is. This would alter metrics such as max tree height and mean tree height and would impact the final classification of the tree. Zörner et al. (2018) produced an adapted version of the algorithm which takes into account slope and was assessed for accuracy of crown delineation in a forest in Wellington. Their results produced accurate derivations of crowns for 99% of trees in their study area. The algorithm they implemented is available in the python package PyCrown and would likely provide more accurate tree crown derivations than we achieved, and thus would allow for a higher classification accuracy and more precise estimate of rimu abundance in the study area.

Next steps

Future research looking to more precisely map the distribution and abundance of rimu in the catchment could benefit from testing a broader scope of classification algorithms and data types. Other data types that have been used in previous studies include RGB and multispectral imagery. Both utilise the different spectral characteristics of different species and have been used to achieve classification accuracies upwards of 90% (Mäyrä et al., 2021). Future studies using a combination of LiDAR and spectral imagery could achieve significantly higher classification accuracies for each species than was able to be achieved here using LiDAR data alone.

We used a support vector machine, an analytic method that has good classification accuracy, is easily implemented, and has an understandable implementation. However, there are a suite of other algorithms that can be used to classify tree species. Aside from a support vector machine, the two most common alternative methods are artificial neural nets (ANN) and random forests (RF). A number of studies have compared the relative accuracies of SVM's, ANN's, and RF's and these generally find similar classification accuracies between all three methods, though ANN's tend to perform slightly better than the other two classifiers (Mäyrä et al., 2021; Raczko & Zagajewski, 2017). Newer deep

learning models such as convolutional neural nets have just recently been implemented and appear to provide slightly higher classification accuracies than the other methods (Mäyrä et al., 2021) but do so at the expense of interpretability (Liu et al., 2018).

The ultimate measure of breeding success for kākāpō is not so much the abundance of rimu as the abundance of rimu fruit. While we can base estimates of rimu fruit production on the abundance and size of rimu in the catchment, this will always produce an estimate less accurate than that gathered through direct measurement. A direct survey of the amount of fruit produced in the catchment each year would provide a more robust measure of rimu productivity and thus a more accurate estimate of kākāpō carrying capacity and propensity for breeding. As surveys of this sort have also been conducted on other kākāpō habitats it would also provide a metric against which the relative chance of breeding success could more readily be compared.

Conclusion

Restoration of our native species requires the use of all the tools at our disposal. One of the most promising new tools is the integration of remote sensing and machine learning technologies. Here, we have used LiDAR derived tree metrics and a support vector machine classifier to estimate the abundance and distribution of rimu in a potential ring-fenced kākāpō haven. We estimate that the proposed sanctuary contains 13,211 rimu (greater than 20m in height) at a density of 3.94 (95% CI: 2.66 – 4.80) individuals per hectare with a mean crown size of 183 m^2, estimated mean basal area of 2.39m^2 per individual, and an estimated mean DBH of 1.75 metres, suggesting fruit production per hectare on par with that of Codfish Island. This number of rimu at the mature size present in the sanctuary area is likely enough to support a breeding population of over 170 kākāpō and, when taking into account the abundance of supplementary food, may provide a haven for over 200 kākāpō, doubling the current nationwide population and securing the future of kākāpō for years to come.

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Wainuiomata Fenced Sanctuary

- A proposal has been developed to build a fence around 3,400 ha of forest that is vested in the Greater Wellington Regional Council as part of the 8,000-hectare Wainuiomata/Orongorongo water collection area.
- A feasibility study has been completed by Jim Lynch (founder of Zealandia) on contract to GWRC. This study indicates a total cost of $41.823 million will be required, over ten years, to establish and operate the venture. In contribution to the feasibility study, DOC completed our own assessment, identifying the biodiversity value of the proposal.
- 29 September 2021, the following recommendations were made to the Minister, by the Department. All recommendations were agreed, except for recommendation 4.
    1. The proposal is a potentially valuable opportunity to aid kākāpō, rowi and hihi recovery. This is particularly significant for critically endangered kākāpō.
    2. This is a valuable opportunity to continue building the spectrum of societal connections to nature demonstrated regionally at Zealandia.
    3. There is a potential cost burden on DOC that would undermine the biodiversity gains of existing programmes developed nationwide across ecosystem, species, and pest priorities.
    4. Sources of funding should be obtained independent of the Department's existing funding streams.
    5. We respect the project leadership shown by GWRC and recommend that you direct the Department to participate with reasonable in-kind support.
- 10 December 2021, the Department and GWRC were invited to submit a bid for the proposal to be considered in Budget 2022, outside the Natural Resource Cluster process.
- The bid sought $31.249 million to enable fence construction and pest eradication to be undertaken. Ongoing costs to run the venture would require alternate funding.
- The budget bid has not been approved.

Additional issues

- For 2022/23 the Department has a challenge to ensure the best impact for threatened and at risk species and ecosystems in a constrained fiscal environment. While the sanctuary proposal has value, the scale of investment required does not align closely enough with the urgent priorities that need attention now within the Conservation portfolio. Therefore the proposal was considered outside the Natural Resources Cluster process.

Key facts

- Nil

Contact: Mark Fitzpatrick. Director, ANZBS Implementation. s.9(2)(a)

Last updated: 09/05/2022.

Read	

Department of Conservation
Te Papa Atawhai

Event Memo

Visit to proposed Puketahā - Wainuiomata Eco-Sanctuary site

In Confidence

GS ref: 22-M-0153
DOCCM: 7182469

To: Minister of Conservation **Date:** 17 November 2022

Event name: Visit to proposed Puketahā - Wainuiomata Eco-Sanctuary site, Wednesday 23 November 2022 from 9.00 AM till 12.00 PM

Key contacts			
Name	**Organisation**	**Role**	**Cellphone**
Angus Hulme-Moir	DOC	Local staff support (Kapiti-Wellington Operations Manager)	s.9(2)(a)
Hilary Aikman	DOC	Local staff support (Director Terrestrial Biodiversity)	
Jenny Nelson-Smith	DOC	Cultural support	
Tane Karepa	DOC	Cultural support	
Wayne O'Donnell	Greater Wellington Regional Council (GWRC)	Iwi liaison and general organisation	
Amanda Cox	GWRC	Coordinating cars, invitation list, organising Pōwhiri, contact for any queries	

Lee Hunter	The Port Nicholson Block Settlement Trust	Tumu Whakarae - Chief Executive	s.9(2)(a)
Ben Robinson-Drawbridge	GWRC	Media and Councillor Liaison	
Katie Lemalu	GWRC	Chair (EA) - Liaison with Minister's office	
Nora Moore	GWRC	Te Hunga Whiriwhiri (Māori Relations team)	

Context & purpose

1. This memo supports your half-day visit to the proposed site of Puketahā - Wainuiomata Eco-Sanctuary, in the Wainuiomata water catchment area in Lower Hutt, on Wednesday, 23 November.

2. Greater Wellington Regional Council (GWRC) and Taranaki Whānui ki te Upoko o te Ika have invited you to this event to show you around the site and discuss the proposal, s.9(2)(f)(ii) [redacted]

Background

3. A proposal to build 29km of predator-fence to create a 3,350 ha eco-sanctuary in the Wainuiomata water catchment area was first developed in 2020.

4. The key parties to the Puketahā - Wainuiomata Eco-Sanctuary proposal are Jim Lynch (the founder of Zealandia), GWRC (owner of the land), Taranaki Whānui ki te Upoko o te Ika, Ngāi Tahu, and DOC. Mana whenua Taranaki Whānui, through the Port Nicholson Block Settlement Trust, support and have been involved in the proposal from the beginning.

5. A feasibility study completed in 2021 by Jim Lynch, estimated that a total cost of $41.823m will be required over ten years to establish and operate the Puketahā-Wainuiomata Eco-Sanctuary.

6. The proposal rests primarily on the mainland habitat potential for threatened indigenous species, supported by:
   - Its size (15 times larger than Zealandia in Wellington City)
   - The quality of the habitat (largely unmodified lowland podocarp, broadleaf forest)
   - Optimum configuration for fencing
   - Easily accessible location.

7. In contribution to the feasibility study, DOC completed an assessment of the biodiversity value of the proposal. Nationally, there are several threatened forest species which require predator-free habitat and where offshore island habitats are not enough to

ensure their long term persistence. The proposed sanctuary could potentially increase the numbers of three iconic threatened species: kākāpō, rowi and hihi. It also has regional and local biodiversity value for other native species. These outcomes would directly contribute to Te Mana o Te Taiao Strategy 2020 goals of preventing extinctions and securing populations of all indigenous species.

8. As part of the feasibility study by Jim Lynch, the Port Nicholson Block Settlement Trust was commissioned to produce a Cultural Safety Report which defines the whakapapa of the area and the interests of Taranaki Whānui.

9. The local iwi is Te Āti Awa and the hapū is Te Matehōu. Waiwhetu and Wainuiomata are the local Marae. The catchment is known to mana whenua as Puketahā after the maunga of the same name on the eastern pae maunga (ridgeline) that dominates the catchment and the adjacent Orongorongo catchment. The general area has been the takiwā (territory) of many iwi over time and has significant cultural value to mana whenua as a bridge between Whanganui-a-Tara and the Wairarapa. While the catchment has not been the site of settlement, it has always been a significant hunting and foraging area and has considerable history and whakapapa attached[1].

<u>Budget 2022 – bid for the proposal was submitted but unsuccessful</u>

10. In December 2021, DOC and GWRC were invited by the Minister of Finance and the Minister of Conservation, to submit a bid for the Puketahā - Wainuiomata Eco-Sanctuary proposal to be considered in Budget 2022. While the sanctuary proposal has value, the scale of investment required did not align closely enough with the urgent priorities within the Conservation portfolio. Therefore, the proposal was considered outside the Natural Resources Cluster process in accordance with Minister Allan's decision.

11. The bid sought $31.249m for fence construction and pest eradication to be undertaken. Ongoing costs to run the sanctuary would require alternate funding. The bid was not approved.

12. GWRC has confirmed they will not proceed with the proposal without central government providing the core funding. They would like to work together with DOC to re-submit the bid. GWRC, Jim Lynch and Minister of Finance have had several discussions regarding this proposal, and Minister of Finance has previously communicated his support for it. However, the Treasury has recently indicated they are not anticipating DOC to submit a bid on the proposal to be considered in Budget 2023.

13. It is likely you will be asked about your view on re-submitting the bid. We recommend you:

    - Indicate at this stage DOC has not been invited to submit a bid on the proposal for Budget 2023.
    - Highlight the desire to avoid cost burden on DOC that could potentially compromise nationally driven biodiversity work in the current fiscally constrained environment.

[1] Source: Lynch, J. (2021). *Puketahā - Wainuiomata Eco-Sanctuary feasibility study. Appendix A. Taranaki Whānui ki te Upoko o te Ika Cultural Safety Report 2021*

Opportunities

14. This visit is an opportunity for you to learn more about the Puketahā - Wainuiomata Eco-Sanctuary and ask any questions you may have about the proposal and its feasibility.

15. This visit also provides an opportunity to meet with the key parties of the proposal and establish or strengthen your relationships with them. You may wish to acknowledge:

    - The leadership shown by Jim Lynch and GWRC in progressing the proposal.
    - The collaboration with iwi, both mana whenua Taranaki Whānui and Ngāi Tahu.
    - The significant amount of work that has been undertaken on both developing the proposal and completing the feasibility study and the accompanying Cultural Safety Report.

Risks & implications

16. The key conservation risk lies with making a commitment to the proposal that could draw current DOC baseline funding away from existing high priority conservation commitments, potentially compromising those outcomes. To mitigate this risk, we maintain that sources of funding should be obtained independent of the existing funding streams. Whilst DOC is focused on the long-term work of predator eradication as part of the Predator Free 2050 goal, we believe that fenced sanctuaries have been, and continue to be, valuable tools for the preservation of our threatened species. They are a very suitable undertaking for our communities to lead.

17. The main proponents of the proposal may expect central government to fund the proposal. Support that excludes the use of DOC's current baseline funds may risk a level of stakeholder frustration. To mitigate this risk DOC will maintain close communications with your office around the proposal to ensure consistent messaging across all stakeholders. We will notify any developments with regular Status Report items, and more detailed briefings if necessary.

18. 9(2)(g)(i) [redacted]

19. There are no known legislative implications.

Key attendees

Key attendees			
Photo	Name	Organisation	Bio highlights
	Jim Lynch	GWRC	Conservationist and founder of Zealandia. He was the President of the Wellington Branch of Forest and Bird from 1992 to 1995. In the 2001 Queen's Birthday Honours, Jim was awarded the Queen's Service Medal for community service. Jim was commissioned by GWRC to produce a feasibility study of establishing a wildlife sanctuary in the Wainuiomata Water Collection Area.
	Wayne O'Donnell, Kaiwhakahaere Matua, Whaitua - General Manager, Catchment Management Group	GWRC	Wayne is the GM for catchment management for Greater Wellington. His portfolio includes: • Biosecurity • Flood protection • Land management • Biodiversity
	Daran Ponter, Greater Wellington Regional Council - Chairperson	GWRC	Daran was first elected to GW in 2010 serving until 2013. He was again elected in 2016 and selected as chairperson in 2019. Before politics, Daran worked as a regional planner in the Bay of Plenty and as a public policy adviser in various ministries in Wellington, most notably Te Puni Kōkiri.
	Amanda Cox, Principal Advisor to the Chair - Chief Executive Office	GWRC	Amanda has been in this role since September 2020, following 9 years as Parks Manager for GWRC. Prior to that she held marketing management and team leader roles for Parks and Bulk Water at GW. Her professional background is in business, specialising in marketing. She has held marketing and business development roles at the NZ Lotteries Commission and several private companies.

	Nigel Corry, Te Tumu Whakarae, Chief Executive	GWRC	Nigel has been Chief Executive since September 2021, having previously served as Deputy Chief Executive from September 2018, as well as serving as General Manager Environment, General Manager of People & Customers, and a number of other environmental roles at GWRC in a career with the council dating back to 1998.
	Yadana Saw, Pōneke / Wellington constituency Councillor	GWRC	Yadana is newly elected to GW. Before being elected Yadana has worked in the non-profit sector and in local film, media and tech industry. She has worked on numerous Wellington City Council committees, Victoria University boards and advisory panels.
	Quentin Duthie, Te Awa Kairangi ki Tai / Lower Hutt constituency Councillor	GWRC	Quentin leads community and restoration. He is an expert in environment policy, and has worked on environment, climate policy and science for two decades.
	Thomas Nash, Pōneke / Wellington constituency Councillor	GWRC	Thomas has two decades of experience working for social change at the local, national and international level. He has set up, led, and advised successful international campaigns and organisations, worked in business and community organising, and has significant governance experience both in and outside council.
	Lee Hunter, Tumu Whakarae - Chief Executive	The Port Nicholson Block Settlement Trust	Lee joined the Trust in September 2021. He is leading the review and implementation of the Board's 5-year plan. Lee participates on a number of iwi projects, boards, committees and groups, such a Waka Kōtahi's Te Ara Tupua, Riverlink, Te Roopu Tiaki Conservation Board, Hem of Remutaka and management of Te Tatau o te Po Marae.

	Angus Hulme-Moir, Kapiti-Wellington Operations Manager	DOC	Angus has been involved with the Remutaka Forest Park and iwi / community interests in the area for a long time. His team work closely with GWRC on a number of projects in the vicinity, notably ungulate control. Together with Taranaki Whānui, GWRC, Remutaka Conservation Trust, Orongorongo Club and Moa Conservation Trust they have developed a shared plan covering the wider area to see biodiversity improved and visitor experiences enhanced.
	Hilary Aikman, Director Terrestrial Biodiversity	DOC	Hilary has had a long career in DOC, in roles involving threatened species management, pest control, marine and freshwater management, as well as people leadership. She has recently moved from the Operation Group where she was Director Operations Issues and Programmes. This role included oversight of DOC's landscape predator control programme and the Compliance and Law Enforcement function.

Attachments

20. Attachments:

- A: Runsheet

MEMO ENDS

Appendix - Additional information for Minister's Office

Media

21. GWRC will be taking photos and videos during the event. These will be developed into a short video (around 1 – 2 minutes) which they will share internally, and externally on their social channels and website. Your office and DOC will get an opportunity to review the video and approve it for release externally. There will be no other media present.

Travel implications

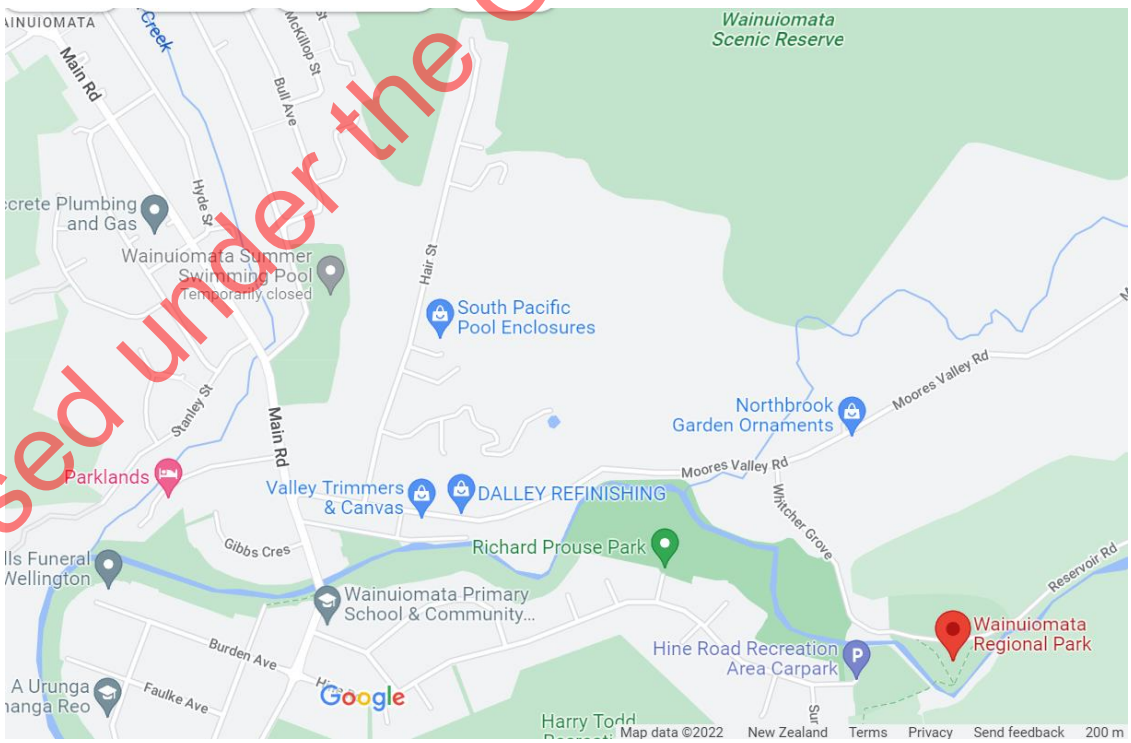
22. The tour of the site will be done by a 4WD, so for most of the visit you will be in a vehicle. Please be prepared for a short walk to Georges Creek by wearing suitable weatherproof clothing and walking shoes/boots, as it can often be cold and wet at the top of the catchment. A full safety briefing will be given to you prior to entering the site.

23. There is limited Vodafone reception at the Rangers office. There is no cell phone reception past this area. The vehicles will always have radio contact throughout the park.

24. To protect the water collection area, anyone with gastroenteritis in the last two weeks will not be able to enter the site.

25. Any gear used in the South Island in the previous two months needs to be cleaned and dried before this visit to protect the waterways.

26. To get to the event location, follow the main road through Wainuiomata and turn left at the roundabout into Moores Valley Road. Take the first turn right into Whitcher Grove and follow this to the park (see map below). Taranaki Whānui and GWRC staff will meet you at the gate.



Attachment A: Runsheet

Event: Visit to proposed Puketahā Wainuiomata Eco-Sanctuary site

Date: 23rd November 2022

Time	Programme	Attendees
8.45am	Arrive at Wainuiomata Regional Park. Greeted at Gate Escorted to Rangers office, near the Lower Dam	Hon Poto Williams Two members of Minister's Office to accompany Minister Jim Lynch (Founder Zealandia) Wayne O'Donnell (GW General Manager) Daran Ponter (GWRC - Chair) Amanda Cox (GW Principal Advisor to the Chair) Nigel Corry (GW Chief Executive) Yadana Saw (GW Councillor) Quentin Duthie (GW Councillor) Thomas Nash (GW Councillor) Lee Hunter (CEO PNBST – Taranaki Whānui) s.9(2)(a) (Chair PNBST – Taranaki Whānui) s.9(2)(a) (Ngāi Tahu) Tane Karepa (DOC cultural support) Angus Hulme-Moir (DOC Kapiti-Wellington Operations Manager) Hilary Aikman (DOC Director Terrestrial Biodiversity) Jimmy Young (GW Parks Manager) Vlad Macoviciuc (GW Ranger) Jo Greenman (GW Ranger) Glen Falconer (GW driver) Shannon Stevens (GW photographer)

9.00am	Pōwhiri The tikanga and kawa of the proceedings for the Puketahā site visit as discussed and agreed with Lee Hunter, CEO Taranaki Whānui Trust: ○ Taranaki Whānui: Mihi followed by a waiata ○ DOC Cultural Support: Mihi followed by a waiata ○ Taranaki Whānui: Karakia, himene, close off the mihimihi proceedings • The Pōwhiri is in an open public access area. • If raining, the mihimihi will take place in the Rangers Hut. • Mihimihi intended to take no longer than 15 minutes. • Taranaki Whānui kaupapa of the site visit is to introduce the Minister to the beauty of the native state of Puketahā and highlight the value of translocating/returning kākāpō and other taonga species. • Tane Karepa (DOC) will be the Cultural support for the Minister and will attend the hīkoi.	
9.30am	• Background to the sanctuary • Speeches ○ Daran Ponter ○ Lee Hunter/Kara Puketapu-Dentice	
	• Kai	
9.55am	• Safety briefing	
10.00am	• Load into vehicles and travel to helipad **Please note:** You will be seated in a vehicle with ○ Wayne O'Donnell (Driver) ○ Daran Ponter ○ Jim Lynch We have provided bios for each, see 'Key attendees'	
	• Short walk up to Georges Creek on way back (if time permits)	
	• Return to base	
12.00pm	• Finish	

ENDS

Out of scope

[redacted]

Fund and enable design of the proposed Wainuiomata Eco-sanctuary

20. GW highlighted the opportunity to develop a fenced eco-sanctuary within the Wainuiomata water catchment area and are seeking that government:

    - Provide new funding to enable the Department to partner with GW and mana whenua to complete detailed design, get resource consent for the proposal, and inform the development of a future business case.

21. The Department is supportive of the Wainuiomata Eco-sanctuary proposal which has the potential to provide a valuable opportunity to aid kākāpō, rowi and hihi recovery. Its location less than an hour's drive from Wellington CBD also has the benefit of improving opportunities for community connection to nature.
22. The Department does not support the funding of this project from vote conservation as this would reduce the biodiversity gains of existing national programmes that have been developed across ecosystems, species, and pest priorities.
23. Ideally, funding would be provided independent to the Department's existing funding streams. The Department will continue to provide in kind support to the project.

Out of scope

[redacted]

Department of Conservation
Te Papa Atawhai

Briefing: Puketahā-Wainuiomata Ecosanctuary Funding Request

To	Minister of Conservation	**Date submitted**	15 March 2023
Risk Assessment	Low	**Priority**	Normal
Reference	23-B-0072	**DocCM**	DOC-7285391
Security Level	In Confidence		

Action sought	Support for a funding request to the Prime Minister's Emerging Priorities Fund.	**Timeframe**	As soon as is convenient.
Attachments	Attachment A – Draft letter of support to the applicant		

Contacts	
Name and position	**Cell phone**
Hilary Aikman, Terrestrial Biodiversity Director	s.9(2)(a)

Executive summary – Whakarāpopoto ā kaiwhakahaere

1. Greater Wellington Regional Council and Taranaki Whānui have submitted a request for funding from the Prime Minister's Emerging Priorities Fund of $1,863,000 over two years to complete the design and pre-construction for a 3,300 ha predator-free enclosure near Wellington (Puketahā -Wainuiomata Ecosanctuary).
2. The use of this fund is at the Prime Minister's discretion.
3. Our assessment concludes that this proposal has the potential to improve the threat status of three critically endangered species – kākāpō, rowi kiwi and hihi, and be beneficial to a range of other species.
4. Because the funding request is for the preparatory phase, there is risk that subsequent funding might not be raised.
5. We support the proposal with the preference it does not divert DOC funding away from existing programmes.
6. If you agree, the next steps are to forward the application through to the Prime Minister's Office with your endorsement and to respond to the applicant indicating your support.

We recommend that you … (Ngā tohutohu)

		Decision
a)	**Agree** to support the proposal by forwarding the request through to the Prime Minister's Office with your endorsement	Yes / No

s.9(2)(a)

Date: 13 / 03 / 2023

Stephanie Rowe
Deputy Director-General Biodiversity, Heritage and Visitors
For Director-General of Conservation

Date: / /

Hon Willow-Jean Prime
Minister of Conservation

Purpose – Te aronga

1. This briefing provides you with context and a recommendation on an external request for funding from the Prime Minister's Emerging Priorities Fund to design a predator-free fenced ecosanctuary near Wellington.

Background and context – Te horopaki

2. You received a request for funding from the Prime Minister's Emerging Priorities Fund of $1,863,000 over two years to complete the design and pre-construction for the 3,300ha enclosure (Puketahā -Wainuiomata Ecosanctuary) in the Wainuiomata catchment.

3. It is a joint funding request from Greater Wellington Regional Council (GWRC) and Taranaki Whānui, with the aim to create a large ecosanctuary for the introduction of endangered species, alongside other conservation benefits.

4. This briefing provides you with:

   - Background about the Prime Minister's Emerging Priorities Fund, its use, and criteria
   - Other funding avenues sought by the applicant
   - An overview of the proposed project and value for conservation
   - Advice regarding whether to support the funding application and next steps
   - A draft letter of support to the requestor (included in appendices).

Prime Minister's Emerging Priorities Fund and other funding sources

5. The Prime Minister's Emerging Priorities Fund has been provided to conservation projects in the past e.g., One Billion Trees Programme.

6. We are not aware of a formal process or defined criteria for applying to this fund. Allocation is at the Prime Minister's discretion.

7. Please note that a briefing was provided to Minister Kiritapu Allan about this proposal, and GRWC was invited by the Minister of Finance and Minister of Conservation to submit a proposal to be considered in Budget 2022. The scale of investment needed 9(2)(g)(i) [redacted] did not align closely with other urgent priorities, and it was not successful.

8. Other funding sources to date:

   a) GWRC $43,000 for feasibility study

   b) DOC $30,000 for feasibility study

9. We are not aware of any other funding applications.

Proposed project and value for conservation

10. The proposal is to construct a 28.8km predator proof fence around the Wainuiomata water catchment, eradicate all pests (predators and browsers) and keep the area pest-free to restore endangered species to the enclosed area.

11. A feasibility study found the project would be challenging, but technically feasible. The total cost over the next 10 years (including eradication and maintenance) would be approximately $42 million, with ongoing annual costs of $2.5 million per annum after 10 years.

12. The funding request considered here is for the preparatory phase to allow the project to achieve all necessary design and permissions to move to a building phase.

13. DOC undertook an assessment of the potential biodiversity benefits of the fenced sanctuary, concluding that it had the potential to improve the threat status of three critically endangered species – kākāpō (Threatened - Nationally Critical), rowi kiwi (Threatened - Nationally Vulnerable) and hihi (Threatened - Nationally Vulnerable).

14. It would be beneficial to a range of other species, including kōkako, common forest bird species, lizards and invertebrates that may already be within the site footprint.

15. A dedicated threatened plant survey has not been undertaken, although a desktop assessment found that it would help protect species of the *Myrtaceae* family such as rātā (Threatened - Nationally Vulnerable), kohurangi / Kirk's daisy (Threatened - Nationally Vulnerable) and could allow for the introduction of three species of mistletoe, of which two are endangered.

16. The forest type (lowland rimu/rātā/tawa-kamahi forest) is not particularly threatened at a national level, but it has been substantially depleted by land clearance (19% remaining). A lot of the remaining area has been degraded by logging, fire and browsing. This site represents a unique remnant outlier of this almost lost rimu/rātā lowland ecosystem.

Risk assessment – Aronga tūraru

17. There is a reputational risk if we do not support a proposal where three highly endangered and iconic species could potentially see their threat status improve with the establishment of populations at this site. s.9(2)(g)(i) [redacted]

18. s.9(2)(g)(i) [redacted]

[redacted]

Consultation – Kōrero whakawhiti

20. Mana Whenua Taranaki Whānui (represented by the Port Nicholson Block Settlement Trust) support the project and have co-signed the application. They provided a Cultural Safety report in late 2021. This report strongly supports the return of indigenous species to the valley.

21. Kākāpō and rowi kiwi are both resident in the South Island within Ngāi Tahu's takiwa, and future translocations rely on a strong relationship between them. Ngāi Tahu and Taranaki Whānui representatives visited the site in late 2020 to discuss potential transfers of kākāpō and rowi kiwi. Initial reactions from Ngāi Tahu have been positive.

22. Previous conservation ministers (Minister Allan and Minister Williams) have been briefed. Minister Allan visited the site and Minister Williams accepted an invitation to visit, but the trip was cancelled. Our previous Director General has also visited and supported the proposal with funding for the feasibility study.

23. Both Minister Grant Robertson and Ginny Andersen (MP Hutt South) have been included in the correspondence from the GWRC to you, so they are aware of this proposal. They may be interested in your response.

Financial implications – Te hīraunga pūtea

24. No financial implications to DOC as part of this funding application.

25. We cannot assess the financial implications on the Prime Minister's Emerging Priorities Fund, as little information is available.

Legal implications – Te hīraunga a ture

26. No legal implications.

Recommendations and next steps – Ngā tāwhaitanga

27. The proposal could potentially improve the threat status of at least three species of highly endangered birds, as well as plants, invertebrates, and lizards.

28. Our position is that we support the proposal, with the proviso that further funds are not sought from DOC for the planning, establishment, or operation of the proposed sanctuary.

29. If you agree, the next steps are to forward the application through to the Prime Minister's Office with your endorsement and respond to the applicant indicating your support.

ENDS

Hon Willow-Jean Prime

MP for Northland
Minister of Conservation
Minister for Youth
Associate Minister for Arts, Culture and Heritage
Associate Minister of Health

Daran Ponter
Greater Wellington Regional Council
Daran.Ponter@gw.govt.nz

Tēnā kōrua Mr Ponter rāua ko Ms Puketapu-Dentice

Thank you for your email dated 15 February 2023 regarding the establishment and design of Puketahā Ecosanctuary at Wainuiomata.

My Department has advised that this proposal has the potential to provide a significant conservation benefit to at least three highly endangered species (kākāpo, rowi kiwi and hihi), as well as a range of other birds, plants, lizards and invertebrates.

I am therefore in support of submitting this proposal to the Prime Minister's Office to be considered for funding through the Prime Minister's Emerging Priorities Fund.

Once I have a response, I will be in touch.

Thank you for taking the time to forward your proposal through to me.

Nāku noa nā

Hon Willow-Jean Prime
Minister of Conservation

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