Submission on the consultation on modernising New Zealand's conservation system

This submission is from Universities New Zealand – Te Pōkai Tara (UNZ[1]) – the peak body for New Zealand's eight universities. The submission has been developed through UNZ's Research and Vice-Chancellors' Committees. This submission responds to the invitation for feedback Proposals to modernise the conservation system : Consultations 2024 and Exploring charging for access to some public conservation land - discussion document

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Submission by email
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Executive summary

Universities are pleased to see that the first of the four priorities in the consultation on modernising the conservation system is to "fix concession processes" to reduce red tape to make it easier for other organisations such as universities, to be active on public conservation land. We propose that DOC grants universities institutional permits which would increase DOC efficiency in processing permits for conservation research.

We do not support the introduction of fees for permits for, or access to, the DOC estate for conservation research undertaken by public institutions like universities and Crown Research Institutes. Conservation research undertaken by public organisations is in national interest and therefore no further barriers to research should be introduced.

Modernising the conservation system

An efficient solution to research permit processing for public research organisations

In general, universities enjoy a very good and trusting working relationship with the Department of Conservation. Since the end of 2021, we have worked in partnership with DOC to speed up the

[1] Universities New Zealand is the operating name of the New Zealand Vice-Chancellors' Committee, a body established under Part 19 of the Education Act 1989. It has statutory responsibilities for university quality assurance, the approval and accreditation of university academic programmes, entrance to universities, and scholarships. It also represents the interests of the universities on a wide range of other matters, such as education and research policies.

processing times of applications to undertake conservation research on the DOC estate. In spite of our best efforts, we have not seen any significant reduction in processing times. This severely impedes the ability of researchers and postgraduate students to undertake the necessary work that contributes substantially to New Zealand's economy. This in turn impacts on universities' ability to develop New Zealand's future conservation capability and capacity.

We appreciate the demand on DOC's resources that is required to process each application for each research project or programme. Therefore, we suggest a more efficient means of granting university research permits through **institutional permits**. This is consistent with the 'class approach' referred to in the consultation document. Institutional permits would replace the high number of permits for small-scale research, thereby reducing the demands on DOC's resources. We believe that an institutional permit could be negotiated with each university and that these permits could include all the necessary components (e.g., IP management, Māori data sovereignty) to provide DOC with the assurance that the research will be conducted by the university in an appropriate and ethical manner.

Iwi/Hapū Engagement

Universities support the consultation document's emphasis on reducing the burden on Iwi and Hapū consultation (reflected in section 4 of the Conservation Act, specific commitments in Treaty settlement deeds and legislation, and agreements with Iwi/Hapū). With specific regard to conservation research, and in line with the institutional permit proposal, we suggest that DOC recognizes that many university researchers have existing and long-standing relationships with relevant Iwi and Hapū. Institutional permits could require the universities to satisfy the proposed new requirements for engagement. As public tertiary education organisations, universities already have a duty in the performance of their functions and the exercise of their powers, to acknowledge the principles of Te Tiriti o Waitangi (section 281(1)(b). Therefore, universities are accustomed to working with Iwi and Hapū and our conservation researchers have a long-established history of doing this well.

Exploring charging for access

We do not support the introduction of access fees (or permit fees) for conservation researchers, research students and research volunteers who are involved with conservation research undertaken on behalf of public institutions like universities and public research organisations (currently Crown Research Institutions). Conservation research undertaken by public organisations is in the national interest (for example, please see appendix 1 for the economic returns of university conservation research) and therefore no new barriers to research should be introduced. We are seeking **exemption from access fees** for all staff, students and volunteers involved in research undertaken by universities.

Appendix 1. The value of New Zealand's university conservation research to the economy

The revenue created by university research for the New Zealand economy is immense. Overall, **university research returns around $5.10 for every dollar invested**, driving innovation and economic growth, and contributing to greater social and cultural understanding[2]. An essential part of this output is in native fauna and flora university research on the Department of Conservation Estate.

This research benefits five key categories:

1. Agriculture and Fisheries
Research into marine protection within the conservation estate has contributed to measures that underpin more than $500million in fisheries. Ongoing university research into pest control and sustainable farming practices has led to healthier crops and lower costs for farmers. With agriculture's significant contribution to New Zealand's GDP, supporting research in this area is essential. Similarly, by studying fish populations and marine ecosystems, researchers now have insights into how to manage fish stocks sustainably, ensuring the long-term viability of the fishing industry—another crucial contributor to New Zealand's economy.[3]

2. Pharmaceutical and biotechnological innovations
University researchers have discovered bioactive compounds in native plants with real-world pharmaceutical applications. Once commercialised, this will create new revenue streams and job opportunities in the biotechnology sector.

3. Climate change mitigation
Research into carbon sequestration and the resilience of carbon reservoirs to land-use-land-change has identified more than $3billion in carbon sequestration value at current market prices. The research has also begun to identify potential management interventions that will increase this value. Research on climate change and its impact on native species and ecosystems provides critical data for developing effective conservation strategies.[4] This research supports policies that protect natural resources, ensuring their availability for future generations and maintaining the economic benefits derived from them.

4. Regional economic development
There are many examples of university research teams collaborating with local communities and industries on conservation projects. This leads to job creation, more funding, and stimulated economic development and growth in the regions where the research is conducted.

5. Tourism and Eco-Tourism
New Zealand's unique, rich ecosystems and wildlife are major attractions for tourists. Ongoing conservation research by universities helps us to keep these unique features safe for future generations, as well as enhance New Zealand's reputation as a premier eco-tourism destination, attracting visitors and generating significant revenue for local economies.[5]

There are countless examples that show where university conservation research on the DOC estate is having short-term and long-term positive economic impacts. The following pages provide some recent examples.

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[2] https://www.universitiesnz.ac.nz/sites/default/files/uni-nz/Briefing%20for%20the%20Incoming%20Minister%20of%20Universities%20January%202025.pdf
3 https://press-files.anu.edu.au/downloads/press/p105531/pdf/article05.pdf
4 https://www.universitiesnz.ac.nz/sites/default/files/uni-nz/University%20economic%20impact%202022%20%28Final%29_0.pdf
5 https://www.universitiesnz.ac.nz/sites/default/files/uni-nz/University%20economic%20impact%202022%20%28Final%29_0.pdf

Sample of case studies that exemplify the economic benefit of university research on the DOC estate

1. Ecosystem based management of the Fiordland Rock Lobster

The rock lobster fishery is New Zealand's most valuable inshore fishery – **valued at $1.35billion with more than $300m in exports**. This has not always been the case. In the 1990s despite inclusion of the Rock Lobster fishery into the Quota management system, the fishery was still in trouble. Following research advice, an ecosystem-based management approach was taken to maintain the resource base for the rock lobster and protect larval and adult connectivity. One of the main management tools employed was the instigation of marine reserves to allow, amongst other stock, rock lobster populations to grow and reproduce without fishing pressure and in areas where food resource and habitat are conducive to population growth. Spill over from the reserves into other areas of Fiordland contributes directly to the success and growth of the fishery and is a major turn-around from the 1990s. Research at the University of Otago continues to monitor the effectiveness of the ecosystem-based management approach to find opportunities for fisheries while maintain a healthy and resilient fish stock.

2. Carbon sequestration

Atmospheric carbon dioxide observations and models suggest strong uptake by forests in New Zealand. By far the biggest of these is the Fiordland National Park, where the annual draw down of CO2 is estimated to be of the same order as our annual national emission from fossil fuel use – a **carbon value in excess of $3billion**. The importance of Fiordland is the mechanism for rapid lateral transport of carbon from the forest floor and canopy to the nearby fiord basins where the carbon is quickly buried and retained in the marine sink rather than simply being slowly reoxidised and returned to the atmosphere. Research has identified that New Zealand fiords have some of the highest organic carbon accumulation rates in the World, matching that of Alaska and approaching the same values as Europe. Collectively, global fiords sequester 11% of the annual marine carbon burial despite only accounting about 0.1% of the global ocean surface area.

3. Improving protection will see kelp forest recovery

Underwater forests, or kelp forests, are among the planet's most productive ecosystems, rivalling the ecological and economic value of Earth's most lush terrestrial forests. Despite being hidden beneath the surface, these forests are globally valued at over NZ$850 billion for their crucial contributions to fisheries, nitrogen cycling, and carbon sequestration. In New Zealand, kelp forests span much of the country's 15,000 km coastline, but they are rapidly disappearing due to poor fisheries and land management practices. In northeastern New Zealand, for instance, kelp coverage has decreased by as much as 50% in some areas, primarily due to the depletion of key species like tāmure (snapper) and koura (crayfish). This depletion allows sea urchins—their natural prey—to proliferate and devastate kelp beds. The establishment of marine reserves has proven highly effective in restoring fish populations and promoting kelp recovery. Recent studies undertaken by the University of Auckland show that with improved protection of rocky reefs and better fisheries management, the recovery of kelp forests in the Hauraki Gulf Marine Park **could result in a one-time economic benefit of over NZ$7.9 million, along with an annual benefit of $7.6 million just from carbon sequestration alone**. The additional economic gains from fisheries and nutrient cycling would likely increase this value tenfold. When we treat nature as something we can exploit without consequence, we risk severe environmental and social costs.

Peleg O., Blain C.O., Shears N.T. (2023) Long-term marine protection enhances kelp forest ecosystem stability. *Ecological Applications* 33:e2895. https://doi.org/10.1002/eap.2895

Eger A.M., Blain C.O., Brown A.L., Chan S.S.W., Miller K.I., Vergés A. (2024) Kelp forest versus urchin barrens: a comparison of ecosystem functions and services provided by two alternative stable marine habitats. *Proceedings of the Royal Society B* 291:20241539. https://doi.org/10.1098/rspb.2024.1539

4. Eradicating predator wasps

Invasive wasps **cost NZ's economy approximately $130 million per year** and impact many different ecosystem elements. These economic costs are born by pastoral farming, beekeepers, traffic accidents, health, plus at least $60m in unrealised honey production from beech forest honeydew taken by wasps. Ecosystem impacts include a notable decline in native birds especially the kākā.

Researchers at the University of Auckland have worked closely with DOC and Manaaki Whenua - Landcare Research to conduct extensive studies into population dynamics, ecological impact, bio-control methods, and honeydew production. Their work has contributed significantly to our understanding and management of invasive wasps in New Zealand and received international recognition.

This research provides the tools needed for better decision making and planning, unlocking the potential for increased honey production, enhanced pollination services that benefit the agricultural sector, reduced beekeeper costs from attacks on hives, and keeps tourists visiting beech forests.

https://www.doc.govt.nz/about-us/science-publications/conservation-publications/threats-and-impacts/animal-pests/an-evaluation-of-the-costs-of-pest-wasps-in-new-zealand/

https://interactives.stuff.co.nz/2022/02/wasp-wipeout-2022/

5. Regenerating snapper stocks

Tāmure, or snapper, are crucial to New Zealand's fishing industry, supporting our largest recreational fishery and one of our largest commercial fisheries.

The severe depletion of snapper stocks is well known. However, marine reserves administered by DOC have been shown to be extremely effective in turning this problem around. The marine reserve at Leigh—the oldest in Aotearoa—tells a remarkable story of ecological recovery. Despite covering just 0.08% of the Hauraki Gulf's marine space, this small, protected area generates outsized benefits. 10.6% of juvenile snappers sampled up to 55 km outside the reserve originated from breeding adults within its boundaries.

The economic impact is undeniable: a recent University of Auckland paper showed that **the reserve generates an estimated $NZ4.89 million annually for commercial fisheries and $NZ 9.64 million in recreational fishing spending**. However, these figures only scratch the surface. There are also additional economic benefits from tourism and broader ecosystem services. Strategic marine conservation doesn't just protect wildlife—it can revitalise entire economic ecosystems.

Qu Z., Thrush S., Parsons, D., Lewis N. (2021) Economic value of the snapper recruitment effect from a well-established temperate no-take marine reserve on adjacent fisheries. *Marine Policy* 134: 104792. https://www.sciencedirect.com/science/article/pii/S0308597X21004036

6. Pine research on Public Conservation Land shows economic benefits

Wilding conifer control is a major government-funded initiative, with an estimated return-on-investment of 34:1. Most of that benefit is driven by water. However, the uncontrolled spread of pine would dramatically impact the availability of water for irrigation and hydroelectric power generation. University of Canterbury research (in collaboration with Scion and Manaaki Whenua) on public conservation land has been an important contribution to making wilding conifer control cheaper and more effective. One of our main contributions has been to shift the focus from simply killing pines towards achieving long-term resistance to re-invasion. To ensure that our research is useful, we published a review in 2022 focussed on applying ecological research to long-term management (Dickie et al. 2022). Ongoing research on the DOC estate is currently taking place at The Wolds & Fisherman's Creek Conservation areas, and previous research has been undertaken at Molesworth Station, at Craigieburn, and at various sites in Mackenzie country.

Recent publications include:

Sapsford, S. J., & Dickie, I. A. (2023). Slow soil enzyme recovery following invasive tree removal through gradual changes in bacterial and fungal communities. Journal of Ecology, 111(12), 2614-2626.

Steel, G. S., Dickie, I. A., & Sapsford, S. J. (2022). A risk to the forestry industry? Invasive pines as hosts of foliar fungi and potential pathogens. New Zealand Journal of Ecology, 46(1), 1-13.

Dickie, I. A., Sprague, R., Green, J., Peltzer, D. A., Orwin, K., & Sapsford, S. (2022). Applying ecological research to improve long-term outcomes of wilding conifer management. New Zealand Journal of Ecology, 46(2), 1-16.

Green, J. L. (2022). Ecosystem legacies of invasive pines with exotic grasses and shrubs. (Doctoral dissertation, University of Canterbury).

Thakur, V. (2023). Tripartite symbiosis of bacterial communities, ectomycorrhizal fungi and invasive pine (Doctoral dissertation, University of Canterbury).

Other outreach has included:

Dickie I. A. (2021). Fungi: the hidden drivers of wilding pine invasions. Webinar for wilding pines network: https://wildingpinenetwork.org.nz/wildings-webinars/

7. Researchers suggest a balanced approach to whitebait population

New research from two University of Canterbury PhD students has revealed crucial insights into how whitebaiting affects our native fish populations. Their work, centred on the West Coast, shows a contrast in how different fish species cope with the popular seasonal harvest.

The study found that kōkopu are naturally resilient to whitebaiting pressure thanks to their multi-year lifecycle. But īnanga, which live for just one year, are much more vulnerable, with each fishing season having a direct impact on their adult populations.

These findings are set to reshape fisheries management approaches. The researchers recommend a dual strategy: implementing more selective fishing regulations while protecting high-quality habitats where adult fish thrive. This balanced approach could help secure the future of both the fish populations and New Zealand's whitebaiting tradition.

References:

Crichton B.R.J., Hickford M.J.H., McIntosh A.R. & Schiel D.R. (2024). Evaluating intra- and inter-life stage density-dependent dynamics for management of perennial amphidromous fish. Ecological Applications, e3038. https://doi.org/10.1002/eap.3038

Watson A.S., Hickford M.J.H. & Schiel D.R. (2021). Freshwater reserves for fisheries conservation and enhancement of a widespread migratory fish. Journal of Applied Ecology 58, 2135–2145. https://doi.org/10.1111/1365-2664.13967

Watson A.S., Hickford M.J.H. & Schiel D.R. (2022). Interacting effects of density and temperature on fish growth rates in freshwater protected populations. Proceedings of the Royal Society B: Biological Sciences 289, 20211982. https://doi.org/10.1098/rspb.2021.1982

Crichton B.R.J. (2023). Whitebait fishery effects on the population and trophic dynamics of kōkopu. PhD thesis, University of Canterbury, Christchurch, New Zealand.

Watson, A. S. (2022). The effectiveness of whitebait reserves for conservation and fisheries sustainability of īnanga Galaxias maculatus. PhD thesis, University of Canterbury, Christchurch, New Zealand.http://dx.doi.org/10.26021/12554

8. Scientific data helps to improve alpine tourism visitor safety

New Zealand's alpine regions are tourist destination hot spots. Glacier tourism is an important and growing contributor to many regional economies (Purdie, 2013; Stewart *et al.*, 2016; Purdie *et al.*, 2020). **In Westland alone, tourism contributes over $95 million dollars towards regional GDP**, and employs over 1100 people (Infometrics, 2025). New Zealand's international reputation as a key tourist destination relies on keeping visitors safe in alpine environments and satisfied with their experiences. The economic implications of rapid glacier recession and associated slope instability are significant, as glacier tourism is a critical and growing contributor to regional economies (Purdie 2013, Stewart et al. 2016, Purdie et al. 2020). University of Canterbury's School of Earth and Environment has been providing essential scientific data to glacier tourism operators and others, helping to improve daily decision making in relation to visitor safety (Gomez & Purdie, 2018), operational sustainability and enable operators to provide high-quality experiences (Purdie et al., 2020).

References:

Gomez, C. and Purdie, H. (2018). Point cloud technology and 2D computational flow dynamic modelling for rapid hazards and disaster risk appraisal on Yellow Creek fan, Southern Alps of New Zealand. *Progress in Earth and Planetary Science*, 5, (50): 1-10. https://doi.org/10.1186/s40645-018-0208-3

Infometrics (2025). Regional Economic Profile - Westland District 2023. Available from https://rep.infometrics.co.nz/westland-district, 52pp.

Purdie, H. (2013). Glacier retreat and tourism: Insights from New Zealand. *Mountain Research and Developmen*t, 33, 463-472. https://doi.org/10.1659/MRD-JOURNAL-D-12-00073.1

Purdie, H., Hughes Hutton, J., Stewart, E. and Espiner, S. (2020). Implications of a changing alpine environment for Geotourism: A case study from Aoraki/Mount Cook, New Zealand. *Journal of Outdoor Recreation and Tourism*, 29 (10235), 1-10. https://doi.org/10.1016/j.jort.2019.100235

Stewart, E.J., Wilson, J., Espiner, S., Purdie, H., Lemieux, C. and Dawson, J. (2016). Implications of climate change for glacier tourism, *Tourism Geographies*, 18(4): 377-398. https://doi.org/10.1080/14616688.2016.1198416

9. Island Conservation for Eco-Tourism

Islands are a key component of the global biodiversity and extinction crisis with island economic losses in the billions from the impacts of pests.

New Zealand leads the world in island pest eradication and accounts for 25% of all such global efforts. For over a decade, the University of Auckland has collaborated closely with DOC, Invasive Species Specialist Group, UNESCO World Heritage, Island Conservation and others to significantly advance the understanding and management of invasive species on islands, both globally and locally.

This biodiversity conservation work, which is part of the Predator Free 2050 initiative, uses mixed methodologies from the natural and social sciences, employing multi-level intervention strategies from grassroots to government.

This research helps preserve and future-proof New Zealand's eco-tourism industry and has significant benefits for the Pacific region and beyond. As well, the IP developed to achieve island eradication is itself marketable around the world. There is also significant flow on agricultural benefits due to reduction of crop damage from invasive species, and improved climate resilience from pest removal due to healthy ecosystems being able to better withstand and recover from climate-related impacts.

https://www.nature.com/articles/s41598-022-14982-5

https://www.theguardian.com/world/2022/aug/17/new-zealand-leads-world-in-island-pest-eradication-study-finds

https://www.islandconservation.auckland.ac.nz

10. Understanding the importance of countering kauri dieback

Kauri timber is amongst the finest in the world, but aggressive felling in the strong investment in the mid-19th to mid-20th century has left a legacy of severely depleted natural kauri forests.

Although the current supply of kauri timber is now restricted, the species shows high silvicultural potential for a future supply. Recognition of the value of kauri forest for carbon markets is now also emerging. Kauri has the fastest carbon sequestration rates to wood of any native conifer in New Zealand, and kauri ecosystems accumulate extremely large carbon pools over time both in wood and organic soils. Remaining kauri forests, however, are subject to threats from climate change and kauri dieback.

The University of Auckland has a long history of research on kauri and its ecosystems, in collaboration and supported by DOC, Auckland Council, iwi and others. Current University of Auckland kauri research is focused on the impacts and solutions for kauri dieback. The research also investigates how kauri will withstand future droughts and its growth in natural stands. One significant project remeasures a kauri stand on DOC land and will provide vital insights into more than 50 years of change.

11. Saving Māui dolphin from extinction

New Zealand's Māui dolphins are the rarest dolphin species in the world. With only 50 living animals aged 1 year or older, they are listed as Critically Endangered.

Since the mid-1990s University of Auckland researchers have worked closely with DOC and the Ministry of Primary Industries using a variety of different research approaches to understand the habitat, genetic diversity, diet, and threats facing Māui dolphins. It was this vital research that led to the historic overturning of a 2019 lawsuit that had tried to downplay the threats to the survival of

the species. Without this detailed research, the findings may not have been overturned, and the Māui dolphin would in all likelihood now be extinct.

Constantine R., Roe W. (2021) The Critically Endangered Māui dolphin is a conservation priority – we shouldn't let uncertainty stop action to save it. The Conversation, 19 October 2021. https://theconversation.com/the-critically-endangered-maui-dolphin-is-a-conservation-priority-we-shouldnt-let-uncertainty-stop-action-to-save-it-167987

Constantine R., Steel D., Carroll E., Hamner R.M., Hansen C., Hickman G., Hillock K., Ogle M., Tukua P., Baker C.S. (2021) Estimating the abundance and effective population size of Māui dolphins (*Cephalorhynchus hectori maui*) in 2020-2021 using microsatellite genotypes, with retrospective matching to 2001. Final Report to Department of Conservation, Wellington 2021.

12. Shipping speed adjustment eliminates whale mortality

There were unsustainable levels of ship strike mortality of the Nationally Critical listed Bryde's whales in the Hauraki Gulf. This was attracting international attention via the International Maritime Organisation and International Whaling Commission who work closely to mitigate global ship strike risk to whales. Innovative University of Auckland research used tags and modelling approaches to understand the risk to whales. Researchers determined that speed restrictions were the best option to mitigate ship strike mortality. An inclusive science-informed, social process with industry, government, mana whenua and researchers led to the shipping industry collectively agreeing to a voluntary slow-down plus other measures. This was adopted in late 2013 and still remains in place. Since 2014, there have been no whales killed within the slow zone and the industry voluntarily maintains the 10 knot slow zone. The small cost of going slower is added to voyage planning, making it substantially more economical having to enforce mandatory speed restrictions. This voluntary approach is held up as a global best practice example. This research was conducted with support from DOC.

Constantine R., Johnson M., Riekkola L., Jervis S., Kozmian-Ledward L., Dennis T., Torres L.G., Aguilar de Soto N. (2015) Mitigation of vessel-strike mortality in endangered Bryde's whales in the Hauraki Gulf, New Zealand. *Biological Conservation* 186: 149-157 https://doi.org/10.1016/j.biocon.2015.03.008

Ebdon P., Riekkola L., Constantine R. (2020) Testing the efficacy of ship strike mitigation for whales in the Hauraki Gulf, New Zealand. *Ocean & Coastal Management* 184: 105034. https://doi.org/10.1016/j.ocecoaman.2019.105034

13. Learning from our mistakes - ensuring sustainable NZ eco-tourism industry for marine mammals

Up until the mid-1990's, New Zealand had been a world leader in the protection of marine animals from anthropogenic impacts, as evidenced by the groundbreaking Marine Mammals Protection Regulations (1992).

When marine mammal tourism expanded rapidly in the mid-1990's we quickly became one of the worst offenders due to poor practices that impacted the animals.

DOC supported research undertaken by the University of Auckland in the Bay of Islands, Texas A&M and the University of Otago in Kaikoura which highlighted poor industry practices. This led to tighter permit conditions and a range of management decisions to ensure a sustainable model that protected the animals.

This research is still world leading and directly resulted in the NZ marine mammal-based tourism industry continuing to thrive.

Fumagalli M., Guerra M., Brough T., Carome W., Constantine R., Higham J., Rayment W., Slooten E., Stockin K., Dawson S. (2021) Looking back to move forward: Lessons from three decades of research and management of cetacean tourism in New Zealand. *Frontiers in Marine Science* 8: 624448. https://www.frontiersin.org/journals/marine-science/articles/10.3389/fmars.2021.624448/full

14. Sea urchin removal trial shows reef recovery

The Poor Knights Islands Marine Reserve is among the world's premier dive locations, listed as one of the top places in the world to travel to in 2025 by National Geographic. The island groups host a diverse array of temperate and sub-tropical marine species, some of which are not found anywhere else in the country. This uniqueness has allowed eco-tourism in the region to thrive. Unfortunately, the Poor Knights Islands have experienced significant ocean warming over the past two decades. This has allowed the native, subtropical sea urchin species, *Centrostephanus rodgersii* to proliferate. Overgrazing by this species is decimating the rocky reef and kelp forest ecosystems that help make the marine reserve so world-renowned. Given the significance of the ecological impacts occurring and threat to vital tourism industries, the University of Auckland has been working closely with DOC and local hapu to trial diver-mediated removals of *C. rodgersii* from areas of reef within the Poor Knights Island Marine Reserve. This work is providing critical information on the feasibility of active management practices with marine protected areas and has demonstrated the efficacy of removals for promoting reef recovery and resilience. The work has been so successful at the Poor Knights that plans are underway to expand the scale of these trials, with a focus on large-scale removals from areas that are regularly visited.

Balemi C.A., Shears N.T. (2023) Emergence of the subtropical sea urchin *Centrostephanus rodgersii* as a threat to kelp forest ecosystems in northern New Zealand. *Frontiers in Marine Science* 10:1224067. https://doi.org/10.1111/rec.13754

Miller K.I., Balemi C.A., Bell D.A., Blain C.O., Caiger P.E., Hanns B.J., Kulins S.E., Peleg O., Spyksma A.J.P., Shears N.T. (2024) Large-scale one-off sea urchin removal promotes rapid kelp recovery in urchin barrens. *Restoration Ecology* 32:e14060. https://doi.org/10.1111/rec.13754