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Oral Presentations

5 Testing the effectiveness of native non-target mitigation measures for Goodnature® A24 self-resetting traps for rats and stoats

Craig Gillies, Katie Ward-Allen, Katrina Douglas-Withers, Laura Melchert
Department of Conservation

The Goodnature® Ltd. A24 rat and stoat trap is a self-resetting, CO2 gas powered, captive bolt trap designed to humanely kill ship rats (*Rattus rattus*) and stoats (*Mustela erminea*). The A24 has proven to be a useful addition to the ground-based toolkit for suppressing rat populations in small-medium sized (i.e. ≤ 1000 ha) forests in New Zealand and overseas; the device has also shown potential as a stoat control tool. We will be reporting on trials to determine how three different non-target mitigation measures affected ship rat (and stoat) catch rates in A24 self-resetting traps. The work was done between May 2020 and March 2022 at three forest sites in the North Island of New Zealand. We used motion activated trail cameras to compare the numbers of rats and stoats caught in 52 A24s fitted with Goodnature® Beak Blocker parrot excluders, 52 mounted on 'Bissett' wire excluder cages, 52 that were set 1m above ground, and 52 set in the standard configuration without any non-target mitigation. We found that significantly more ship rats were killed in A24s deployed in the standard and 'Bissett' wire cage configurations than those set with Goodnature® 'Beak Blockers' or raised 1m above ground. Despite being regularly detected on the cameras, we trapped too few stoats to draw any reliable conclusions. We also monitored 20 lured, but 'unarmed', A24s deployed with and without non-target mitigation measures on pest free Tiritiri Matangi Island. 26 bird species were filmed in proximity to, or interacting with, the A24s. The Goodnature® 'Beak Blockers' and (for the most part) the 'Bissett' wire excluder cages, appeared to prevent birds accessing the trigger mechanisms on A24s. However, we did film birds accessing the trigger mechanism of A24s that were raised 1m above ground and deployed in the standard configuration.

7 The status of ant eradications from entire islands

Ben Hoffmann
Myrmex Pty Ltd

This talk will summarise the current status of ant eradications that require the treatment of the entirety of islands. Case studies will include eradication attempts of African big-headed ant from Tyon island and Busy island, successful and failed attempts to eradicate yellow crazy ant from Johnston Atoll, Miles island and islets around Hawaii and the recent eradication of tropical fire ant from Melville island. An update will also be provided for the upcoming on-ground trials of new genetic-based baits (RNAi) to target multiple ant species on multiple island systems.

8 Nowhere to hide: Using thermal imaging drones to assist with island eradications

Simon Pahor[1], Michael Johnston[2]
[1]Effective Conservation Outcomes, [2]Ecolegacy Pty Ltd

Thermal imaging drones are rapidly transforming the way practitioners tackle invasive species eradication on islands, offering new levels of efficiency, safety, and precision in both survey and removal efforts. This talk will provide a brief overview of the fundamentals of how thermal imaging drones operate. We will discuss practical applications for thermal drones, detailing how they support both survey and hunting efforts. Example footage from island eradication projects will be presented to illustrate how these drones locate individuals in low density populations in real time often allowing for immediate response and removal. These tools can also complement existing technologies used during eradication validation operations. No one tool is an eradication 'silver bullet' – the benefits and limitations of thermal imaging drones will be discussed, and lessons learnt from our real-world application of drones as an eradication tool will be shared.

10 Invasive mammal eradications: Reflections on best practices and principles

Chad Hanson[1], Karl Campbell[2], Josh Donlan[3,4], David Will[1]
[1]Island Conservation, [2]Re:wild, [3]Advanced Conservation Strategies, [4]Cornell Lab of Ornithology

Conservation practitioners are increasingly undertaking invasive species eradications on islands that are more complex and challenging than ever before. This shift has prompted a growing tension between the need to

innovate and the imperative to follow established best practices. Here, we reflect on how our understanding of best practices has evolved and propose a framework for integrating foundational principles into eradication planning and evaluation. To achieve this, we introduce twelve working principles for invasive mammal eradication that articulate the underlying rationale—the "why"—behind the "how" of best practices. These principles offer a lens through which new tools and strategies can be critically assessed, especially in contexts where existing best practices may be insufficient. Through selected case studies, we demonstrate how a principles-based approach can guide innovation while maintaining accountability and rigor. By aligning theory with practice, we aim to initiate dialogue around the distinction between principles and best practices and support practitioners in navigating the complexities of modern eradication campaigns and promote more adaptive and effective eradication efforts.

12 Eradications on New Zealand islands, charting the future without losing lessons of the past

Keith Broome, Kerry Brown, Finlay Cox, Chris Golding, Stephen Horn, Em Oyston, James Reardon
Department of Conservation

Islands offer significant restoration opportunities, provide benchmarks for ecological change, and important connections with marine habitats. Islands are often critical refugia for threatened species and protect the genes of more common native species. Strategic options to manage island invasives include: prevention, eradication or sustained control. However, the boundaries between these options are often not clearly defined in project goals. Over the last 40 years we have pushed the limits of island eradication scale and complexity and reaped the biological rewards. However, increasing confidence in our abilities have led to more challenging eradication attempts and sometimes failures. Today our biggest challenges are funding, large scale logistics and social acceptance as we attempt larger scale, multi-species eradications and attempt permanently inhabited islands. Advances in eradication success often draw on lessons from previous projects or adapt technology from other disciplines. The Island Eradication Advisory Group's core business is transferring knowledge from past projects. In the 2001 conference we introduced the 'eradication mindset' which calls for uncompromising excellence in the planning and delivery of projects. For Dundee in 2017 we provided an example of our best practice guidance targeting mice, a basic 'recipe' of New Zealand methods for others to build on. For this conference we present an updated holistic package of eradication planning guidance. We aim to increase the likelihood of sustainable management outcomes, promote excellence in planning and inspire confidence in investors. We suggest 'charting a successful future' requires understanding context, choosing the appropriate strategy and quantifying barriers while embracing new ideas and technologies with a clear understanding of past lessons. Now more than ever we must collaborate with an eradication mindset.

13 Islands at the frontlines: U.S. policy lessons for tackling invasive species worldwide

Laura Brewington
Arizona State University

Invasive species are one of the greatest threats to island biodiversity, food security, and cultural heritage—and their impacts are escalating globally. This presentation draws on a synthesis of invasive species management across U.S. and U.S.-affiliated islands to illuminate policy gaps, practical challenges, and proven solutions relevant to island nations worldwide. Despite their small land area, these islands bear a disproportionately high burden of species extinctions and economic losses due to invasive species, costing over USD$11.7 billion in damages between 1980 and 2019—five times more per square kilometer than the U.S. mainland. Three key lessons emerge with global relevance: (1) Biosecurity must be strengthened at ports of entry, including air and sea transport, to prevent new introductions, especially as trade and tourism increase; (2) Sustainable control tools—like biological controls, tailored chemical solutions, and long-term ecosystem restoration—are essential but underfunded and underutilized in island settings; and (3) Local capacity, trust, and governance must be prioritized to ensure lasting impact. Community engagement, equitable partnerships, and adaptive management models are not just ethical imperatives—they are practical necessities for success. This talk will highlight effective models from across the U.S. and Pacific Islands, including interagency agreements, career-pathway programs, and region-specific biosecurity plans. It will also point to innovative international examples—like biofouling controls in Australia and community-driven biosecurity in Mexico—that underscore the need for coordinated global responses. Because island nations serve as both sentinels and shields against invasive species spread, bolstering their resilience offers global environmental, economic, and security dividends.

14 Removal of invasive fishes and recovery of anchialine pool complexes in Kaloko-Honokōhau National Historical Park, Hawai'i

Leo Nico
Independent Research Scientist, Kamehameha Schools Hawai'i and Bishop Museum

Introduced fishes are a major threat to the integrity and functioning of Hawaiian anchialine ecosystems. Non-native fishes are known to alter habitat, compete for resources, prey on native species, and negatively affect anchialine shrimp species, including *Halocaridina rubra*, *Metabetaeus lohena*, and *Procaris hawaiana*, and the orangeblack Hawaiian damselfly (*Megalagrion xanthomelas*). Kaloko-Honokohau National Historical Park encompasses more than 200 known anchialine pools; approximately 19% of these contain introduced, non-native fishes. In February and March 2022, eight pool complexes were treated with the fish toxicant rotenone in habitats ranging from open lava flows to non-native woodland. Each site was populated by one or two non-native fish species: Mozambique Tilapia (*Oreochromis mossambicus*), Guppy (*Poecilia reticulata*), and/or Western Mosquitofish (*Gambusia affinis*). Rotenone was applied as the commercially available CFT Legumine or the traditional Hawaiian fish stunning plant, 'Auhuhu (*Tephrosia purpurea*). Non-native vegetation was removed from around four pool complexes. We report on the recovery status of the treated pools following pool treatment and plant removal as evidenced by recolonization by native animal and plant species. A future goal is to eradicate invasive fish present in 'Aimakapā Fishpond, a 30-acre wetland complex and the largest Hawaiian example of an anchialine habitat. Its large, resident population of Mozambique Tilapia was the source of invasion to several adjacent anchialine pools. Until 'Aimakapā's non-native fishes are eradicated, the site will remain a source of invasion or re-invasion by tilapia to other Park aquatic habitats including anchialine pool sites, as well as to coastal marine waters and nearby Kaloko Fishpond. Project was supported by National Park Service (NPS) and USGS. Main NPS collaborators included Sallie Beavers, Kaile'a Annandale, Amanda McCutcheon, and Jackson Letchworth; and Megan Lamson of Hawai'i Wildlife Fund.

15 Where's wallaby? Using environmental DNA to detect mobile, elusive terrestrial pests

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[1]Department of Anatomy, University of Otago, [2]Department of Biodiversity, Conservation and Attractions, [3]Department of Zoology, University of Otago, [4]Ministry for Primary Industries

Wallabies, introduced to New Zealand from Australia in the late 1800s, strongly exemplify the detection challenges posed by invasive terrestrial species that are rare, cryptic, or highly mobile. Over much of their range, wallabies occur at low densities across large landscapes, making their surveillance and management challenging using standard detection tools. Recent research has demonstrated that airborne and water environmental DNA (eDNA), which refers to the genetic material constantly being shed by organisms into their environment and captured from the air or water, can rapidly identify terrestrial vertebrate diversity in an area without any visualization of the target(s). Leveraging these findings, we investigated the utility of air and water as sources of eDNA for the targeted monitoring of wallaby pest species *Notamacropus rufogriseus* in New Zealand, using a species-specific, highly sensitive probe-based quantitative PCR assay. Following successful validation in controlled captive settings, we determined that distance from the target, as well as the air eDNA collection method, specifically, active (fan-assisted) versus passive (no-fan) sampling, strongly influences detection likelihood. Additionally, environmental factors such as temperature and wind direction further modulate the probability of detection. Building on these findings and our predictive model for detection success across varying distances, we extended our investigation to explore the parameters influencing detection in natural environments containing high densities of wallaby (Hakataramea Valley, South Canterbury) and low densities of wallaby (Naseby, Central Otago) including radio-collared individuals with known locations and movements. Our results showed that airborne eDNA, as opposed to water eDNA, provides significantly higher detection rates of *N. rufogriseus* when the density of wallabies is high (> 2 wallabies per hectare). However, when the population density is low (< 0.1 wallabies per hectare), neither method could infer a positive detection, which has important implications for the application of these tools in a management setting.

16 What now? Adaptive management techniques for dealing with non-target species during invasive species eradications.

Elizabeth Bell
Wildlife Management International Ltd

The presence of non-target species complicates the operational requirements of any proposed eradication. Non-

target species can include native mammals, birds, reptiles, amphibians and invertebrates as well as the habitat(s) they live in. Detailed assessments need to be completed prior to an eradication, to identify and measure the risks and possible impacts that may occur for each non-target species and the environment. Mitigation measures to address these risks are developed prior to, and implemented throughout, an eradication. Adaptive management techniques are vital to deal with novel and unexpected behaviour from non-target species, particularly around devices and tools during the operational phases of the eradication. Experiences from a number of ground-based eradications in the United Kingdom and the Caribbean have helped outline changes to methodologies and tools to address non-target interference during the operational phases of rodent and feral cat eradications. These lessons can be used to better inform future eradications planned across the globe.

17 Biosecurity for LIFE – setting up a national island biosecurity programme to safeguard UK seabirds

Laura Bambini[1], Billy Byrne[13], Bryony Baker[4], Mark Bloomfield[9], Daisy Burnell[4], Jayne Burns[10], Thomas Churchyard[1], Tessa Coledale[1], Rachel Cripps[1], Bart Donato[7], Finn Eaton[11], Murray Fyfe[11], Sarah Lawrence[5], Leigh Lock[1], Ben McCarthy[2], Ian Mitchell[4], Niall Moore[12], Pete Moore[5], Greg Morgan[1], Matty Murphy[6], Ellie Owen[3], Holly Paget-Brown[1], Olivia Pargeter[1], Jaclyn Pearson[1], Emma Philip[5], Liz Pothanikat[8], SarahKay Purdon[1], Sophie Smith[1], Karen Varnham[1], Jeff Waddell[3]

[1]RSPB, [2]National Trust, [3]National Trust for Scotland, [4]Joint Nature Conservation Committee, [5]NatureScot, [6]Natural Resources Wales, [7]Natural England, [8]Department of Agriculture, Environment and Rural Affairs, [9]Welsh Government, [10]Marine Directorate of the Scottish Government, [11]Department for Environment, Food and Rural Affairs, [12]GB Non-native Species Secretariat/Animal and Plant Health Agency, [13]Northern Lighthouse Board

The UK has more than a thousand offshore islands >2 ha in area, around 80 of which hold nationally or internationally important populations of breeding seabirds and are designated as Sites of Special Scientific Interest or Special Protection Areas (SPAs), respectively. Most are uninhabited, but 15 sites also have seasonal or permanent human populations, and several others were inhabited in the past. Rats and/or mice are today found on around 25% of UK's SPA seabird islands, and along with the American mink are the main risk species threatening UK seabird islands. Since 1990, rats have been eradicated from nine UK islands, but a 2016 audit found that on many of these, biosecurity measures were insufficient to prevent reinvasion and indeed some had been reinvaded. On most of the UK's seabird islands, no biosecurity measures were in place at all. In 2018, three environmental NGOs, supported by the UK statutory nature conservation bodies, embarked on a project to transform how the threat of invasive non-native mammalian predators is managed to safeguard seabird populations on UK islands. The Biosecurity for LIFE initiative (2018-present) has built a strong public-private sector partnership that is working together to establish a long-term national island biosecurity programme across the UK and today, more than 95% of the UK's SPA seabird islands are protected by biosecurity measures. Work continues to improve these measures and to encourage organisations and communities to commit to maintaining biosecurity measures in place permanently. Investment in island biosecurity in the UK has grown year-on-year since 2018, and the number of organisations and agencies involved has more than doubled in the same time period. During 2018-2024, the biosecurity teams responded to 40 suspected or confirmed incursions on UK seabird islands, demonstrating the value of early detection and rapid response systems that are now in place.

18 Assessing the relationship between house mouse relative abundance and Peruvian diving-petrel hatching success on Isla La Vieja, Peru

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Invasive rodents are recognized as major threats to seabird populations worldwide due to their roles in predation and ecosystem disruption. From 2020 to 2024, we assessed the relative abundance of introduced house mice (*Mus musculus*) and their potential impact on the hatching success of Peruvian diving-petrels (*Pelecanoides garnotii*, PDPE) on Isla La Vieja (1045 ha), within the Paracas National Reserve, Peru. We hypothesized that sectors with higher mouse abundance, quantified using the C100TN index (captures per 100 corrected trap nights), would exhibit lower PDPE hatching success due to increased predation pressure. Snap traps were deployed along linear transects across three to five sectors over 111 field days spanning eight trapping campaigns. C100TN values ranged from 0 to 80, with significant variation by sector and transect location (inside vs. outside PDPE nesting clusters), as identified by the most parsimonious statistical model. PDPE hatching success varied annually from 48% to 70%, with complete breeding failure observed in 2023 during an El Niño event. The interaction between C100TN and season (summer vs. winter) emerged as the strongest predictor of

hatching success, providing evidence of a seasonally mediated predation effect. These results emphasize the ecological risks posed by invasive mice and underscore the importance of ongoing monitoring and integrated management to mitigate their impacts on vulnerable seabird populations in protected island ecosystems.

19 Biosecurity pathway modelling methods – case studies for fruit fly (Tasmania, Australia) and rodents (Rakiura, NZ)

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Effective border biosecurity requires an understanding of the risks associated with introduction pathways (e.g., air and marine transport, plant and animal products). The risk of pest incursions from specific pathways may be estimated from factors such as their volume, likelihood of contamination, and the effectiveness of pathway interventions/ surveillance. Often, data to directly estimate these parameters are limited. This paper highlights two recent case studies using a methodology that overcomes these limitations by combining existing data with estimation via structured expert judgement. First, a study conducted on behalf of Biosecurity Tasmania examined the risk of priority agricultural pest outbreaks (e.g., Queensland and Mediterranean fruit fly) from passenger and produce pathways. Using statistical modelling of border interception data, we identify risk factors for pathways and measure how effectively biosecurity measures mitigate those risks. Combining these results with elicited data, we estimated the relative risk of outbreaks to inform resource allocations across the border. A second case study applies this methodology to rodent incursions into Rakiura (Stewart Island) in southern New Zealand. This study, in collaboration with Predator Free 2050 and Predator Free Rakiura, involves developing a similar pathway risk model for a future rat- and mice-free Rakiura. These studies demonstrate a powerful and flexible approach to pathway risk modelling that provides valuable intelligence to inform biosecurity decision-making.

20 Orkney Native Wildlife Project - prevention of spread and eradication of stoats from the Orkney islands

Sarah Sankey[1], Hannah Read, Tom Hadley, Hannah Findlay, Katherine Keogan, Graham Neville
[1]RSPB

The Orkney Native Wildlife project is an externally funded partnership project mid-delivery with an objective to eradicate the invasive non-native stoat (*Mustela erminea*) from 55,000 hectares of land across five populated islands off the north coast of Scotland, prevent spread to many other islands now within swimming distance and prevent re-establishment. The Orkney islands are an archipelago of 70 islands that are naturally free of mammalian predators and harbour significant proportions of UK populations of priority wildlife of conservation concern. Stoats were first detected on the islands in 2010, arriving by unknown means. By 2017, stoats had spread across five of the islands, with many others well within swimming distance and food available year round. There are no poisons legally available to use in the UK and the islands are populated, with agriculture being the main land use. The project has had to devise and test methodologies that are dependent on an extensive range of detection techniques, trap box design options and shooting, together with frequent analysis of data and adaptive management to deliver its objective. Nearly 9,000 trap boxes are deployed and over 40 staff, 8 detection dogs and 100 volunteers are active with 1000 voluntary access agreements with landowners in place and 7,500 stoats removed. Two thirds of the project area is reaching the end of a second phase of knockdown whilst a third of the area has moved into a 2 year mop up phase, where all remaining animals must be detected and removed. Biosecurity measures and incursion responses have so far prevented spread of stoats to more islands and wildlife monitoring shows significant recovery of native wildlife. Invasion pathways are being assessed to write the islands-wise biosecurity plan. The project is due to complete in December 2029.

21 Assessing feral cat removal techniques and risk to non-target species on Little Cayman (Cayman Islands).

Caitlyn Pink[1], Dave Algar[1,2], Mark Holdsworth[1], Sue Robinson[1], Joe Jeffcoate[3], Frederic Burton[4]
[1]Robinson Holdsworth Conservation Trust, [2]Department of Biodiversity, Conservation & Attractions, [3]Royal Society for the Protection of Birds, [4]Department of Environment

Trials of feral cat (*Felis catus*) removal techniques, successfully used in Australia, were conducted on Little Cayman (Cayman Islands) to assess the efficacy of poison baiting and soft jaw leg-hold traps and to record any interactions with non-target species. The trials will inform the development of an Operational Plan for consideration of future removal of feral cats from Little Cayman under the Royal Society for the Protection of Birds/Darwin Plus project “Empowering and preparing Cayman’s Sister Islands to tackle invasive mammals”.

Trials were conducted during February (dry season) and July (wet season) and involved the deployment of equipment designed to imitate removal techniques with non-toxic baits and deactivated traps to avoid risk to native animals, cats (feral or domestic), domestic dogs and humans. Our objective was to determine the utility of these techniques in a potential feral cat eradication and to assess the likely impact on domestic and native species, particularly the critically endangered Sisters Island Rock Iguana (*Cyclura nubila caymanensis*). We were particularly interested in whether iguanas were attracted to and/or able to access the equipment and, if so, whether interactions could be mitigated by refining techniques to eliminate risks. Sand pads and trail cameras were used to quantify interactions of all species. The results of these trials and recommendations for cat eradication on Little Cayman will be presented.

22 Eradication of invasive Pink Salmon in the most important Norwegian Atlantic salmon river.

Roar Sandodden, Pål Adolfsen, Rune Pedersen, Aksel Fiske, Mari Berger Skjøstad, Asle Moen
Norwegian Veterinary Institute

Pink salmon (*Oncorhynchus gorbuscha*) is one of several salmon species that naturally belong in the northern part of the Pacific Ocean. After several attempts in the latter half of the 20th century, Russian fisheries authorities managed to move and establish pink salmon in waterways close to the Norwegian border in the northern Atlantic Sea. The presence of pink salmon has dominated many of the rivers Northern Norway over the native anadromous Atlantic salmon in 2021 and 2023. The spread continues from river to river both westward and southward in the North Sea to several European countries. Pink salmon poses a risk both to the biological diversity in the rivers and the risk of spreading disease. Due to its location, size and length of anadromous stretch of approximately 1200 km, the Tana River has a large potential to produce pink salmon and contributes to increased spread locally and in the long term, most European Atlantic salmon waterways. Due to the size of the river, it is very challenging to implement effective eradication measures against pink salmon and at the same time avoid bycatch or damage to the vulnerable spawning populations of Atlantic salmon in Tana. The Norwegian Veterinary Institute was commissioned by the Norwegian Environment Agency to lead a project for the establishment of guide fences and a fish trap in the Tana River. The first attempt was performed in 2023 but proved not to be very successful, further development in 2024 and a full-scale attempt to stop the pinks will be performed this summer. In this talk, I will describe the efforts conducted to control pink salmon for the Tana River and experience gained in the last four years.

24 Revolutionising island conservation: Innovative drone-assisted baitpod systems for targeted control of small invasive mammal species

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[1]Toi Ohomai Institute of Technology, [2]Aerospread Technologies Ltd, [3]X-Craft

Islands serve as critical ecosystems for biodiversity; however, they face threats from invasive mammalian predators. Recent advancements in pest management, particularly through the use of drone-assisted baitpod systems, provide a transformative and ecologically sensitive approach to pest control in these vulnerable habitats. Our innovative baitpod technology improves precision, efficacy, and sustainability by enabling targeted bait distribution across challenging terrains, including cliffs, rocky outcrops, and otherwise inaccessible islands where traditional methods often prove impractical or costly. The baitpods can be deployed over a variety of habitats, including dense forest canopies. In a series of seven operations (with sites ranging from 1 to 88 ha), we utilised drones to deploy baitpods containing 1080 while closely monitoring pest activity with chew cards, tracking tunnels, and trail cameras. Within weeks, we observed complete suppression of rat (and possum) populations at the treatment sites, highlighting the effectiveness of our intervention. The baitpods are compatible with various aerially approved baits. Unlike conventional pest management methods, our drone-based platform operates autonomously, both day and night, and can adapt to the specific environmental and ecological conditions at each site. We use a fully transportable, containerised system that ensures safe and efficient transport and storage of the bait pods. Within this container, we employ a robotic baitpod loading system. We implement real-time monitoring and feedback mechanisms for the adaptive management of baiting strategies. This approach reduces the risk of environmental contamination and enhances operational safety. All drone pilots are fully certified. By merging rigorous scientific insights with advanced technology, our baitpod system offers a scalable, compliant, and environmentally responsible approach to managing small invasive mammals in sensitive island ecosystems. This innovative approach not only improves conservation outcomes but also represents a significant shift in pest control for managing invasive mammals, particularly in island ecosystems.

25 House shrew (*Suncus murinus*): distribution, impact and management

James Russell[1], Sebastian Steibl[1], Mark Moseley[2], Thomas Bodey[3]
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The house shrew (*Suncus murinus*) is an overlooked introduced species throughout islands of Southeast Asian waters and the Indian Ocean. Recent resolution of its taxonomy and biogeographic status has highlighted its widespread historical introduction by early seafarers. Although a common household pest, little is known about the biodiversity impacts of house shrews, and their eradication has only been attempted on Iles aux Aigrettes and nearby islets in Mauritius. We review the distribution and impacts of house shrews and present new results from a population structure and genetic connectivity study across five neighbouring islands in Laamu atoll (Haddhunmathi) in the Republic of the Maldives. House shrews are widespread and continuing to colonise new islands, although are also recorded as dying out on others. Very few studies have been undertaken in their non-native island range, but as voracious insectivores, it can be assumed that they have major impacts on invertebrates and potentially on small vertebrates. Our study in the Maldives captured house shrews relatively easily using standard rodent traps, and so we believe they would be a suitable candidate species for further investigation of impacts and management, including eradication. Population genetic data suggest house shrews are typically commensal introductions and not capable of self-dispersing even over relatively short stretches of water. This highlights the importance of biosecurity of human cargo to ensure the longevity of successful eradication operations. Although house shrew impacts on native island biota are less visible than those of invasive rodents, the house shrew seems to have been capable of spreading widely across Indian Ocean islands, where its impact on the insect fauna may have caused so far undocumented yet cascading effects on island functioning.

26 Introduced plant pathogens as a threat to the endemic flora of the Society Islands, French Polynesia (South Pacific)

Jean-Yves Hiro Meyer[1,2], Sandra Lepers-Andrzejewski[3], Frédéric Jacq[4]
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Introduced pathogens are becoming an increasing threat to forests worldwide, and the number of invasive alien taxa is growing even in remote islands due to globalization. These pathogenic micro-organisms (bacteria, fungus and virus), often introduced in lowland agrosystems, remain unnoticed in natural habitats until the observation of large-scale epidemics and/or high plant mortality. We conducted a preliminary study on twelve endemic vascular plants belonging to six plant families (Aquifoliaceae, Araliaceae, Asteraceae, Campanulaceae, Melastomataceae, Myrtaceae) found in montane cloud forests of two tropical high volcanic islands of Tahiti and Raiatea (Society archipelago, French Polynesia) that showed symptoms of plant pathogen diseases on leaves and stems. A total of 178 potential pathogenic strains and 88 different morphotypes were identified according to morphological criteria (nature and color of mycelia, and size and form of spores) and molecular analysis (PCR using mainly ITS and GADPH primers). Six presumed fungal pathogens (including Colletotrichum, Fusarium, and Pestalotiopsis with several strains each, including newly recorded taxa for the Society Islands) were found on the critically endangered *Sclerotheca raiateensis* endemic to Raiatea. Their pathogenicity has yet to be proven, but the scarcity of the host plants remained an obstacle and require their ex-situ propagation. Species-rich tropical montane island forests that remained relatively preserved by human disturbances are now at high risk. In order to stop the introduction, spread, and impacts of plant pathogens on threatened endemic species, we recommend: (1) to reinforce and strongly implement biosecurity policies and controls at island countries and territories borders but also between islands, for both aerial and root pathogenic micro-organisms ; (2) to develop plant pathogens surveillance protocols on the field in the different islands ; and (3) to consider innovative conservation measures, such as large « safety perimeters » around sensitive endemic plants to avoid direct human contact and pathogen contamination.

27 Saving Marion Island's Seabirds: The Mouse-Free Marion Project. Advancing toward the eradication of House Mice from a globally significant sub-Antarctic island

Anton Wolfaardt, Keith Springer, Sue Tonin
Birdlife South Africa

Marion Island, a South African sub-Antarctic territory, is home to globally important seabird populations, including over a quarter of the world's breeding Wandering Albatrosses. However, invasive House Mice (*Mus musculus*) introduced in the early 19th century, are causing escalating ecological harm—most notably through direct predation on seabird chicks and adults. Without management intervention, up to 19 of the island's 29 breeding bird species could face local extinction within decades. The Saving Marion Island's Seabirds: Mouse-Free Marion (MFM) Project, a partnership between BirdLife South Africa and the South African government, aims to eradicate mice from the island as a foundational step in its ecological restoration. This presentation provides an update on project progress, including research and planning conducted since the project's formalisation in 2020. Recent insights gained from global eradication attempts are highlighted—including failed attempts at eradicating mice on Gough Island and Midway Atoll—and how these have informed an adaptive, risk-averse approach to planning. Guided by a Research Plan, a key step is the implementation of larger-scale bait trials than have been undertaken to date. Commencing with hand-baiting trials in 2025 and expanding to an aerial baiting trial of nearly 1,000 hectares in 2027, these trials are designed to simulate the conditions of the full-scale eradication. These trials are critical to refining the baiting strategy for the MFM Project, addressing remaining uncertainties, and maximising the likelihood of operational success. In addition to supporting Marion's restoration, the trials will contribute valuable information to the global field of island invasive species management.

28 Eradicating invasive mammals from Rapa off-shore islets – engaging a local community for enduring conservation outcomes.

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Hand-broadcast operations led by locally-trained teams have significantly expanded in capacity on remote islands. In November–December 2023, a rat eradication campaign targeting Pacific rats (*Rattus exulans*) was conducted on Rapa Iti and Tauturou, two islands off Rapa in the Austral Islands, French Polynesia. Rapa, the most isolated island in the territory, accessible only by monthly freight ship and without commercial air service, hosts exceptional biodiversity and rare seabird colonies. The operation aimed to protect a critically endangered species by eliminating invasive rats through the hand application of brodifacoum bait. Secondary objectives included strengthening local biosecurity and building long-term conservation capacity. Despite challenges posed by weather and rugged terrain, bait was successfully applied twice on Tauturou and once on Rapa Iti. In parallel, a long-standing effort to remove feral goats—major contributors to habitat degradation—was completed on all islets, with strong community involvement. The removal of both invasive rats and goats represents a critical step in protecting native vegetation and seabird nesting sites. These operations underscore the importance of local leadership, skilled field teams, and adaptive planning in effective invasive species management. This project was made possible with the help and support of the local community, offering a replicable model for island restoration and community-driven conservation throughout the Pacific region.

29 The role of feasibility studies in community engagement. A case study from successfully eradicating rats from Palmerston Atoll, Cook Islands

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Rodent eradications on tropical islands are challenging, and those on inhabited islands are even more complex due to significant amounts of alternative food and infrastructure associated with human settlement. The presence of a community also adds an overarching layer of social-political intricacies that must be navigated if the community is to be successfully engaged – a necessity for a successful eradication outcome.
This paper shares insights from a project that eradicated ship rats (*Rattus rattus*) and Pacific rats/kiore (*Rattus exulans*) from Palmerston Atoll, an inhabited atoll in the Cook Islands, and how a field-based feasibility study enabled effective engagement and empowerment of the community through the building technical capacity and encouraging informed decision-making in the project. Engagement with the community continued remotely in the period leading to the operation through provision of updates via social media, fostering relationships with families and members of the team, and collaboratively defining roles of each individual and household. The baiting operation consisted of three hand broadcast applications on each island of Pestoff 20R brodifacoum rodent bait across 19 m x 19 m grids. An extensive bait station network was used around buildings and other infrastructure. Real-Time-Kinematic equipment and cloud based mobile data management were used to effectively monitor and respond daily to bait uptake and potential risks. Robust biosecurity measures that were developed collaboratively with the community were implemented to protect the investment made in eradicating

rats. Post-operation activities included community surveillance, eradication validation and preliminary outcome monitoring. Validation monitoring confirmed the success of the project. Early outcomes perceived by the community include enhanced food security, improved wellbeing, and observed signs of increased biodiversity.

30 Return of a large darkling beetle to Korapuki Island in the Mercury Islands

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Department of Conservation

The Mercury Islands are a group of islands off the Coromandel Peninsula, northern New Zealand, with a mixed history of exotic pest introductions. Two islands, Middle and Green Islands, remained pest free while others have been cleared of introduced mammals. Kiore (Pacific rat) and rabbits were eradicated from Korapuki Island in 1986 and 1987, respectively. The group provided an excellent study area to research techniques for invertebrate species translocations as part of the Korapuki I. restoration programme. *Mimopeus opaculus* (Coleoptera: Tenebrionidae) is a large, nocturnal, flightless darkling beetle species susceptible to rodent predation which had been extirpated from Korapuki I (18ha) but remained on Middle I (13ha). Several designs of wooden blocks were tested on Middle I. as artificial daytime refuges to monitor the darkling beetle population. Subsequently these refuges, together with resident beetles, were removed and transferred to Korapuki I. The first transfer of 50 beetles occurred in March 2000 followed by 50 in October - November 2002. Each set of 50 were released at two sites 50m apart to facilitate testing of different post release monitoring methods. Intensive monitoring using artificial refuges and night searching finally revealed the first beetles in December 2006. Subsequent monitoring verified large numbers were present indicating *M. opaculus* had established. The study revealed the importance of different survey techniques in different island habitats for the darkling beetle.

31 Responding to remnant rodent populations following initial eradication attempts on inhabited tropical and subtropical islands: pathways to a successful outcome

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Some recent rodent eradications on inhabited islands in the tropical and subtropical Pacific have required follow up efforts to remove small residual populations to achieve success. We reviewed four rat eradication operations (Lord Howe Island, Palmerston Atoll, Tetiaroa Atoll and Wake Atoll) to assess the possible causes that led to some rats surviving the initial eradication attempt and describe how eradication success was eventually secured. The human social setting and interactions often differed markedly between islands. There were similarities and differences between the islands in the surveillance and response strategies applied as well as the methods to confirm success. Several novel techniques were developed to address specific habitat types, available tools and skills, and sex and age composition of the remnant rat populations. Lessons learned and recommendations for future 'extended-eradication' rodent responses are discussed. To improve success rates, future rat eradications on low-latitude islands especially those with added complexities (e.g. inhabited islands) may need to plan for intentional adaptive management measures to remove residual rodents and provide additional resources to accomplish this. We provide guidance on the measures and likely costs that could be incorporated into future inhabited island rodent eradication planning.

32 Eradicating rats using drones operating from a small ship in the Marquesas: achieving success on isolated small islands.

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Using drones for rodent eradication is a developing technique for island restoration. The advantages and shortcomings for their use are still not fully appreciated. The eradication of Pacific rats on the small islets of Motu Takahe, Motu Oa, and Motu Mokohae, at Ua Pou in the Northern Marquesas Islands, French Polynesia, was undertaken in August-September 2023. A drone with a 10kg lift capacity aerially broadcast rodent bait on the islands, whilst operating from a small ship. Although complete aerial bait application across one island was abandoned and was sub-optimal on another, rats were successfully eradicated on all three islands. This may have been due to any surviving rats finding remaining bait as it was likely available for several weeks post-application due to the prevailing dry conditions. Despite the Marquesas being very isolated, eradication on small islands

was carried out with a relatively small budget. The operation also confirmed that drones could be operated off a boat for rodent eradication purposes despite the constraints imposed by the consistently strong trade winds and associated swell conditions. In the future, the use of a larger vessel with deeper draught would likely increase the number of flyable days and improve the ease with which take-offs and landings are undertaken by the drone pilots.

33 Spatial and temporal variability in population parameters of island cats

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Auckland Island in the New Zealand subantarctic region is highly important for biodiversity, with more than 500 species, including nine island-endemic bird species. To protect this natural heritage, the New Zealand Department of Conservation plan to eradicate feral cats (*Felis catus*) and other invasive mammals from the island. This will require knowledge of population density, distribution, detection probability and movement behaviour of feral cats on the island. We used camera traps and spatially explicit capture-recapture analysis to estimate the population parameters of feral cats at three locations on Auckland Island. One of these locations had also been sampled using the same methods three years previously. Our results show considerable temporal and spatial variation in population density, detection probability, and movement behaviour, even within the confines of a relatively small (45,891 ha) island.

34 Eradications and biosecurity on the Titi islands southern New Zealand – empowering indigenous owners

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The Titi or Muttonbird islands around Rakiura/ Stewart Island, southern New Zealand, are a mix of freehold and tribal land owned by Ngai Tahu/ Kati Mamoe and managed by two committees made up of elected representatives from the birding whanau/families who are of Rakiura maori decent, with access and titi (Sooty Shearwater / *Ardena grisea*) harvesting rights by whakapapa or a proven birth right. The islands have a long history of active conservation management including the eradication of invasive/ introduced species and translocation of threatened native species. Initially most of these actions were funded and undertaken by government agencies but this has progressively devolved to the owners and their representative committees having an increasingly important role in conservation actions to the point where funding and management of projects are being undertaken by Ngai Tahu and the management committees along with the whanau on the various islands with permitting and often logistical support from the Department of Conservation. This work has seen the removal of cats from one islands weka (a large predatory rail introduced to the islands in the past as a human food source) from three islands and rats (*Rattus rattus, R. exulans* and *R. norvegicus*) from ten islands, two of which are within swimming range and have subsequently been reinvaded. Due to the number of people and quantity of equipment and supplies taken to the islands each year and the close vicinity of some islands to mainland Rakiura, biosecurity is an ongoing issue with several incursions having taken place in recent decades. Increasingly biosecurity responsibilities have also moved from government agencies to the island owners and their management committees including education, prevention, detection and response.

36 Engineering selectivity: A novel trap design to control invasive snakes

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Invasive snakes are among the least managed yet most ecologically disruptive vertebrates worldwide. *Lampropeltis californiae*, invasive on Gran Canaria, has caused the collapse of endemic reptile populations, threatening the island's biodiversity and ecological balance. Despite ongoing control efforts, available traps are non-selective, often capturing large numbers of non-target species and increasing operational costs. In this study, we present a novel approach for improving the selectivity of live-baited box traps used in the species' control program. We designed a series of entrance mechanisms to improve trap selectivity based on morphological criteria, particularly head width and body length of the snakes and non-target species (mainly endemic reptiles). We created and evaluated seven trap designs including U-shaped and funnel mechanisms, turnstiles, and commercial eel traps. During 2023 we conducted trials under semi-controlled conditions using 35 individuals of *L. californiae* and 101 endemic reptiles (*Gallotia stehlini* and *Chalcides sexlineatus*), resulting in over 900

behavioral assays. On 2025 we started a field experiment to test trap selectivity and effectivity in the field. Our results show that funnel and U-shaped mechanisms successfully allowed snake entry while reducing non-target captures. Mechanisms that required vertical movement favored the snake's locomotor capabilities while limiting smaller reptiles. Entrance doors discouraged entry by both *L. californiae* and *G. stehlini*, but not *C. sexlineatus*, reflecting key behavioral differences among species. Body length was a reliable discriminator, supporting designs that guide animals to species-specific exits. This work provides the first experimentally tested basis for the selective trapping of invasive snakes. By integrating species-specific morphology and behavior, our trap prototypes improve efficiency, animal welfare, and cost-effectiveness in IAS control. These findings can be applicable to other contexts facing similar invasion challenges and underscore the urgent need for innovation in invasive reptile management to design effective and efficient control strategies in these under-resourced taxa.

37 Restoring resilience: Rodent eradication as a tool to improve food security and climate adaptation in Tuvalu

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Island Conservation

Invasive rodent eradication is a powerful conservation strategy for restoring island ecosystems on low-lying atolls where biodiversity, food security, and climate resilience are so tightly intertwined. In 2023, Island Conservation and the Tuvalu Department of Environment completed the first-ever rodent eradications in Tuvalu, targeting small islets within Funafuti Atoll. These efforts were extended in 2024 with the successful removal of rats from four additional islets in Nukufetau Atoll. Planning for the removal of rats from the inhabited Niulakita Island in 2026 is underway along with feasibility assessments for more complex, populated islands within Tuvalu. With the right level of resourcing, it is possible to envisage all nine of Tuvalu's atolls and islands being rat free. Tuvalu's seabird populations, once central to nutrient cycling across its fragile land and inshore marine ecosystems, could be restored restoring soil fertility, reef productivity, and natural coastal defenses, factors that could strengthen Tuvalu's resilience to sea-level rise, extreme weather, and food insecurity. Our experience in Tuvalu highlights both the urgency and feasibility of these interventions in low-lying Pacific nations and underscores the importance of sustained community engagement and strong biosecurity to sustain project outcomes.

38 Wake Atoll rat eradication – operational outcomes and lessons learned from a campaign-style approach to achieve eradication success

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In 2024, a multi-partner operation was conducted to eradicate two invasive rodent species —the Polynesian rat (*Rattus exulans*) and the White-throated Woodrat (*Neotoma albigula*)—from Wake Atoll, a remote unincorporated territory of the United States comprising three islands (~700 ha). The operation followed a 2012 eradication attempt that successfully removed *Rattus tanezumi* but failed to eliminate *R. exulans*. Lessons from that operation informed a revised strategy aligned with best-practice guidelines for tropical rodent eradications and an adaptive management approach focusing on stakeholder engagement and commensal management and ultimately an aggressive detection and response phase. The operation employed a comprehensive baiting strategy, including aerial broadcast of Brodifacoum-25W at 50 kg/ha in two applications 21 days apart, with supplemental aerial baiting guided by real-time bait availability monitoring. Critical ground baiting operations included infrastructure baiting and comprehensive treatment of the intertidal Pemphis zone with floating bait devices. The baiting operation achieved full spatial coverage and sustained adequate bait availability across the atoll. However, both target species were detected following the final broadcast. Although not originally planned, the operation transitioned into a campaign-style eradication operation. An adaptive detection and response phase was initiated, deploying rodent detection dogs, game cameras, air rifles with thermal optics, traps, and localized rodenticide applications. A cloud-based data management system enabled real-time spatial analysis and decision-making. Over four months, 18 *R. exulans* and 2 *N. albigula* were removed, with the final detection recorded in November 2024. A proof-of-absence model is currently being used to assess eradication success, with final verification scheduled for September 2025. This project underscores the critical importance of planning for the potential need to shift into a campaign-style approach. While the Wake Atoll team adapted effectively, future eradications may benefit from explicitly incorporating campaign-style contingencies into planning frameworks to enhance resilience and increase the likelihood of success.

39 Early warnings at the gate: Scaling up Hawai‘i’s entry point defenses against key invasive species

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The Hawaiian Islands have earned the title of the "invasive species capital of the world" due to the high number of introduced species. These introductions have been facilitated by military infrastructure, tourism, and the heavy reliance on imports for most industries. As a result, the islands have seen an acceleration in the extinction of endemic species and significant alterations to ecosystems and their functions. The ongoing dependence on imports continues to provide pathways for the introduction of invasive species, which threaten both ecological integrity and economic stability. To mitigate this risk, increased monitoring at ports of entry is essential for early detection and effective rapid response. The Port of Entry Monitoring Program (PoEM), formerly known as Mamalu Poepoe, is an interagency initiative designed to enhance the rapid detection of target invasive species. Recently expanded from major airports to include harbors and smaller airport terminals across the Hawaiian Islands, PoEM involves collaboration among state agencies such as the Hawaii Departments of Agriculture, Health, Transportation, and Land and Natural Resources, alongside the University of Hawai‘i. The program also partners with island Invasive Species Committees and the Hawaii Ant Lab. PoEM targets pests including the coconut rhinoceros beetle, Japanese beetle, Africanized honeybees, mosquitoes, and various invasive ant species, with successful interceptions occurring. The program's new strategic five-year plan will have an expansion that aims to strengthen Hawaii’s biosecurity efforts, preventing further ecological, economic, and public health impacts from invasive species. This plan will be finalized at the end of 2025, with an aim to increase the scope and targets of phase I of the program.

40 The effect of inconsistent removal pressure on an invasive predator and insular wildlife populations

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The overriding objective of invasive species eradication projects on islands is to reduce the threats to, and support populations of, at-risk insular species. However, dedicated monitoring of the broad range of species present on islands can be an expensive addition to operational budgets due to the necessity for specialised equipment and expertise. Trail cameras provide an economical option with a relatively low requirement for expertise while collecting data on a broad range of fauna. In this study, we used camera data to document the trajectory of multiple wildlife species throughout an eradication attempt on an invasive predator between 2018-2023. A secondary array of trail cameras and standardised direct bird counts contributed data to the monitoring of cryptic and common bird species populations using the island. In August 2018, 67 cameras were installed across French Island (170 km^2) to prepare a baseline population estimate for feral cats (*Felis catus*) and then inform progress towards eradication of the population. This increased to 156 cameras in December 2022. Sufficient detection of some endemic, translocated and invasive wildlife species supported preparation of an index of population abundance at specified time points. A baseline dataset was collected over a 2.5 year period, prior to commencement of the eradication attempt. The feral cat population was placed under intensive pressure from May – December 2021 using poison baiting, shooting, cage and leghold trapping. A five month pause in removal effort followed before operations recommenced in May 2022 but were again abandoned two months later. While limited removal pressure has been applied sporadically since that point in time, the cameras have continued to collect data throughout. This paper reports on the response observed in the distribution and abundance of endemic fauna populations on French Island as well as demonstrating a recovery of the invasive predator.

41 Towards a mink-free GB: A successful landscape-scale eradication trial for American mink (*Neogale vison*)

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American mink (*Neogale vison*, hereafter mink) were introduced to Britain for fur farming a century ago. By the 1980s feral mink had spread across most of mainland Britain and its offshore islands. Predation on native wildlife was widespread and particularly damaging on water voles (*Arvicola amphibius*), which consequently became Britain's fastest-declining mammal. Efforts to control mink were ongoing for decades, and two eradication attempts (one in Scotland, one in England) failed. A new eradication trial was formally initiated by

the Waterlife Recovery Trust and partner organisations across 5,853 km² of eastern England in 2020, where less coordinated trapping had been underway for years. Electronically monitored 'smart' live cage traps on floating rafts were used, latterly baited with fresh anal gland scent harvested from captured mink. The experimental Core Area was protected from mink immigration by a 70km-wide Buffer Zone, both with about the same mean trap density (one per 18 km²). Most of the traps were managed by volunteers trained and supported by a small team of professional Coordinators. The catch per unit effort (mink trapped per 1,000 trap nights) - a good proxy for mink density - declined year-on-year by 67% on average. The sex ratio in the catch, heavily male biased initially, declined as the more inquisitive males were removed. The criterion for trial success - no evidence of reproduction over a 12-month period despite rigorous searching- was met in 2023. Similarly there were no captures or sightings of kits or reproductively active females in either 2024 or 2025. Eradication from scratch is achievable within five years; an Allee effect hastens the demise. Trial success generated interest and finance to extend the work. By mid-2025 some 40,000 km² (38%) of England has been comprehensively trapped, and fact-finding operations are active in other parts of England, Scotland and Wales.

43 Tackling invasive species in the Pacific Region – An urgent priority

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The Pacific Region is a global hotspot for biodiversity both terrestrial and marine. It is also a centre of cultural and linguistic diversity. While the region is vast and its islands remote, the impacts it has sustained are huge. Over 50% of native landbird species have vanished, along with numerous bats, reptiles, and amphibians. Now with a warming climate, its cultural diversity is also at risk. Pacific Island nations are already experiencing rising sea levels, intensified storms, and ecosystem disruption. Even under the most optimistic climate scenarios, the future for some low-lying island nations is uncertain. Some countries are responding by reclaiming land or building hard infrastructure like seawalls. However, nature-based solutions, such as enhancing reef productivity and terrestrial ecosystem health, offer a potentially cost-effective and sustainable alternative. Removing invasive species, as a scientifically validated approach to restoring ecosystem function is a key starting point and provides a pathway to recovering ecosystem connectors such as seabirds that can provide vital nutrient flows between land and sea serving to maximise natural reef building processes. Coupled with other management actions such as habitat rehabilitation, rewilding and the protection of marine resources, invasive species management could turn the tide on biodiversity loss in the Pacific and better position island communities for climate change. In this paper, we identify the contribution invasive species eradication could make for biodiversity and climate resilience. We highlight the challenges, those overcome and those still needing to be addressed to fully realise the potential of this management action. And to provide a sense of the scaling of the effort required, we contrast historical investments with those that are needed. As climate change accelerates ecological degradation, restoring Pacific Island ecosystems is now urgent. Can we rise to the challenge?

44 Untold tales of yellow crazy ants in the developing Pacific Islands region

Monica Gruber
Te Herenga Waka - Victoria University of Wellington

Yellow crazy ants (*Anoplolepis gracilipes*) are among the three most damaging invasive ants globally and are present in ~90% of developing countries and territories in the Pacific islands region. Unpredictable, sometimes repeated, population outbreaks are observed. Often, but not universally, these outbreaks are assisted by mutualisms with honeydew producing insects. These outbreaks can be devastating, with high numbers of these ants dominating all aspects of ecological communities and affecting people's quality of life. Despite their wide distribution, reports of major impacts are relatively sparse. Competition is the major population regulator among ants, and these high abundance outbreaks enable yellow crazy ant populations to exclude other ants, further reinforcing their dominance. Much of the evidence on yellow crazy ant population dynamics in developing countries and territories in the Pacific is anecdotal. This presentation brings together published and unpublished information that supports a more holistic hypothesis for the population dynamics of yellow crazy ants. Greater understanding of these dynamics will enable better management of these ants, for which eradication is often not feasible as it requires toxicants with potential non-target impacts, and often fails, or is prohibitively expensive.

45 Challenges and opportunities for inter-island biosecurity in the developing Pacific

Monica Gruber

Te Herenga Waka - Victoria University of Wellington

Small island / large ocean developing countries and territories face many biosecurity challenges. Some of these challenges are obvious, including small workforces with high turnover, and many islands and pathways. However other challenges are less obvious, such as structural and systemic approaches to how biosecurity is supported both regionally and internationally. Inconsistencies in definition and application lead to confusion and misunderstanding about the purpose of biosecurity. Attempts to resolve the challenges faced are generously supported by bilateral and multilateral development partners, and the recent emergence of more integrated regional support mechanisms and cooperation show promising benefits. However, not all islands face the same challenges, and solutions that are locally derived for their own context are likely to be the most effective. There exist many opportunities for small island / large ocean developing countries and territories to learn from each other, and several promising approaches are apparent.

47 Design and operationalization of the first automated toxicant bait manufacture and aerial broadcast systems for invasive snake management

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The Brown Treesnake (BTS; *Boiga irregularis*) on the island of Guam is the best-known example of an invasive snake population establishing in a new environment and causing a trophic collapse of native communities due to near total extirpation or global extinction of native herpetofauna and avian species. Invasive snake populations are becoming more common with increased global trade and diversified transport networks with similar community-scale ecological damage. These introduced snake populations are difficult to control due to their cryptic nature, limited control tools, and reliance on labor-intensive ground survey/removal techniques. Acetaminophen-laced dead neonatal mouse baits are an effective snake pesticide and studies utilizing hand broadcast of these toxicants from a helicopter have demonstrated the ability to suppress BTS populations at a landscape scale. An Aerial Delivery System (ADS) was designed and tested to reduce the labor involved with aerial broadcast and make large landscape BTS control a possibility. The ADS consists of three systems: an automated bait cartridge manufacture platform, an automated helicopter broadcast toxicant dispensing module, and an autonomous payload management system. In 2019 the ADS was operationalized and has been utilized at two forest sites on Guam to attempt an eradication within a snake-proof barrier fence and to drastically suppress snakes in an unbounded site. Results from six years of control has highlighted the ability of the system to quickly and drastically suppress a snake population over a large area. However, ADS leaves a small population of refractory snakes that will not take the carrion bait and cannot be removed with this tool. Despite these challenges, the ADS is a critical tool in an adaptive management strategy where this aerial-based system cost-effectively removes most snakes from a landscape before ground-based management tools remove the remaining BTS.

50 E Ola Nā Loko: Resilient traditional Hawaiian fishpond ecosystems in an era of ecological change

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The Kumuola Marine Science Education Center located in Hilo, Hawai'i, aims to rehabilitate three indigenous Native Hawaiian fishpond systems (loko i'a) through innovative research, action, and education. Nearly 500 loko i'a were once situated along the many shorelines and inland regions of the Hawaiian Islands to capture nutrients, support primary productivity, and grow a host of native aquatic species to amplify the natural abundance of those spaces and support sustainable native communities with high-quality foods. The introduction of non-native invasive species, shoreline development, and changes in land tenure have dramatically impacted the number and function of loko i'a extant today. Here we present student-led research focused on understanding the impact of invasive species on our loko i'a ecosystems to regain and rebuild a path forward for stewardship that once again positions loko i'a as 'āina momona, or places of native abundance. Specifically, we share research conducted at the loko i'a on: 1) assessments of native and invasive fish assemblages and body metrics as tied to measures of benthic primary productivity and consumption rates, and 2) predation of native shrimp ('ōpae) zoea by juvenile native and invasive fish species found within the loko i'a. Together this research connects the movement of energy through the fishpond system from juvenile fish to adult and informs adequacy of resources through body

metric analysis. At Kumuola we center our students as both researchers and practitioners grounded in traditional, generational, and innovative environmental stewardship to empower, uplift, and contribute to community well-being. We hope that this research will contribute to the current understanding of our environment and position us in the fight against the proliferation of invasive species to allow our ʻāina (lands), loko iʻa, and lāhui (community) to thrive.

51 Progressing towards a world-first snake eradication on Islan Dåno' (Cocos Island), Guam

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Invasive snake populations are becoming increasingly prevalent worldwide and are notoriously difficult to manage, with no known island eradications. Their devastating ecological effects are best illustrated by the near-total extirpation of the native terrestrial fauna, including the global extinction of two bird species, from Guam, Mariana Islands, by the invasive Brown Treesnake (BTS; *Boiga irregularis*). In 2020, Guam residents discovered an established BTS population on Islan Dåno' (Cocos Island), 2.5 km off the southern coast of Guam, threatening its significant conservation assets. In response, United States Geological Survey BTS Rapid Response Team organized nighttime visual surveys, removing 58 snakes between October 2020 and September 2021. The volunteer group Friends of Islan Dåno' mobilized to conduct additional visual surveys, and removed 39 BTS since June 2021. United States Department of Agriculture (USDA) Wildlife Services removed an additional 26 BTS in island-wide visual searches since November 2021. USDA National Wildlife Research Center tested the use of toxic bait and cage traps, common BTS control tools on Guam, but those methods proved ineffective, likely due to the abundance of natural prey, leaving visual survey/hand capture as the only viable removal tool. A typhoon in May 2023 damaged transect trails and briefly interrupted searches. In total, 123 snakes have been caught during visual surveys, and capture rates have decreased throughout the response period, with no BTS captured or sighted between April 2024 and June 2025 despite ongoing search effort. Continued multi-agency and community collaboration and innovation in low-density snake detection methods will be crucial to complete the eradication and ensure the ongoing biosecurity of the island.

52 Estimating when to declare eradication or effective suppression of the invasive brown treesnake

Melia Nafus, Jerilyn Calaor
U.S. Geological Survey

Estimating population size is critical for monitoring wildlife responses to management. In the case of invasive species management, actions such as declaring an eradication successful rely on the assumption that detection methods can accurately predict population elimination. Among the challenges in understanding capture and eradication probabilities is that detection is not stable across time and may be affected by individual state, behavior, habitat, environment, observer, and spatial or temporal extent of surveys. Bias resulting from these dynamic changes in encounters can be especially difficult to account for with snakes, because they typically exhibit exceptionally low detection probabilities. There are also no eradications of meaningful scales from which to glean information. We combined capture and detection probabilities during a multi-year experimental removal of the invasive brown treesnake (*Boiga irregularis*) from a 5-ha enclosure on Guam, U.S.A., to quantify factors that correlate with capture probability during hand capture, trapping, or toxic baiting to improve prediction of population response to individual control tools. We used population changes and detection estimates to build a user friendly spreadsheet that can help inform probability of successful eradication or functional eradication. The spreadsheet is designed to facilitate managers in forecasting effort needed for eradication or to suppress snakes for native prey recovery. The intended use is to help balance tradeoffs between Type I or II errors when declaring success, including evaluating tradeoffs in tool application, mischaracterization of eradication, and understand probability of treatment success early in the planning process.

53 Evaluating tools and techniques for eradicating feral pigs from a tropical island

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Feral pigs are amongst the most widespread and damaging of invasive mammals, causing habitat change and loss of biodiversity. On islands these impacts are particularly devastating, with population declines and local extinctions observed across taxonomic groups including plants, invertebrates, reptiles and birds. Eradication of feral pig populations is an accepted solution for restoring the biodiversity and ecosystem health of islands, however there are relatively few eradication attempts recorded in the scientific literature. The feasibility of eradicating feral pigs on islands is dependent on factors including scale, availability of tools and social acceptability. Here we document a successful feral pig eradication on the island of Nu'utele, in the Samoa archipelago, and compare the efficacy of tools and techniques used to detect and remove individuals. We discuss the limitations of various tools and suggest improvements to increase efficacy. We emphasize the importance of environmental factors on diet, behaviour and density of feral pigs and show how these must be taken into account when planning an eradication. We examine other barriers to planning and delivering the eradication of feral pigs on islands within the tropical Pacific region including logistical constraints and social acceptability.

54 Vegetation restoration on islands following omnivore and herbivore eradications

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Islands comprise a small portion of terrestrial land mass but harbor a disproportionate biodiversity amount, which is under threat, largely due to invasive mammal introductions. More than 1,500 eradication attempts on more than 1,000 islands have been completed to conserve and restore these key ecosystems, however most global analyses of impacts of these interventions focus on benefits to animals. Invasive omnivore and herbivore impacts on endemic island plant communities are well documented, including complete collapses of native ecosystems due to loss of native seed dispersers, herbivory, and erosion. While some islands passively recover following the removal of these pressures, in many cases, active restoration is necessary to restore degraded ecosystems or transition systems into a new stable ecological state. To date, there is no global synthesis of where and when active restoration has occurred following invasive mammal eradication, limiting the ability of practitioners to understand where and when these interventions may be most effective and necessary. We report on the first analysis to summarize global vegetation restoration efforts following island omnivore and herbivore eradications. This summary quantifies the type of restoration intervention, the vegetation monitored responses, the restoration outcomes, and the goal for the restoration action both by country and by eradication species type. More than providing critical baseline information on how island ecosystems respond to vegetation restoration following eradications, this work can inform where and when to conduct future active restoration efforts to maximize benefits, justify the need for investment into active restoration efforts, and inform high-priority innovations to scale impact. Furthermore, our work highlights leading regions undergoing plant restoration that are prepared for additional ecosystem restoration interventions.

56 Toward a mosquito-free Hawai‘i: One Health suppression of invasive culex for honeycreeper recovery

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No mosquito species are native to the Hawaiian Islands. Southern house mosquitoes spread avian diseases that have already driven many native Hawaiian honeycreepers to extinction and continue to push the survivors toward collapse. The yellow fever and Asian tiger mosquitoes transmit Zika, West Nile virus, and other human pathogens; and were responsible for a large outbreak of dengue in 2015. Since 2016 we have been working on a "Mosquito-Free Hawai‘i" vision that embeds biodiversity and public-health goals within a One Health framework. In 2023 we launched two complementary controls: (i) helicopter application of *Bacillus thuringiensis israelensis* and insect-growth-regulator larvicides over >400 ha on Maui and Kaua‘i, and (ii) the Birds, Not Mosquitoes (BNM) partnership's Wolbachia-based Incompatible Insect Technique (IIT). Application

of IIT mosquitoes to protect human health is under regulatory review and should be approved by 2026, allowing agencies to protect environmental health statewide. Since November 2023 BNM has flown biweekly releases of ~250,000 IIT males across ~1,200 ha of remote East Maui forest. Operations on Kaua'i started in February 2025; combined, >46 million males have been released by May 2025, sustaining overflooding ratios >10:1 despite persistent inclement weather and logistical challenges. Concurrent drone trials are informing an integrated aerial–drone–ground scheme that can scale to >75,000 ha of critical honeycreeper habitat. This presentation will (1) synthesize ecological, technical, and cultural lessons from these first-of-their-kind larvicide and IIT deployments in rugged island terrain; (2) outline adaptive monitoring and modeling that link multiple tools into a long-term integrated pest-management strategy; and (3) show how BNM's community governance, Native Hawaiian leadership, and cross-sector public-health alliances are operationalizing One Health at landscape scale. Framing mosquito suppression as both an invasive-species and a health intervention offers a transferable pathway for islands worldwide to deliver simultaneous gains for wildlife, ecosystems, and people.

57 The elimination of rats (*Rattus rattus, R. norvegicus*) and weasels from a mainland urban area

Emma Rowell
Predator Free Wellington

New Zealand (NZ) has the highest proportion of threatened indigenous species in the world, in large part due to the human introduction of rats, weasels, stoats, ferrets and possums. In 2016, the NZ government announced the Predator Free 2050 (PF2050) initiative which aims to eradicate these species from the country by 2050. To date, rat and mustelid eradications have been achieved on inhabited landmasses, but these have generally been small offshore islands with no more than several hundred residents. Reaching a national eradication target will rely on developing technologies to remove predators from highly populated mainland areas and subsequently defend them from reinvasion. In 2018, Predator Free Wellington Ltd. (PFW) was established with the objective of eliminating PF2050 target species from the 30,000-hectare capital city of Wellington. The first project phase began with developing a methodology on the 1000-hectare Miramar Peninsula. PFW applied a three-part 'remove and protect' model, an approach previously investigated by Zero Invasive Predators Ltd. (ZIP). This involved the removal of target predators; defence of the area from reinvasion; and the detection and removal of invaders. Here we report the novel ground-based methodology developed by PFW for the successful elimination of ship rats (*Rattus rattus*), Norway rats (*R. norvegicus*) and weasels (*Mustela nivalis vulgaris*) following phase one of the project. Our results demonstrate how existing control tools can be applied alongside effective community engagement to achieve rat and weasel elimination within an urban mainland context. The outcomes of this study aim to inform national PF2050 efforts for populated areas, as well as enabling broader international applications. We anticipate progressive advancements in time and cost effectiveness of urban predator elimination as PFW advances west through its phase two project area. Phase two will likely also integrate stoat and possum elimination into the project methodology.

59 The attempted eradication of house mice (*Mus musculus*) from Gough Island and its immediate aftermath

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The invasive house mouse (*Mus musculus*) is the only land mammal on Gough Island (6514ha), where it has been driving declines in numerous globally important and highly threatened seabird species. In 2021, an eradication attempt—one of the most ambitious ever undertaken targeting mice—was carried out. Concurrent captive holding operations safeguarded populations of Gough finch (*Rowettia goughensis*) and Gough moorhen (*Gallinula comeri*) during baiting. Here we detail the execution of the eradication operation and describe its immediate aftermath. Helicopters distributed cereal bait pellets containing brodifacoum between 13th June and 2nd August, supplemented by hand baiting in and around structures. Bait was distributed at a nominal rate of 8kg ha-1 on each of two applications, with additional bait applied on cliffs and fern bush habitat – the former planned, the latter following the discovery of unforeseen high bait consumption by invertebrates, particularly slugs. Delays due to inclement weather were accommodated in planning, but conditions were particularly poor resulting in parameters under which bait was spread being relaxed. Despite all challenges, the team were content with the execution of the operation and considered it to have a high chance of success. Unfortunately, however, the eradication attempt failed. Land birds were released from captive holding from late September – early December 2021, prior to the eradication outcome being known. Gough finch has recovered from the

operation but Gough moorhen was more significantly impacted, and its low survival potentially exacerbated by unexpectedly protracted secondary brodifacoum pathways via soft-bodied invertebrates.

60 Building from failure: review, investigations and next steps towards eradicating mice from Gough Island

Andrew Callender, Peter McClelland, Araceli Samaniego, Sophie Thomas
RSPB

In 2021, a house mouse (*Mus musculus*) eradication attempt was carried out on Gough Island. Unfortunately, the eradication attempt failed, prompting a thorough evaluation to understand the causes. The Royal Society for the Protection of Birds and its partners organised three project reviews: an Internal Review by the project team, an Independent Review by an expert panel, and a discussion of the latter by the New Zealand Department of Conservation's Island Eradication Advisory Group. Results of subsequent mouse genetics and brodifacoum analyses were fed into the review processes as and when information became available, however some were received after the review process concluded which may challenge emerging theories to improve best practice. Several potential and interacting contributors to failure were identified with moderate to high probability, including 1) insufficient bait application rate given the size and density of the mouse population, 2) unexpectedly high non-target bait consumption, 3) temporal gaps in aerial baiting due to unfavourable weather conditions, 4) availability of alternative food sources, particularly after the first bait application, potentially reducing bait attractiveness to surviving mice, and 5) insufficient bait toxicity, given variation in brodifacoum levels reported from post-operation bait samples. To prepare for a second attempt, greater scrutiny is needed of the specific conditions prevailing on Gough Island itself. Continuity of personnel and expertise throughout the planning and implementation phases, more comprehensive bait trials, a re-evaluation of bait application strategies (especially to consider the relative importance of each application), further research into bait competition and palatability, and the development of robust bait quality assurance processes are all needed. Here, we present on the post-operation review process, findings, and learnings for future reviews as well as initial findings from subsequent trials and analyses undertaken on and off island, outlining the path forward to ultimately remove mice from Gough Island.

61 Preparing for aquatic invasive species

Tim Riding, Scott Sinclair, Effie Fan
MPI

Predicting what the next aquatic invasive species (AIS) might be, or when and where it might arrive, is highly uncertain. Consequently, preparing for future AIS incursions is inherently challenging. Despite this, we need to develop and embed incursion response management systems that are capable of effectively and efficiently responding to new incursions of AIS, where outcomes like eradication of AIS incursions is not just possible, but likely. To do this, we need to understand what are the most likely AIS taxon that could arrive on our shores, understand what readiness and response work has been done globally, identify the gaps in our knowledge and management of these organisms, and then aim to fill these gaps with well reasoned 'readiness for response' science and management approaches. In this presentation, we will outline the Aquatic Readiness Prioritisation Framework, which Biosecurity New Zealand's Aquatic Readiness Team has used to rapidly assess our current state of readiness for AIS. We will present the frameworks results and outline the national-level readiness work that is beginning currently for AIS.

62 First steps to island restoration: eradication of rats from Takūtea Island, Cook Islands

Kelvin Passfield, Alanna Smith
Te Ipukarea Society

Takūtea Island lies 22km north east of Atiu is the Southern Cook Islands. It is vital site for the protection of biodiversity within the Cook Islands and is home to the largest and most important seabird colonies in the Southern Cook Islands. The island belongs to the people of Atiu, and is managed by the Takūtea Trust. It is designated as an internationally important bird and biodiversity area (IBA) and is culturally significant to the community of Atiu, supporting an important multi-species subsistence fishery. In the second half of 2024, Te Ipukarea Society led a consortium to eradicate introduced invasive rats from Takūtea. In order to help prevent reinvasion by rats, or the introduction of any other invasive species, a Biosecurity Plan has been developed, and publicised among the Atiu community. This plan identifies the pathways through which invasive species might

reach Takūtea Island, assesses the risks associated with these pathways, and outlines measures for managing these risks. It details how the status of the island will be monitored and specifies the response protocols in the event of an incursion. Additionally, the plan identifies the roles, responsibilities, and resources required to ensure the long-term security of Takūtea. Safeguarding the biological and cultural values of Takūtea underscores the necessity of the effective execution of this plan.

65 Advancing the registration and application of norbormide as an alternative to broad-spectrum rodenticides

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Rodent control and eradication is dependent on anticoagulants such as brodifacoum which is highly effective but bioaccumulative leading to secondary poisoning, as occurred on Rat Island in 2011. Norbormide has been identified as an effective alternative. Norbormide is rapidly metabolised and has unique attributes, being 100 to 150-fold more toxic to rats than to birds and most other mammals, including humans. Its contractile effect on rat peripheral arteries and the lack of this effect in other species explains why this compound is uniquely toxic to rats. A historical database, c1965, in over 50 species demonstrated species specificity. These early studies were not carried out in accordance with recent test guidelines. To enable the product registration to be completed, and hence availability of norbormide for field use Standard Organization for Economic Cooperation and Development (OECD) guideline studies have now been completed to focus on data-gaps in chemistry, genetic toxicology, non-target toxicity, general ecotoxicity and environmental fate. Norbormide has been shown to lack genotoxicity in OECD 471, 487 and 490, in-vitro studies. It lacked irritancy in OECD 404, 406 and 407. Further OECD studies (OECD207 and 487) have yielded results consistent with the historical data that reported LD50 ranges, following oral administration for Norway rats, between 5.3 and 15.0 mg/kg. The lack of toxicity (i.e., LD50 > 1,000 mg/kg) previously reported in five bird species and numerous mammalian species, including rhesus monkeys is being further clarified by ecotoxicology studies in birds, earthworms, fish and Daphnia (OECD 223, 207, 202 and 203). Field efficacy data, generated with baits containing a consistently palatable form of norbormide and results from safety testing will be presented alongside plans for the use of norbormide on islands. All studies completed to date demonstrate very low or no risk to human and environmental health.

66 Eradicating invasive reptiles and amphibians in Aotearoa New Zealand: Lessons from a decade of practice

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Over the past decade, eradication efforts targeting invasive reptiles and amphibians in Aotearoa New Zealand (NZ) have generated key insights into effective tools and strategies. This paper synthesizes lessons from several response operations focused on two species: the plague skink (*Lampropholis delicata*) and the alpine newt (*Ichthyosaura alpestris*). Present in NZ since the 1960s, plague skinks have expanded steadily across the North Island. Incursions on Great Barrier Island and several South Island sites in the 2010s triggered eradication attempts due to the high ecological consequences of affected areas. Success and failure alike highlighted the importance of early detection, precise delimitation, and physical containment. High-density, frequent trapping with non-lethal sticky traps, use of detector dogs, and deployment of physically contained eradication cells demonstrated that eradication of established, breeding lizard populations is possible under specific conditions. The alpine newt was first detected in NZ in 2014, prompting a coordinated, multi-agency response. Delimitation was achieved through aquatic and terrestrial trapping, detector dogs, and intensive search effort. The area was divided into drift fence-bounded cells with pitfall traps, and extensive habitat removal was conducted. After three seasons with no detections, the response was formally closed by Biosecurity New Zealand in 2023. Ongoing regional surveillance continues to support confidence in eradication. A common challenge across projects was the inability to robustly estimate detection probabilities. Nonetheless, conservative prior estimates of detection probability developed by Technical Advisory Groups appear to have resulted in successful outcomes. These case studies confirm that eradication is feasible, though improving detectability estimation remains a priority.

67 Adaptive management strategies to treat persistent Argentine ant infestations during an island eradication campaign

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Globally, invasive Argentine ants (*Linepithema humile*) cause significant ecological and economic impacts, including outcompeting native ants and disrupting critical ecosystem functions like pollination and seed dispersal. In sensitive island ecosystems, these impacts are magnified; however, eradication may be feasible if populations are detected at a tractable size. On Santa Cruz Island in California, eradication efforts have decreased the total Argentine ant infestation area (> 400 hectares) by approximately 98% since aerial treatments began over a decade ago. However, following an initial delineation and complete treatment of the known infestations, five residual infestations have been detected during follow-up surveys. After each new detection, we investigated possible causes of treatment failure and altered our approach to improve outcomes of subsequent monitoring and bait applications. Key suspected causes for treatment failure include: 1) presence of Argentine ants at less detectable densities near the periphery of infested areas, leading to inadequate delineation; 2) rugged topography causing spherical bait beads to roll off site; 3) light application of bait along the shoreline; 4) dense tree canopies preventing bait from reaching ground-dwelling ants; and 5) the presence of alternative, high-value resources that sustained ant populations through treatments. Following detection of residual infestations, we modified our treatment and monitoring approaches by: 1) intensifying search efforts along the boundaries of former infestations; 2) deploying irregular polymer shards instead of spherical bait beads in steep topography; 3) modifying the helicopter bait hopper with a shield for use near the shoreline; 4) applying bait by hand beneath dense tree canopies; 5) adding a protein to the bait mixture to entice ant uptake in resource-rich areas. Taking an adaptive management approach has allowed us to incorporate new information acquired through monitoring, which has guided improved treatment protocols and strengthened the likelihood of achieving eradication in this

68 A house half built - management of abandoned copra plantations for conservation outcomes following rat eradication on atoll islands

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Atolls are a vital part of the Indo-Pacific region, providing critical habitat for biodiversity, including 25% of the world's tropical seabird populations and supporting numerous human communities and cultures dependent on atoll ecosystems. Learnings from past efforts to eradicate invasive rats from atolls and scientific investigation of paired rat-invaded and rat-free atoll islands strongly suggest removing invasive rats from atolls safeguards atoll biodiversity and boosts ecosystem functions driving resilience to climate impacts. However, for atolls with abandoned copra (coconut palm agriculture) plantations, rat eradication allows release of seeds and seedlings from rat predation. This outcome increases the likelihood of coconut palms remaining or becoming the dominant vegetation state. Many tropical seabird species require native vegetation; the reduction in the utility of atoll islands as seabird nesting and roosting refugia has downstream consequences. Restricting seabird access reduces beneficial nutrient (N and P) transport to atoll islands and reefs which diminishes associated ecosystem benefits. Atoll islands show higher primary productivity and greater biodiversity where seabirds deposit nutrients and this benefit extends to lagoon (productivity) and reef habitats (increased coral growth and increased fish diversity and biomass). Management strategies combining rat eradication, conversion of abandoned copra plantations to native vegetation, and seabird restoration are required together to fully achieve biodiversity and ecosystem benefits for atolls. This study explores the opportunity to maximize the conservation impact of rat eradiation on 81 Pacific atolls where abandoned copra plantations remain unmanaged. We assess the status of invasive rat populations (extant or eradicated), and known and modeled seabird population estimates for all atolls in our study set to explore the potential costs (resourcing and effort) and conservation benefits of combining rat eradication with conversion of abandoned copra plantations to native vegetation and seabird restoration.

69 From rodents to rainforests, the U.S. Fish and Wildlife Service's 15 years of targeted invasive species eradication and control—restoring ecosystems, protecting native species, and improving large-scale conservation efforts.

Aaron Martin
U.S. Fish and Wildlife Service

Since 2009, the U.S. Fish and Wildlife Service's National Wildlife Refuge System (NWRS) has strategically invested millions of dollars to support the eradication or maximum control of invasive species threatening native

ecosystems across the United States and affiliated Pacific and Caribbean islands. This long-running initiative has funded 19 large-scale projects across 15 refuge units and surrounding lands, aiming to protect more than 150 native species—many of them endemic. The program emphasizes projects with high potential for long-term success, strong biosecurity, and measurable ecological benefit. Prioritized species include rodents, feral ungulates, invasive ants, bullfrogs, and Spartina, with 74% of efforts focused on island ecosystems—where vulnerability to invasive species is especially acute. Collectively, the completed projects will restore over 600,000 acres of habitat and leverage more than $10 million in partner contributions. This presentation will summarize program design, funding strategy, project outcomes, and lessons learned, highlighting how adaptive management, multi-year planning, and rigorous proposal review have contributed to the program's success. We will also discuss how this model has informed national island restoration policy, catalyzed additional investments, and helped pilot new national eradication funding initiatives. This case study offers a proven blueprint for coordinating large-scale, high-impact invasive species work through federal investment and partner collaboration, with relevance for island restoration practitioners globally.

70 Sitting on the fence? Perspectives on predator-proof barriers from a European island community

Cristina Sellares de Pedro
University Of Aberdeen

Public support for invasive species management and eradication is a critical factor determining the feasibility, implementation success and long -term sustainability of projects. The effectiveness of outreach programmes thus depends on a clear understanding of public perceptions and concerns. While consultations on control/eradication programmes are increasingly frequent, knowledge of public perspectives on barrier techniques such as predator-exclusion fencing is presently more limited. This is likely due to the current restricted geographic use of this technique, and because many fenced sanctuaries have been developed by local community groups - effectively bypassing the need for consultation by external proposers. Fencing is increasingly accepted as a technically effective intervention in populated areas to retain native species populations prior to wider invasive species control. However, as this technology is expanding from Pacific nations to other parts of the world, communities that have not previously been exposed to it might present differing and undocumented views or concerns. We used a Q-method study to investigate community views on a proposal to install a fence to exclude invasive mammalian predators from key seabird breeding sites in Jersey, a densely-populated European island. We identified perspectives based on a sense of responsibility to both local natural heritage and to global conservation efforts; concerns on the visual impact of the fence on the landscape, and doubts as to the effectiveness of the technology and to the scientific basis of invasives management. These perspectives reveal a degree of alignment with feedback received from similar projects elsewhere, while other results appear unique to this consultation so far. This methodology represents a useful tool to identify community perspectives at the earliest stages of invasives management programmes, helping the design of effective engagement approaches that facilitate the deployment of unfamiliar techniques in novel locations.

73 Eradications on inhabited islands. Life after the rodent eradication project on Lord Howe Island, Australia.

Darryl Birch, Kristine Ward, Darcelle Matassoni
Lord Howe Island Board

The 2019 Rodent Eradication Project (REP) and subsequently the 2021 Rodent Response Project (RRP) resulted in the eradication of black rats (*Rattus rattus*) and house mice (*Mus musculus*) from Lord Howe Island, a UNESCO World Heritage-listed Island located in the Tasman Sea, 600km east of mainland Australia. This globally significant program was the first successful full-scale eradication of rodents from a permanently inhabited island. The REP/ RRP was the culmination of decades of work and feasibility studies which evaluated the likelihood of achieving success and the subsequent biodiversity benefits that the removal of rodents would bring to the island. It did, however, underestimate the operational and subsequent social complexities of delivering such a project within a traditional island community. The presence of a community shaped every stage of the project, from planning and logistics, to communication, trust, access, and legacy. It highlighted a critical need to weigh social feasibility equally alongside technical readiness. In 2024, the Lord Howe Island Board (LHIB) undertook a comprehensive review of the REP/ RRP. The subsequent 'Lessons Learned' report found that an eradication on an inhabited island should not be viewed as an end point but as a continuum. To build resilient eradication outcomes, early investment in the local community and in local capacity is essential. This should go hand in hand with a clear strategy for the ongoing biosecurity of the island to guarantee sustained

support for conservation efforts in perpetuity. This report aims to assist conservation practitioners when planning similar ground-breaking ecological restoration and regeneration projects to eradicate invasive species from inhabited islands. Eradication efforts will always face technical hurdles, but on inhabited islands, the lasting legacy is determined by the capacity and commitment to protect what has been restored. Communities are not simply stakeholders in eradication, they are co-authors of its success.

74 A new frontier: removing rats by drones for island restoration projects.

Baudouin Des Monstiers, Thommy Hall, Paul Jacques, Jesse Friedlander, David Will, Richard Griffiths
Island Conservation

With a history of more than a thousand successful interventions, invasive alien mammal eradication is a proven and effective approach to protect island biodiversity. The development of helicopter bait application in the 1990s was a major step forward in increasing the scale and pace of island restoration worldwide. Today, uncrewed aerial vehicles (or "drones") open a pathway to restoring many islands that previously were considered unaffordable or logistically too challenging. Using case studies of drone-based rodent eradication projects conducted across the tropical Pacific, we highlight the opportunities that can be realised and the efficiencies that can be made through the use of drone technology. Many of the countries where these projects occurred do not have a locally based helicopter service and the cost of importing and using a helicopter was beyond the resources available. Thus, the use of drones enabled eradications on these islands that otherwise would not have been possible, directly increasing the rate of island eradication attempts. We provide an overview of the similarities and differences between the projects in eradication strategy, challenges faced as well as solutions employed, and the implications of the use of drones on project success. Several aspects of drone technology still require improvement to improve the efficacy of its application for rodent eradication but none of them appear unattainable. Based on lessons from these projects, we provide guidance on how drone methodology could become a key tool for other projects where the availability of helicopters or resources is limited.

78 3D printing adds new dimensions to invasive species research and management

Shane Siers
Independent Contractor, Formerly: USDA National Wildlife Research Center

With the diversity of target and nontarget species and island environments, island invasive species research and management often require custom-tailored solutions for which mass-market products are poorly suited. The last 10 years have seen rapid evolution in the 3D printing industry. Tools once limited to research labs and factory floors are now reaching maturity as consumer appliances that are affordable in nearly any household. Accessibility is increased by free online resources and active user groups with an open-source mentality. 3D printing allows a user to translate a concept into a physical object in mere hours and enables iterative prototyping as the design is optimized. Free online computer aided drafting (CAD) programs allow users with no prior experience to create new printable 3D models within minutes. While on remote operations, 3D printing can enable same-day replacement of broken parts that could otherwise take weeks to arrive. I will review some of the ways that 3D printing has revolutionized my own invasive Brown Treesnake research, from simple camera brackets and tool jigs to more elaborate test devices and novel bait stations, lure chambers, trap adapters, and nontarget excluder devices, and even more exotic applications such water-soluble pesticide capsules. I will also give a brief survey of the state of 3D printing technology and some practical guidance for getting started.

79 Recent innovations in invasive brown treesnake control tools

Shane Siers
Independent Contractor, Formerly: USDA National Wildlife Research Center

As ecosystem invasions by snakes and other reptiles increase in number and scale, the Brown Treesnake invasion of Guam continues to receive the most research attention and funding for control tool development. Traditional Brown Treesnake control tools include cage trapping with live mouse lures, acetaminophen as a toxicant in dead mouse baits, visual detection and hand capture during nighttime searches, and, more recently, aerial baiting by helicopter and shooting of snakes high in the canopy. In this presentation, I will survey more recent innovations in various stages of testing and adoption. With the addition of a 3D-printed bracket that incorporates a ball-joint and a small water reservoir, acetaminophen bait stations now reduce nontarget bait take by crabs, monitor lizards, and ants by 85–100%. Using customized lure chambers in standard cage traps, we have demonstrated that live quail lures increase snake captures 4.5-fold compared to traditional live mouse lures in intensive removal scenarios. We have tested and optimized the AT220 self-resetting kill trap for humane and effective killing of Brown Treesnakes, and developed a nontarget exclusion setup for field implementation. We have demonstrated

that disturbing vegetation with telescoping poles and vibrating tree trunks with a portable hammer drill increases nighttime visual detection rates by 50%. We have tested the maximum vertical reach of Brown Treesnakes to identify the height at which we can hang baits containing multiple acetaminophen tablets to selectively target the largest snakes. Future concepts being developed for testing include radiotracking live surrogate 'sentinel birds' with external acetaminophen capsules to evaluate residual predation threat and kill remaining bird predators, and training coatimundi as climbing detector animals to find and remove arboreal snakes in early detection, rapid response, and eradication scenarios. It is our hope that these innovations can be adopted and adapted for other invasive reptile management programs.

80 From pixels to practice: Using satellite data to guide island restoration and boost climate resilience

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Native vegetation cover and health is a cornerstone of resilient island ecosystems, buffering climate impacts, stabilizing soils and coastlines, storing carbon, and sustaining biodiversity. Yet invasive species have severely degraded native plant communities worldwide, exacerbating island vulnerability to compounding climate threats. Although invasive species removal is increasingly recognized as a powerful nature-based solution that restores ecosystem stability, fewer than 20% of projects conduct long-term ecological monitoring, and in situ data are often limited, particularly in remote or rugged locations. To fill this gap and support evidence-based conservation action, we developed a globally consistent, scalable framework that uses open-access satellite data to track changes in vegetation structure and function through time. We applied this framework to more than 50 islands globally where invasive species were removed or are still present. Using satellite-derived indices from 1984 to 2024, we tracked changes in canopy cover where woody vegetation is present, vegetation productivity (NDVI, EVI, or MSAVI2), and water stress (NDMI) to assess ecosystem responses across diverse island plant communities. We validated remotely sensed trends with field data and translated the results into a decision support tool designed for island managers. This tool enables users to visualize change, identify areas in need of active restoration, guide reintroduction efforts, and optimize monitoring programs. It also supports reporting on climate-relevant outcomes associated with ecosystem stability such as canopy recovery, moisture retention, and vegetation health. By integrating satellite data, field data, and data-driven decision making, we are helping to quantify and accelerate the climate and biodiversity benefits of invasive species removal. These tools provide a foundation for tracking large-scale ecosystem recovery, maximizing the value of island restoration to deliver essential services for nature and people in a rapidly changing world.

81 Rewilding Christmas Island - holistic restoration of a unique island ecosystem

Rosie Willacy
Parks Australia

Christmas Island is an isolated oceanic island located in the eastern Indian Ocean, approximately 2,600 kilometres north-west of Perth, and 350 kilometres south of Jakarta, Indonesia. Christmas Island's unique ecology is characterised by a specific assemblage of endemic flora and fauna, and large populations of land crabs and seabirds. Many threatened and otherwise highly significant species are present on the island and are subject to multiple and interacting threats. The most important impacts result from invaders including feral and stray cats (*Felis catus*), Yellow crazy ants (*Anoplolepis gracilipes*), and Asian wolf snakes (*Lycodon capucinus*). To tackle the threat posed by these species, Parks Australia, in partnership with key stakeholders, have established an integrated, ecosystem approach to threat mitigation and threatened species management. This project is funded by the Australian Government Saving Native Species Program. We aim to eradicate feral and stray cats from Christmas Island to benefit reptiles, mammals and birds. Substantial and sustained improvements to habitat condition and red crab (*Gecarcoidea natalis*) populations are delivered through the suppression of Yellow crazy ant super colonies using drones. The horizon goal to return extinct in the wild reptiles to the Christmas Island environment drives the development of novel methods for Asian wolf snake monitoring and suppression. Black rats (*Rattus rattus*), on the other hand, are tolerated, as they potentially fill a niche that was vacated by the extinction of two native rodent species (*R. macleari* and *R. nativitatis*), may be regulated in the ecosystem by hyper abundant terrestrial red crabs, and may be an important prey source for the endemic Goshawk (*Accipiter fasciatus natalis*) and Hawk-owl (*Ninox natalis*). Multi-invaded ecosystems present complex management challenges. Parks Australia is tackling the problem by taking a holistic, context-dependant approach to managing

the non-native species present within the Christmas Island ecosystem.

82 Evaluating spatial factors that affect bait take, including non-target invertebrates, in brown treesnake toxic baiting

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Invasive species management relies on effective control tools, so understanding factors that might alter efficacy is essential. Toxic baiting is a primary control tool for the invasive brown treesnake (*Boiga irregularis*) in Guam, and bait take is often used as a proxy to measure snake removal. However, take by non-target species and spatially variable take by snakes are major factors that can compromise suppression strategies and bias assessments of snake removal rates. While attention has been given to reducing take by vertebrate non-target species, the role of invertebrates in bait take, for example, has yet to receive the same level of exploration. Thus, we assessed how invertebrate presence might affect bait take by brown treesnakes, starting with ants. We also explored spatial components of removal and invertebrate detection to evaluate potential environmental factors that may predict removal outcomes. We evaluated whether ant exclusion approaches from bait tubes improved bait take rates by snakes and which approach to ant exclusion was most promising. To do this, we set up bait tube stations with a suite of ant control methods and cameras facing bait tubes. We found that ants generally do not affect bait take rates by snakes, but the presence of some ant species may reduce bait take. In addition to ants, maggots appeared to impact bait take rates, warranting further investigation of this non-target life stage. Finally, bait take appears to have a strong spatial component, with specific tubes having much greater take rates by snakes. Information from this study can help prioritize efforts for addressing non-target take by invertebrates to improve toxic baiting methods for brown treesnake management.

83 Assessing Argentine ant impacts and evaluating drone-based baiting and lured pitfall monitoring on Ahuahu Great Mercury island

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Being first detected in 2013, the Argentine ant (*Linepithema humile*) of Ahuahu Great Mercury Island (1840 ha) would come to dominate 190 ha and has since been contained to 100 ha. Despite continued success in dispersal restriction, eradication has been limited by volunteer availability, time constraints and monitoring difficulties. This study investigates the impact of Argentine ants on local invertebrate communities while discussing alternative monitoring (targeted pitfall traps) and baiting (aerial drone dispersal) methods. Using a site-based comparative approach, ants and non-ant invertebrates were monitored, with comparisons made between invasion history, baiting method, and habitat to assess site-specific responses in ant and non-ant invertebrate communities. In the process, both the impacts of the Argentine ant and novel aerial drone bait dispersal were investigated. Additionally, the efficacy of lured pitfall traps was compared to traditional monitoring devices across various habitats, Argentine ant densities and timescales, the results of which will play a critical role in continued monitoring efforts. The risk and impact of invasive ants remain severe and mutable; therefore, it is critical that our methods of control continually evolve. The findings of this study will contribute to the continued management of the Argentine ant of Ahuahu, but also to the management of invasive ants at a wider scale by providing new insights into novel tools that may assist in the monitoring and control of invasive ants.

85 A multi-pronged, sectional approach to rodent control on an inhabited island

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Norfolk Island is a unique inhabited island ecosystem that presents various management complexities. Invasive rodents are a key threat to many of our native plants, birds and invertebrates, making effectuive rodent control a major priority. Unfortunately, extensive use of rodenticide likely exposes our Critically Endangered Morepork to secondary poisoning. Using recent scientific findings, we implemented a complete overhaul of our rodent control program with the aim of maximising its effectiveness while mitigating the threat of secondary poisoning; Results from a recent PhD project on Morepork diet and ecology, saw us reduce the amount of rodenticide used in the park at any one time by introducing a cyclic baiting system in the National Park, whereby discrete areas are intensively baited on a rotational basis using various rodenticides. Another recent PhD project (led by A. Andersen) demonstrated that invasive rodents in the National Park were highly arboreal, spurring the exploration and implementation of arboreal baiting and trapping techniques. To understand the impacts of the new control

program on rodent activity, we then implemented a new regular monitoring program using chew cards, camera traps and thermal cameras. Using these monitoring results, we can identify hotspots of rodent activity in real-time, which helps direct our trapping efforts, as well as deliver additional responsive baiting when needed. Three years on, we are continuing scientific partnerships to better understand the impact of our updated control program on invasive rodents in the park. By combining up-to-date scientific evidence with adaptive community-conscious management, we are tackling the environmental problem of invasive rodents now and into the future.

86 Invasive rats and protein preference: exploring intraspecific variation to inform bait design

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Energy and nutrient requirements underpin all predation and selective foraging in animals. Research applying the multi-dimensional nutritional geometry framework has shown that animals select diets with specific amounts and ratios of three macronutrients (proteins, carbohydrates, and lipids) to satisfy species- and circumstance-specific intake targets. Foraging and prey selection are therefore strongly influenced by the macronutrient composition of available prey items in relation to the predator's intake target. Applying this framework to invasive species research and management provides insights into predation risk and design of bait matrices to closely match an invasive species' intake target. We identified the nutrient intake target of the invasive Pacific rat / kiore (*Rattus exulans*) on a coral atoll in captive field experiments by offering standardized, isocaloric pellets with differing protein energy ratios (5% and 45% net metabolizable energy from protein) and measuring daily feeding selection in 44 individuals over seven days. Rather than converging on a singular protein intake target, we found that the invasive kiore population exhibited a bimodal intake target. While 84% of tested rats balanced their foraging towards a low protein target (10.7% ± 6.3% protein), seven rats had a significantly elevated protein intake target (43.5% ± 2.1% protein). Subsequent morphological and physiological analysis suggested that adult, large-bodied, male kiore with increased testes glands were significantly associated with elevated protein intake. These findings reveal intraspecific variation in protein intake targets, putatively associated with sex, and reproductive and dominance status. Our findings have important implications for invasive rodent management, suggesting that variation in protein preference could be one of the factors influencing bait uptake during eradications, warranting further investigation.

89 Lessons from Tierra del Fuego: The pilot eradication project for beavers

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Between 2015 and 2018, Argentina conducted a pilot program to eradicate the North American beaver (*Castor canadensis*) from its section of Isla Grande de Tierra del Fuego, as part of a binational agreement with Chile signed in 2008. The project aimed to evaluate the necessary effort, tools, staffing, governance, and environmental changes associated with beaver removal. The preparation phase, dedicated to assembling personnel and equipment, took 12 months. Ten trappers, trained specifically for eradication, worked across 69,000 hectares for 18 months. Operations removed 1012 beavers during 22,622 trap-nights. To better gauge trapping effort, we introduce the concept of "episodes"—the interval between each trap check. On average, eradicating beavers required 18 episodes per kilometer of stream. Full eradication from the entire Argentine portion of Isla Grande is estimated to cost $31 million USD over 17 years. By targeting the entire population, the team could collect data on age, sex, and reproductive status, offering valuable insights into beaver population dynamics. Using Leslie matrix models, areas with different management histories were compared. Results revealed that the more intense the removal, the higher the beavers' population growth rate, resilience, and earlier onset of reproduction. Population growth was especially sensitive to the survival rates of kits, yearlings, and subadults, rather than the number of offspring produced. Most environmental data was gathered before the operations began, but administrative delays hindered post-removal measurements. When GEF funding ended and local government took over, biosecurity operations nearly ceased. In 2017, Chile launched its own pilot project, but bureaucratic obstacles hampered the exchange of information and personnel between the two countries. Beaver eradication is technically feasible. However, implementation agencies lacked the necessary agility for such initiatives. The poor political support stopped biosecurity efforts, and trained personnel were eventually lost to attrition, leaving current capacity diminished.

90 Assessing the impact of predator eradication efforts on native reptiles in the Galapagos

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In October 2023, Floreana Island in the Galápagos Archipelago was the site of an attempted invasive rodent (*Rattus* spp. and *Mus musculus*) and feral cat (*Felis catus*) eradication. On this island and the wider archipelago, lava lizards (*Microlophus grayii*) are primary seed dispersers and lava lizards and geckos (*Phyllodactylus baurii* and *P. reissii*) serve as important prey species for endemic and introduced predators, including those targeted for eradication. Although the island is not yet eradicated from invasive predators, their populations have changed dramatically and have influenced the abundance and presence of native reptiles including the lava lizards and lesser-studied gecko species.Despite reptiles playing central roles in maintaining island ecosystems and being an integral part of island food-webs, adequate monitoring of reptile species has often been neglected in eradication operations beyond Oceania. As restoration of ecosystems is a primary goal in island eradications, monitoring key native species surrounding such operations documents restoration progress, changes in ecosystem dynamics and informs further restoration and management measures such as species reintroductions. The predator eradication on Floreana is ongoing, however following its success, 12 native species reintroductions are planned to aid the restoration process of the island. Some of these are predatory species (Galapagos short-eared owls (*Asio flammeus galapagoensis*), Galapagos hawks (*Buteo galapagoensis*), Mockingbirds (*Mimus* spp.) and Racer snakes (*Pseudalsophis* spp.)) that will rely heavily on the small lizard population. As part of native species monitoring and preparation for species reintroductions, we monitored the abundance response of Floreana lava lizards and gecko species for three years before and two years after the attempted eradication with a Before-[illegible]-Impact (BACI) experimental design. The results of the study are presented here.

94 Long-term risks of brodifacoum exposure to island raptors: Lessons from the Pinzón Island eradication

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Eradicating introduced rodents from islands is a highly effective conservation tool, with ~1000 global projects at a reported 88% success rate. These initiatives predominantly use second-generation anticoagulants in particular brodifacoum, which is known both for its high efficacy, but also for its persistence in the environment and its propensity to move through food webs. Brodifacoum residues are known to pose risks to non-target species, especially birds of prey through secondary and tertiary exposure events. While temporary captive holding of raptors can successfully mitigate acute exposure risks, the long-term impacts of sub-lethal, but cumulative brodifacoum exposure remain poorly understood. Many wide-ranging raptor species appear to experience no significant population consequences, but endemic or highly resident populations are highly vulnerable to low-level, persistent and cumulative brodifacoum residues. On Pinzón Island, Galápagos Hawks experienced unexpected mortality after release following an aerial broadcast of brodifacoum baits. Subsequent environmental sampling confirmed brodifacoum residues in lava lizards (*Microlophus duncanensis*), identifying a clear exposure pathway. Residues persisted in lava lizards for over three years post-eradication, emphasizing the critical need for improved risk assessment and management planning in future island invasive rodent eradication projects, particularly concerning the long-term biological consequences for predatory species.

98 Attrition based eradication of *Varanus bennetti* on a Ulithi Atoll, Federated States of Micronesia

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Community concerns on Ulithi Atoll (Federated States of Micronesia) about declining green sea turtle (*Chelonia mydas*) numbers led to the observation of invasive monitor lizards preying on turtle nests. In response, the community requested eradication support for Loosiep Island, which provides important turtle nesting habitat. Ecological and taxonomic assessments confirmed the species as Bennett's long-tailed monitor (*Varanus bennetti*), native to parts of Micronesia but not to Ulithi Atoll. Initial trials in 2019 demonstrated that adult and subadult monitors were susceptible to 500–1000 mg doses of acetaminophen delivered in fish baits. Supporting ecological studies defined parameters of diet (primarily *Rattus tanezumi*), home range, and reproductive biology, guiding bait grid design and treatment strategy. Non-target bait uptake was also assessed. These findings informed a phased strategy, beginning with rat eradication to remove the lizard's primary prey. Notably no suitable tools were found to target neonates and juveniles, breaching a fundamental principle of eradication practice and forcing a high-risk strategy. Standardised monitoring before and after 2019 treatment showed a significant reduction in adult monitor detection rates, indicating a strong initial knockdown. A locally

co-developed eradication plan adapted methods to environmental, logistical and capacity constraints. Since 2019, a dedicated Ulithi-based team has sustained control efforts. No neonates or juveniles have been detected in recent seasons, and only a low density of subadults appear to persist. While eradication is not yet confirmed, the population appears no longer self-sustaining. Continued removal of remaining subadult individuals before reproductive maturity will be essential to achieve eradication by attrition.

99 Good grief! Unexpected consequences of mammal eradications from islands off northeastern Aotearoa New Zealand

Dave Towns

Alien (non-native) invasive species are almost always removed from islands to enable the recovery of native species and ecosystems. Management after these eradications can range from passive recovery through to recolonisation and active restoration involving multiple reintroductions. Such initiatives also come with many questions, one of which is: What does passive recovery teach us about the way island ecosystems function? Here I discuss the results of long-term studies after a range of invasive mammals were removed over 27 years from the Mercury Islands archipelago. In a localised example, shoreline inhabiting diurnal shore skinks increased in distribution and abundance on Korapuki Island for a decade, which apparently illustrated hitherto unexpected release from the previous effects of rats. The response then reversed, most likely due lag effects after the subsequent recovery of an avian predator. Broader ecological responses were demonstrated by the recovery by populations of burrowing seabirds, which in the Mercury Islands was also more rapid than expected. This in turn can have subtle effects at multiple scales, including increases in the complexity of invertebrate food webs, changes in the diversity of nearshore marine algae, and increased seabird numbers in the far Pacific. However, our understanding of seabird engineering effects on terrestrial ecosystems is limited by island size. On large islands with old-growth forests the effects of seabird colonies appear to be localised and complicated by modifying effects from the forests themselves. Unfortunately, financial resources available for increasingly ambitions eradications rarely support studies of the ecological processes associated with subsequent recovery. Consequently, defining endpoints for management can require navigating an increasingly turbulent sea of value judgements.

100 Birth control for rats shows promise within a seabird conservation site in Hawai‘i

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Rats are the most widespread invasive mammals, introduced to 80% of islands globally. An inestimable amount of resources are used to combat rat invasion and mitigate negative impacts including disease transmission, habitat alteration, and extinction of native species. Chemicals with various physiological actions have been used to control rats throughout history, many resulting in unintended environmental damage or harm to human health. Evolve™ is a recently developed commercial bait containing cottonseed oil and targeting rat fertility, as opposed to common lethal chemical control options, which are often anticoagulants. Laboratory testing and urban trials demonstrate positive results, with high rates of bait consumption and reduced birth rates. To investigate the potential for rat contraception in island conservation, we tested the effects of Evolve™ at a seabird protection site in Maui, Hawai‘i. The contraceptive bait is deployed within one of two predator-proof exclosures, with the second serving as a control. Regular ink-card tracking and live-trapping are performed in both exclosures to assess rat presence and population age structure. The rate of bait consumption is high, and camera trap data reveal consistent rat presence at the bait stations. Within the experimental exclosure, seasonal abundance of rats is lower than predicted based on historical tracking data. In addition, trapping results show proportionally fewer young rats when compared to the control, suggesting a reduced birth rate. Overall, our results demonstrate that contraceptive bait can be effective in a field setting for conservation management. An integrated approach utilizing lethal trapping in conjunction with contraceptive bait would provide the best protection for native species, while avoiding negative consequences of chemical control through toxic anticoagulants, including chemical resistance and non-target lethal effects.

101 Building and maintaining social acceptance while working towards a pest free Kawau Island.

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Working towards a Pest Free Kawau Island aims to remove four wallaby species, brush-tailed possums, two rat species and stoats to restore native biodiversity and contribute to New Zealand's Predator Free 2050 goal. While the project has gained strong support and investment, it faces many of the complex challenges generic to inhabited islands such as local opposition from a minority of landowners, constraints to the methods that can be used on private land, constraints on access, the presence of domestic animals and even sabotage. These factors have and continue to shape the operational strategy. Despite this, the project continues to make progress toward its goal of removing the targeted invasive species. Strong local participation, transparent planning, and ongoing community engagement have and continue to be critical to maintaining social acceptance and building trust. The experience on Kawau highlights the need for good communications and careful and sustained engagement integrated with sound eradication knowledge to successfully deliver conservation outcomes on populated islands.

102 The pathway to precision pest control: Enhancing species selectivity for vertebrate toxins

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Worldwide, the toxins currently used for vertebrate pest control are often harmful to humans and non-target animals. Consequently, their use is increasingly restricted. This has created growing global demand for safer, more species-selective alternatives. In New Zealand, the development of safer toxins is critical for controlling invasive mammalian species as part of halting the decline of our native species. A multidisciplinary research programme is addressing this need by developing highly selective, environmentally responsible toxins for precision pest control. The programme builds on established and emerging toxicants, investigating their mechanisms of action to inform the design of improved pest control tools. Research is structured around four major themes: 1. Redirecting norbormide selectivity: We are investigating molecular mechanisms by which norbormide and its analogues exert their effects, with the goal of shifting their species selectivity from rats to mice, a key invasive species. This includes structure-activity relationship and targeted mechanism-based testing. 2. Improving methaemoglobin-forming toxicants: We are working to refine formulations of methaemoglobin-forming toxicants such as sodium nitrite. We aim to understand metabolic pathway differences between key target and non-target species, while developing reliable markers of toxicity. 3. Genomic insights into species susceptibility: We are using genomic data to better understand why different species vary in their susceptibility to toxins. This work also seeks to identify potential opportunities for novel species-selective toxins. 4. Social acceptability and mātauranga Māori: In partnership with hapū and iwi, we are exploring policy development and cultural considerations for responsible toxin use. This ensures the programme reflects both scientific and social values. Together, these themes have the potential to deliver a range of safe, effective and socially acceptable novel tools for pest control. These tools will enhance the management of invasive mammalian species in New Zealand and meet the global demand for improved pest management solutions.

103 Advancing large-scale rat eradication: field trials and innovation on Great Sitkin Island, Aleutian Islands, Alaska

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Alaska supports the majority of the nation's breeding seabirds and nearly half of its shorebirds, making it especially vulnerable to the ecological impacts of invasive rodents. The Alaska Maritime National Wildlife Refuge (AMNWR) has led invasive mammal eradication across the Aleutian Islands for over 70 years. With introduced fox eradication now complete, focus has shifted to proposed Norway rat (*Rattus norvegicus*) eradications on four large, uninhabited islands. In partnership with Island Conservation, USDA APHIS Wildlife Services, the USDA National Wildlife Research Center (NWRC), and the U.S. Fish and Wildlife Service, AMNWR is conducting pre-eradication field trials on Great Sitkin Island. This project builds on the 2008 successful rat eradication from Hawadax ('Rat') Island, integrating lessons learned into new challenges presented by larger, more complex island ecosystems. Current trials aim to determine optimal bait application rates across habitat types, assess rat distribution at high elevations on this active volcanic island using thermal imaging, and test baiting methods near freshwater systems to reduce risks to anadromous salmon. Concurrently, raptor movement patterns and attractant strategies are being studied to mitigate risks to avian scavengers. NWRC is investigating rodenticide trophic transfer to better understand potential exposure pathways to salmon and their predators. Insights from Great Sitkin will inform eradication planning on other high-priority islands, including Kiska, Amchitka, and Attu—critical breeding sites for burrow- and crevice-nesting seabirds that remain under pressure from rat predation. This collaborative effort not only strengthens eradication methodology but also advances AMNWR's long-term vision of a rat-free Aleutian Archipelago. Outcomes from this work aim to enhance the efficacy and ecological integrity of future island restoration across the region.

105 Multiple species eradication from Flinders Island South Australia, a public private partnership to create a conservation legacy

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Flinders Island has been privately owned by the Woolford Family since the 1970s, initially operating as a sheep station until the mid-2000s. Since then, destocking has been underway as the family transitioned to nature-based tourism enterprises. In line with this shift the family approached the South Australian Department for Environment and Water with the idea of converting the island to a Safe Haven. This project represents a major public-private conservation partnership for South Australia. The Woolford's are passionate stewards of the island and in partnership with National Parks and Wildlife Service, eradication experts, and the Eyre Peninsula Landscape Board brought the necessary experience and expertise together to help give the best chance of project success. The island's size, remoteness, and mild climate with reliable rainfall made it ideal for establishing a cattle, sheep, mice, rats and cats were the target species for eradication. The project's aim was to maximize the island's restoration capacity and ultimately contribute to the national Haven network. Fossil records show that animals such as the Western Quoll and Banded Hare-wallaby were once present, but no native terrestrial mammals remain. These animals are now threatened species. A fully integrated eradication plan was developed over 2022-2024 and $4.8 million was secured from the Australian Government Saving Native Species Program and SA Government Landscape Priority Fund. The removal and eradication of sheep and feral cattle, and the aerial baiting operations targeting mice, rat and cats were completed in mid-2025, with the feral cat eradication effort being completed by December 2025. A key project component was a range of baseline monitoring, including pre-operation cat population estimates to assess the impact of the rodent baiting and a single 1080 aerial bait drop. This was the first attempt of a multiple species island eradication in South Australia.

106 A new baiting paradigm for rodent eradications: Use multiple bait products

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Bait type is just one of many factors that may contribute to success and failure of rodent eradication attempts. Most rodent eradications on islands have been successful by using a single bait product. However, several eradication attempts over the last 1-2 decades have failed, at least as outlined by the original implementation plan. During several of these failures (e.g., Midway Atoll, Wake Atoll), ample bait was available in locations where survivors were detected, and the surviving rodents were observed passing next to the toxic bait without showing interest in the bait. These observations, along with past successes in using a secondary bait product to mop up survivors, sparked a new and relatively untested paradigm in baiting for rodent eradications, which is to strategically apply multiple bait products during a single eradication attempt. Here we present: 1) past successful rodent eradication projects where multiple bait products were used after a single bait product was unsuccessful, and 2) laboratory cage trials demonstrating efficacy of several bait products that have not been previously used for island-wide eradications, as these bait products may be candidates for future projects (e.g., 25-50 ppm of brodifacoum, bromadiolone, chlorophacinone, and diphacinone). When considering testing and implementing the multiple bait product paradigm, we envision a primary bait product (e.g., Bell Laboratories B25D/B25W or Orillion's Pestoff20R brodifacoum) and a secondary bait product that has a different flavor and would be applied after completing the initial bait application(s) with the primary bait. We present the pros and cons of this new approach, including importance of real-time bait monitoring, adjusting methods during the eradication project, nontarget risk, and disposal of extra bait. We hope that such trials can occur on islands to help form best management practices and improve the success rate of rodent eradications on islands.

107 Emerging technologies to improve the efficiency and feasibility of restoring islands through invasive mammal eradication

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The removal of invasive mammals from islands remains one of the most effective conservation interventions for preventing biodiversity loss and restoring globally unique island-ocean ecosystems. Yet, most eradication efforts to date have been implemented on small, uninhabited islands using a limited set of methods—primarily broad-spectrum toxicants and hunting or trapping—developed over the past several decades. These methods are often challenging or infeasible on islands with significant human populations, sensitive native species, limited aerial broadcast capacity, or stakeholder resistance. Multi-method eradications face additional challenges, particularly in detecting and removing the last remaining individuals. Furthermore, long-term outcome monitoring is constrained by the logistical and financial demands of repeated sampling on remote islands. In response, the past decade has seen a surge in both incremental and transformative innovations aimed at improving the feasibility, efficiency, and scalability of island restoration efforts. At the same time, technologies in remote internet connectivity, artificial intelligence, and genetics have emerged. We review key areas where innovation is most urgently needed, highlight emerging tools that are ready for broader use, and identify methods expected to be testable within the next decade. We also examine persistent barriers to adoption, including regulatory, technical, and social constraints. Given that transformative, species-specific solutions are unlikely to be globally available in the near term, we argue that conservation practitioners should prioritize safeguarding the existing toolkit while integrating proven, emerging technologies to shift eradication paradigms within their local contexts. Finally, we propose the adoption of an "application usability level" framework to standardize communication about the maturity of new tools and recommend building capacity in data science and genetics to support the development and deployment of next-generation eradication methods.

108 Prevention is better than the cure: Exploring readiness for rat incursion responses in the Channel Islands, California

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Invasive rodent species have established on ~80% of the world's archipelagos, and have wide ranging harmful impacts to native species, habitats and ecosystem processes. In California, five of the eight major Channel Islands are rat free; four were never invaded (Santa Cruz, Santa Rosa, Santa Barbara, San Nicolas), while one was invaded but experienced a successful eradication in 2001-2002 (Anacapa). A new rat invasion on the islands is perceived as low in likelihood but high in potential harmful impact, with risk varying by island according to

frequency of human access and type of transport logistics. Further, should rats establish on larger islands in the archipelago, there is uncertainty if enabling conditions for eradication could be met. Island biosecurity represents the combined actions of preventing, detecting, and rapidly responding to invasive species incursions, with a goal of preventing invasive species from establishing. In the Channel Islands, biosecurity capacity for prevention and early detection is improving; however rapid response remains a less well-developed function. Here we offer a short commentary on the likelihood of new rat invasions and the readiness for an effective rapid response in the Channel Islands, based on: 1) rat impacts and invasion biology in the context of the Channel Islands, 2) a generalized overview of rat incursion response strategy, and 3) a comparison of the challenges for rapidly responding to potential rat incursions on two of the Channel Islands: Anacapa and Santa Cruz. While eradication of newly established rat populations on the Channel Islands may be possible under specific conditions, prevention remains the most effective strategy.

111 Partnership-led, technology-driven eradication of sika deer from Northland, New Zealand

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In 1988, 12 sika deer (*Cervus nippon*) were illegally released in Russell Forest and Ngaiotonga Scenic Reserve, Northland, New Zealand. A second release of at least six deer in 2015 and together led to the establishment of a small herd in a previously wild deer-free region. Between 1998 and 2019, culling efforts removed at least 126 individuals. In 2020, a formal plan to eradicate the remaining population was developed. The success of the project was built through a four-year partnership between the Department of Conservation, Northland Regional Council, Ngāti Kuta, Patukeha, Te Kapotai, Ngātiwai), and the community. A working group provided collaborative decision-making and values-based planning to support mana whenua aspirations, fostered social licence to operate, with modern vertebrate pest management techniques. Field operations began in April 2022, led by specialist deer control contractors. A suite of tools was employed to enable data-informed hunting, improving both efficiency and confidence in eradication outcomes. Key components included: A preliminary faecal pellet survey with DNA analysis to delineate deer home ranges and identify individuals (n = 24). Detection technologies such as camera traps, thermal drones, and search dogs to find deer or faecal pellets. Targeted control methods including thermal assisted aerial shooting and ground-based hunting with dogs. By May 2025, 64 deer had been removed. Only two stags remained after the final female was culled in June 2025. As the aim of the project is to remove all animals, a final independent survey across ~7,000 ha is planned post-2025 – and hopefully after the last males are shot. This project demonstrates the effectiveness of partnership, community engagement, skilled contractors using emerging technologies in wildlife management.

113 Successful removal of an incipient island population of black rats; and implications for eradication practice

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Following a black rat and mouse eradication operation on Lord Howe Island in 2019 an incipient black rat population was detected in April 2021. A limited permanent surveillance network of ‘passive’ detection devices had been installed within the island‘s Settlement alongside pre-prepared rodent incursion response guidance documents in case of anticipated small-scale incursion events. The Rodent Response faced numerous challenges including: immediate establishment of a large-scale field operation and mobilisation of the necessary expertise; detection and removal of individuals at a very low population density with plentiful natural food; obtaining property access and community support; and biosecurity practises and standards that were still in development. After 3½ months when the final positive detection was made, 96 rodent bodies had been retrieved and no more were found. Numerous lessons were learnt, which included: The relative efficacy/reliability of rodent detection dogs, wildlife cameras, and passive rodent detection devices when rats were at very low density in a food-rich environment; the best complementary use of monitoring tools; rat interactions with snap traps; and how to effectively implement a novel rodent removal technique. Eradication success for the Lord Howe Island Rodent Eradication Project was confirmed in September 2023. This presentation will provide valuable lessons for biosecurity practitioners, rodent ecologists, and island eradication planners.

115 Toward adaptive governance for invasive rodent eradication in the Ogasawara Islands:

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The Ogasawara Islands, a UNESCO World Natural Heritage Site, are renowned for their exceptional endemic biodiversity and evolutionary value. However, invasive rodents have severely degraded native ecosystems by preying on land snails and birds. Previous eradication attempts using first-generation anticoagulant rodenticides—including aerial applications—were suspended on Anijima Island in 2014 due to concerns over non-target impacts and insufficient stakeholder acceptance. This study presents a novel, interdisciplinary framework that integrates adaptive governance into rodent eradication strategies, with a special focus on second-generation anticoagulant rodenticides (SGARs) such as brodifacoum and difenacoum. We aim to overcome past failures by combining ecological modeling with inclusive risk communication, supported by empirical field research and comparative case studies from New Zealand and other global islands. Our project is structured into three thematic groups. Subtheme 3 specifically focuses on developing eradication strategies based on SGARs and enhancing community engagement. We are developing a model-based estimation program using sensor camera data to evaluate past rodent control efforts on Anijima and simulate cost-effectiveness across management options. Furthermore, we are initiating a multi-step participatory process, including resident workshops and stakeholder forums, to facilitate informed public discussion and build trust.To ensure intergenerational equity, we also incorporate "Future Design" methodologies—inviting participants to envision and represent the interests of future generations during deliberations. This research contributes both theoretically and practically to conservation governance by offering a replicable model for integrating high-potency eradication techniques with ethical and socially legitimate decision-making.

116 From eradication to evaluation: environmental insights from Wake Atoll

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Eradicating invasive rodents from islands is a powerful conservation strategy, but the ecological consequences of such interventions are not always well understood. In 2024, the United States Department of Agriculture (USDA) undertook a Pacific rat (*Rattus exulans*) eradication operation on Wake Atoll, using aerially applied anticoagulant bait. To assess the environmental footprint of this effort, we implemented a targeted monitoring programme designed to detect toxicant residues and evaluate potential non-target impacts across the atoll. Sampling was conducted before, during, and after bait application, focusing on soil, water, and biota across terrestrial and nearshore habitats. To capture spatial variation in exposure and response, samples were collected from each of Wake Atoll's three islets. Live specimens were systematically collected for residue analysis, while dead wildlife encountered opportunistically were also recorded and analysed. In total, over 400 samples were processed as part of the monitoring efforts. This approach allowed us to evaluate both the spatial distribution and persistence of toxicant residues, as well as to document observed mortality across a range of non-target species. Monitoring was structured to reflect known exposure pathways and food web interactions, providing insight into how contaminants may move through insular ecosystems following rodenticide operations. Wake Atoll offers a valuable case study for understanding the environmental trade-offs involved in eradication campaigns on remote tropical islands. Drawing on lessons from previous Pacific projects while accounting for Wake's unique ecological and operational conditions, this work contributes to the refinement of best practices for eradication planning, environmental risk assessment, and post-operational surveillance. The findings reinforce the value of embedding environmental monitoring into eradication programmes, not only to detect unintended effects but to improve long-term outcomes for biodiversity and ecosystem health. As island restoration efforts expand globally, insights from Wake Atoll can help guide more effective and ecologically responsible conservation actions.

117 The importance of the Monito Island rat eradication initiative for the restoration of other islands in the Puerto Rican (Caribbean) Archipelago

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The eradication of Black Rats from Monito Island was the first rat removal action implemented by the Puerto Rico Department of Natural and Environmental Resources (PRDNER) starting in 1992 and received great resistance from other government agencies. This action was completed in 1999 and presented at the first Island Invasive symposium in 2000. The main conservation targets were the recovery of the Monito Island gecko and important seabird's colonies. Post eradication assessments were conducted and documented that the island continued rat free after 15 years and posteriors (2016) Monito gecko population assessments showed dramatic

increases in numbers with population estimate of 7661 geckos (50% CI: 5344–10,590) and occupancy of 27.8% (50% CI: 11.3–68.6%). Thus, the Monito Island gecko was removed from the U.S. Endangered Species list in 2019. Post delisting monitoring for the gecko and assessments of the seabird's population have continued and the success of this project has served to facilitate the implementation of new and more ambitious eradication programs in lands under the jurisdiction of PRDNER.

118 Creating Flinders Island safe haven: planning, partnership, and shaping perceptions for long-term success

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Flinders Island, South Australia, is a 3,854-hectare privately owned island located 30 km off the rugged coastal township of Elliston (pop. 1,014). Named by Capt. Matthew Flinders in 1802 and first settled by Irish sealer Bill Bryant in 1826, the island's history has been shaped by 200 years of primary production – from sealing and wallaby hunting to livestock grazing and crop cultivation. Today, this legacy is undergoing a transformational shift as the Woolford family works to restore the island's ecosystems and transition to a conservation and ecotourism-based future. The Flinders Island Safe Haven Project is a multi-species eradication initiative that aims to create South Australia's largest island refuge for threatened native species. It represents a unique public-private partnership between the Australian Government (via the Saving Native Species Program), the South Australian Department for Environment and Water, the Eyre Peninsula Landscape Board, and the Woolford family. The project was over six years in development before implementation, ensuring full funding and the establishment of long-term protections via a Management Agreement and conservation deed over the island's freehold title. Crucial to the project's success has been the integration of rigorous biosecurity protocols and the active involvement of the local Elliston community. Many locals have deep generational ties to the island, including historical residency and visitation long before the Woolfords' custodianship began in 1979. Building trust, reshaping perceptions, and fostering community understanding have been essential in navigating the transition from agriculture to conservation. Equally important has been the communication of why significant public investment has been directed to a privately owned island. This required a strategic approach to community engagement. The project highlights the challenges and opportunities of aligning private land tenure with public conservation goals, while cultivating broad community support for a new, long-term legacy of ecological stewardship.

119 Delivering re-eradication: Operational lessons from Te Wharawhara/Ulva Island's 2023 Norway rats removal

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In this paper, we examine the 2023 Norway rat (*Rattus norvegicus*) eradication operation on Te Wharawhara/ Ulva Island (269ha), off the coast of Rakiura/Stewart Island, and highlight the need for adaptive, collaborative, and interdisciplinary strategies to detect and manage reinvasion pressure on nearshore islands. We present key recommendations from the 2022 feasibility assessment and evaluate their implementation through significant upgrades to Ulva Island's surveillance and incursion response system, as well as the planning and execution of the 2023 eradication, and the resulting post-operational outcomes. We explore the intersection of Ulva Island's ecological significance as a predator-free refuge supporting populations of threatened species, its role as an open sanctuary within Rakiura National Park, and the shared values, aspirations, and environmental stewardship of Rakiura Māori and the community. Aerial brodifacoum baiting was selected as the most effective and logistically feasible method for full-island eradication. This was supported by enhanced surveillance using trail cameras, AI-assisted image analysis, and detection dogs. By integrating current best practice in island eradications, technological innovation, cultural management tools, and social values, we highlight the critical role of collaboration and knowledge sharing in achieving resilient and enduring conservation outcomes for nearshore [illegible] are under persistent reinvasion pressure.

120 Rethinking rodent bait: Balancing ambition with practical realities

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Aerial broadcast of toxic cereal bait has been a cornerstone of successful rodent eradication on islands since the 1990s, with hundreds of operations proving its effectiveness. The standard brodifacoum 2 g cereal-based bait, manufactured in New Zealand (by Orillion) and the USA (by Bell Labs), is a trusted tool in this global effort. But some recent failures on large (>5,000 ha) and tropical islands—already recognised as complex, high-risk settings—have prompted conservationists to ask: can we improve our bait, or even tailor it to specific environments and target species? It's a fair and timely question, especially as project reviews highlight multifaceted causes behind these setbacks. But tinkering with bait formulation is not a straightforward fix. To help map the potential ramifications, we outline the flow-on implications that changing bait composition, toxicity, or pellet size can have on other operational aspects. A smaller pellet, for example, might increase the rate of mice encountering bait, but recent trials suggest it also degrades faster in wet conditions, reduces helicopter sowing capacity (by narrowing swath width), is more prone to shattering and limits the pilot's ability to monitor bait flow. Shifts in bait composition or toxicity could trigger regulatory hurdles, with new registrations requiring years of work, substantial funding, and a viable commercial case. Indeed, softer, peanut butter-based baits have previously shown promise against mice, but were shelved due to limited market potential. We advocate for a systematic, collaborative approach. Any changes should be tested in controlled lab and field trials first, with close monitoring of ecological, operational, legal, and financial consequences. Collaboration will ensure promising innovations aren't just scientifically sound, but also practical, permitted and ultimately, effective. Better bait is worth striving for, and research is underway to support this. But large-scale implementation will require shared understanding of the challenges and trade-offs involved.

121 From islands to freshwaters

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Together, islands and freshwater represent just 3% of the earth's surface, yet support a disproportionate amount of global biodiversity. These systems have witnessed ~90% of all known global extinction events, with Invasive alien species (IAS) a leading cause. Invasive animals can be permanently removed from many islands and freshwater bodies after which native species, even some on the edge of extinction, can and have made remarkable recoveries. Every successful eradication is underpinned by well established globally accepted practices. Yet the principles of eradication, well accepted in island restoration, are not, as of yet, as clearly defined for freshwaters. So long as these principles are met and implemented judiciously, they are equally applicable to any taxa and system including freshwaters. The first Islands & Invasive Species Symposium in 2001 catalyzed a global movement of island invasive species eradications that has protected 7% of all CR & EN reptiles, birds and mammals from extinction. There has been no comparable movement for freshwaters despite freshwaters being more abundant and accessible than islands. The opportunity in freshwaters is unparalleled. We can leverage naturally occurring freshwater "islands" or create new ones by building invasive fish barriers in otherwise connected waterbodies. Freshwater invasive fish eradications are further safer to implement and both technically and logistically easier than comparable island vertebrate eradications. Members of the thriving island invasives community, their experiences and networks, lessons learned, and successes are needed to help create a movement to catalyze biodiversity conservation action in freshwaters. Islands (2% of Earth): 61% of extinctions, 78% caused in part by invasives. Freshwaters (<1% of Earth): 28% of extinctions, 27% caused in part by invasives.

124 Potential management strategies for the Asian black-spined toad (*Duttaphrynus melanostictus*) in Madagascar

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The Asian black-spined toad *(Duttaphrynus melanostictus)* is a commensal species complex with a broad native range spanning from Pakistan to Indonesia. It was accidentally introduced to Madagascar, one of the world's biodiversity hotspots, in ~2010. The species has currently spread over >100 km2 from its port of entry, with small satellite populations emerging at greater distances, likely following accidental road transport. These toads produce potent cardiotoxins at all life stages, and sensitivity to the toxins is proven or predicted for all native predators in Madagascar. As a country with over 90% endemicity among terrestrial animals, *D. melanostictus* thus represents a severe threat to many endemic species as both generalist predator (notably of smaller herpetofauns) and toxic prey. Additionally, toads have the potential to reduce beneficial crop-pest predator populations and eliminate additional household income sources (e.g. honey production), reducing food availability and economic empowerment in one of the poorest countries in the world. Madagascar is a

country facing multiple significant development challenges, so the ecological and socioeconomic threat of *D. melanostictus* is one issue among many competing priorities. However, clearly demonstrating evidence of multi-sectorial impacts together with the potential efficacy of control measures is the first step towards goals of broader control and even ultimate eradication. Here we quantify the socioeconomic impacts of toads through examination of diets within ricefields – the staple agricultural crop - revealing significant consumption of invertebrate predators and honeybees. We also present evidence for the effectiveness of community-led removal efforts to protect forest fragments containing localised endemic herpetofauna. Finally, we demonstrate, using SDMs and IBMs, the likely unchecked spread of the species, and highlight opportunities for control interventions that could reduce the toad's effects on the country's protected areas network to reduce the extent of its impacts.

128 Rats, islands and people: Community co-design on the Isles of Scilly

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Invasive brown rats are scheduled to be eradicated from three inhabited and around 30 uninhabited islands in the Isles of Scilly (Cornwall, South-West England) in 2027 in a ground-based project to benefit the archipelago's remarkable seabird assemblage. Eradicating rats from inhabited islands using ground-based methods is an extremely labour-intensive process and requires a high level of support from residents. For example, rodenticide stations need to be placed in every property and regularly checked. Reducing the carrying capacity for rats by removing food and harbourage also affects local people as the project seeks to improve waste management procedures. Eradication projects on inhabited islands have rarely managed to fully engage island communities, so that they are comfortable in communicating their views and needs to project planners. Co-design is a participatory approach that enables communities to play a leading role in complex projects. It relies on facilitated workshops, structured to promote a shared understanding of problems and to explore potential solutions. While centred on communities, the approach is specifically intended to allow different bodies of expertise - in this case, the project planners - to be drawn into joint decision making. In the case of ground-based rat eradication projects there are operational 'red lines' which must be met for the project to meet best practice standards and these must be communicated to island residents. However, within these red lines there are many ways in which the project could proceed and issues on which the communities can voice their preferences. Island communities are all different and results from one island cannot be transferred directly to another. Co-design workshops enable this specificity to be achieved, enhancing project efficacy while recognising communities as an essential project partner.

131 The history of invasive species management and the conservation future of Lehua Island, Hawai'i

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Pacific rats (*Rattus exulans*) were introduced to Lehua Island as early as the 1300s, and European rabbits (*Oryctolagus cuniculus*) in the 1800s, triggering a cascade of ecological degradation, such as predation of native plants, birds, degradation of archeological sites, and soil erosion into the nearshore coral reef ecosystem. These introductions led to the extirpation of breeding populations of marine birds, notably the threatened Newell's Shearwater. The successful eradication of rabbits in 2006, coupled with the invaluable lessons learned from the failed rat eradication attempt in 2009, sustained crucial momentum and interest in eradicating rats, leading to an updated implementation strategy. With a primary focus on partnership and collaborative planning, actively involving representation from Ni'ihau Island, and strong state level leadership resilience, the project was successfully implemented from 2017-2019, utilizing aerial, supplemental hand-broadcast, and enclosed bait stations containing 50 ppm diphacinone, a first-generation anticoagulant rodenticide. Independent monitoring was undertaken to assess the movement of rodenticide into the food web, particularly the marine ecosystem, recognizing the intense public interest in the potential non-target environmental outcomes of the project. Today, Lehua supports a vibrant ecosystem including 17 seabird species and 25 native plant species, 14 of which are endemic to Hawai'i; active native plant restoration and seabird social attraction projects are ongoing to accelerate restoration. This remote and culturally significant island is unique in the Hawaiian archipelago due to its elevation, 213 m, and is now virtually predator-free. However, the island still has threats from invasive plants, Barn Owls, and Cattle Egrets. The successful eradication of rabbits and rats from Lehua has been a profound demonstration of the positive impact invasive species eradication can have on restoring ecological balance in

Hawai'i and catalyzing future conservation action, including motivating the planning for the eradication of introduced rodents on other islands in the archipelago.

133 Analysing a New Zealand invasion database to assess the risk of incursions, and initial detection methods for rats mice and stoats.

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Invasive mammals have been the focus of eradication efforts for many decades in New Zealand. Many islands in New Zealand are now pest-free but numerous incursions or suspected incursions have occurred, with some no longer pest free with the re-establishment of invasive mammals. Invasion analysis for islands should receive regular review, to assess resourcing levels and strategies for island biosecurity and to inform feasibility of planned eradications. This is particularly relevant as more inhabited islands are considered for eradication. The NZ Department of Conservation (DOC) has been maintaining an incursion database with information from DOC islands and some non-DOC islands. The information is imperfect. However, it does provide insights for the relevant levels of risk. Analysis of island incursion data for rats, mice and stoats is presented to consider factors leading to invasion. We also investigate the initial detection tools that detected the rats, mice or stoats.

134 Evaluating bait uptake and exposure in tidally inundated habitats during atoll-wide rat eradication planning

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Planning for the eradication of invasive rats (*Rattus rattus*) from Aldabra Atoll, a UNESCO World Heritage Site and globally important biodiversity hotspot in Seychelles, presents exceptional ecological and operational challenges. One of the most significant is the presence of tidally inundated habitats—mangroves and tidal pools—where conventional baiting techniques may be compromised by fluctuating water levels. As part of a multi-year eradication feasibility study, we designed and implemented trials to assess bait uptake and exposure across Aldabra's key habitat types, with a particular focus on mangroves and tidal zones. Non-toxic biomarked bait bolas were deployed at a standard 20 kg/ha rate across experimental grids. Two baiting strategies were trialled: canopy-only and combined canopy/ground applications, simulating the outcome of an aerial bait broadcast. Rat exposure was assessed through biomarker detection in trapped individuals, while bait availability and palatability were monitored over time. Non-target species interactions and tidal influences were also recorded. Both tested baiting strategies demonstrated excellent rat exposure, and rates were consistent with those required for successful eradication. Bait coverage and gaps remained within acceptable thresholds. Bait also persisted in the environment for a minimum of 4 nights, even under challenging tidal conditions. Combined ground and canopy baiting proved particularly effective in enhancing coverage without compromising bait longevity. Interactions with non-target species were relatively limited and appeared manageable. This study provides a critical evidence base to inform the design of a full-scale eradication operation on one of the world's largest tropical atolls. The approach adopted on Aldabra offers valuable lessons for eradication planning in similarly complex tropical and tidally influenced systems, where high biodiversity value meets operational constraints.

135 Managing marine pests – transforming marine pest control science for the 21st century

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Cawthron Institute

Marine pest control science is relatively embryonic, and efforts typically default to overly labour-intensive manual removal methods. As a result, marine pest eradication and management campaigns usually fail. There are, however, a handful of successful examples where well-conceived strategies and tactics have been supported by control tools that work at the required scales. One such example was the use of allée effects to define density-based criteria to successfully eradicate the brown mussel (*Perna perna*) by repeatedly dredging a 12.6 ha area of Tasman Bay during 2010. This demonstrates that marine pest eradication is achievable, and concerted innovation and collaboration can transform the field so that success becomes the norm rather than the exception. The virtuous cycle of success that has been achieved for some terrestrial biosecurity contexts, such as terrestrial island eradication, can be replicated in marine systems. The development of successful terrestrial island eradication provides direct inspiration for marine eradication, as well as technical approaches to adapt to fast-track progress. Our recently funded MBIE Endeavour Research Programme aims to transform capacity to eradicate and manage marine pests. This will be achieved by developing marine pest control systems comprising goal setting frameworks, eradication and management strategies, spatial and temporal tactics, and control technologies. Work packages include: Social science to derive marine pest eradication goals and establish adaptive governance frameworks; Ecological modelling to inform strategies to drive marine pest decline across seascapes; Population and hydrodynamic modelling to direct optimal allocation of finite resources; Innovation for new marine pest control tools, spanning novel chemistry to genetic engineering; Operational validation ahead of time to promote operational and decision-making readiness to act. This talk will outline our approach to generate new impetus and a concerted effort to overcome barriers that have stifled marine pest control performance outcomes to date.

136 Cat eradication on Socorro Island, Revillagigedo Archipelago, Mexico: Current status, challenges, and achievements

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Socorro Island is part of the Revillagigedo Archipelago—a UNESCO's World Heritage Site—, located in the Pacific Ocean, ca. 460 km southwest of the Baja California Peninsula, Mexico. It is the largest island in the archipelago at 132 km² and an elevation of 1,130 meters. The island's current main threat to biodiversity is the presence of the feral cat (*Felis catus*), introduced in 1957. This invasive predator is responsible for the in situ extinction of the endemic Socorro Dove (*Zenaida graysoni*) and poses an ongoing threat to the Socorro blue lizard (*Urosaurus auriculatus*), Townsend's shearwater (*Puffinus auricularis*), and several other endemic bird and arthropod species. Following the successful eradication of feral sheep (*Ovis aries*) in 2012, cat eradication efforts began in 2014. As of mid-2025, a total of 906 cats have been removed, with a cumulative trapping effort of 787,356 trap-nights. The main challenges to completing the eradication include trapping in remote areas, maintaining year-round coverage across the island to maximize detection and capture probability, and overcoming logistical obstacles such as hurricane season, dense vegetation (a remarkable outcome after sheep removal), rugged terrain, and the presence of native land crabs that interfere with trapping. Notable achievements include securing sustained funding, eliminating cats from the central, southern, and eastern areas of the island, establishing remote field camps, testing and optimizing traps, attractants, and baits, deploying continuous camera trap monitoring, and being able to fence trapping zones to keep them cat-free. Signs of ecosystem recovery are already evident in the endemic vertebrate populations. With current efforts, eradication is estimated to be completed by the summer of 2026, making Socorro the largest Mexican island to be cleared of invasive cats and the largest successful operation globally without the use of toxic baits.

137 Predators, people and power: Exploring social dynamics in landscape-scale predator eradication in inhabited areas.

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To realise predator free visions at scale in inhabited areas, significant funding has been directed at landscape-scale projects to eradicate invasive predators. In inhabited locations, eradications should be viewed as complex socio-environmental issues as there are multiple stakeholders with diverse perspectives on the problem, target species and eradication methods. Project teams with expertise predominately focused on managing biological dimensions, risk underestimating the social dimensions of working in communities. This paper presents research which explored the social dynamics in three landscape-scale eradication projects in inhabited areas in New Zealand and Australia to give insight to the way existing community predator control groups and communities engage in projects. Through interviews with a range of stakeholders, observations and document analysis, the research examined project power dynamics to understand who has influence, how decisions are made, and how and where resources are allocated. As there is no blueprint for undertaking predator eradication in inhabited locations, the research unsurprisingly found different approaches to community engagement. These were, a relational approach; a partnership approach; and a consultative approach. The paper explores what drove these differences and their effects on community engagement. To support effective collaborations with communities the paper outlines the organisational mindset that is needed for engaging with communities in landscape-scale projects. This focuses on a values-based approach that seeks to build social and cultural capital by empowering people and fostering enabling processes. The research contends that invasive species management needs to be more critically reflexive around how communities are engaged, to make visible social and power dynamics. This includes identifying both the positive consequences of these new collaborations but also the unintended negative consequences that disable engagement. Critical reflection is needed if we are to optimise predator eradication and control efforts in inhabited areas and importantly, sustain the gains achieved so far.

138 Hawaii's invasive rose-ringed parakeet problem: >10,000 more birds in the last seven years despite multi-year culling

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The rose-ringed parakeet (RRP), (*Psittacula krameri*), is the world's most successful introduced parrot, and

it is now established in over 40 countries. The Hawaiian Islands have the largest population of RRP in the Pacific. While ephemeral populations have been reported on Maui and Hawai'i islands, O'ahu and Kaua'i are the only two islands with sustained RRP populations. On these two islands, RRP cause economic losses to the agricultural and tourism industries. After humans released them into the wild in the 1930s on O'ahu and 1960s on Kaua'i, and after a 30+ year lag period, the RRP population has increased exponentially since the late 2000s. In 2018, our RRP population estimates were 4560 on O'ahu and 6801 on Kaua'i. In 2025, we repeated RRP population surveys on O'ahu and Kaua'i islands using the same methodology as our previous surveys. While the O'ahu RRP population was estimated at 6577 in 2025, which is an increase of ~2,000 birds in 7 years, the Kaua'i population was estimated at 16,421 birds in 2025, which is an increase of ~9,500 birds in 7 years and spanned a period in 2020 when 4400 (confirmed) to 6300 RRP were lethally removed and more recent lethal removals (2024-2025) of >2,000 birds. Almost all lethal removals have been from hired contractors that shoot birds at their nighttime roost. There have been no organized culling efforts for the O'ahu population of RRP. We discuss possibilities of why the Kaua'i population has grown so much more than the O'ahu population, and outline some population control techniques previously attempted and proposed for the future. The likelihood of complete RRP eradication from either island is uncertain. Island societies should prevent new introductions of the RRP to ensure natural resources and island economies are protected from this highly successful invasive bird.

140 Eradication of invasive mammals on three tropical dry islands from the Marías Archipelago, Mexico.

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The Marías archipelago composed of four islands: María Madre, María Magdalena, María Cleofas, and San Juanito, is a key refuge for the biodiversity of the Mexican dry tropics, home to over 460 native and 28 endemic species of flora and fauna. The establishment of a Penitentiary Center in 1905 led to the introduction of invasive fauna—black rats, cats, goats, pigs, and cows—which have severely impacted the island's ecosystems for over a century. In 2016, following several studies documenting these impacts, eradication efforts of goats and cats began on María Cleofas. Progress was partial due to restrictions associated with prison operations. Following the closure of the Penitentiary Center in 2019, access to the Islas Marías was facilitated, enabling significant progress in invasive species management. By 2025, eradication on María Cleofas Island was completed using a combination of netting, corrals, live-extraction, trapping, and hunting. On María Magdalena, eradication efforts for cats, goats, and deer were initiated. Simultaneously, progress was made in controlling cats and livestock in inhabited areas of María Madre, the biggest and inhabited island. Recent monitoring conducted in parallel with the absence confirmation phase on María Cleofas indicates an encouraging recovery: the understory is regenerating, and several reptile and bird species are more abundant. Since María Madre has become a government-operated tourist destination, in collaboration with the National Commission of Protected Natural Areas, an island biosecurity protocol was developed, and various measures are implemented systematically to prevent future introductions of invasive species. The goal is to remove invasive mammals (except black rats) from María Magdalena and María Madre by 2030.

142 Optimising island surveillance and control using new AI technologies.

Helen Blackie
Critter Solutions

Over the last few years, we have been developing and integrating the latest technological advancements into island biosecurity and conservation work. Harnessing the power of machine learning and remote sensing technology has allowed the Critter Solutions team to develop smarter, more efficient surveillance and control solutions. These new tools maximise efficacy while minimising costs and labour required to maintain control and monitoring networks. Recent work has included developing novel resetting traps which use 'edge' AI to identify target species (whilst not triggering on natives), as well as cost-effective thermal cameras with real-time notifications and AI capabilities. Other tools include the development of real-time detection devices for smaller, more cryptic species such as lizards and small mammals. These technologies are coupled with highly attractive lures and advanced communications networks. The tools have now been successfully deployed for a variety of island conservation and eradication scenarios, allowing users to work smarter, not harder. Devices can be monitored remotely, control is target-specific and safe, and AI technology makes decisions for us (even in remote environments). This presentation will outline these new tools and recent use case scenarios.

143 Integrated invasive grazer eradication and ecosystem restoration in Washington Slagbaai Park, Bonaire, Dutch Caribbean.

Paulo Roberto Kelling Bertuol, Roxanne-Liana Francisca, Caren Eckrich, Jason Francisca
Stinapa Bonaire

Overgrazing by free-roaming goats, donkeys, and pigs is a critical threat to the tropical forests of many SIDS, including those of the Dutch Caribbean Islands. To address this, and as part of the Nature and Environmental Policy Plan (NEPP), STINAPA Bonaire with funds from the local and national government, initiated a phased eradication project known as 'Proyekto Parke Bunita', targeting the southern half of Washington Slagbaai Park (1,846 ha), which was subdivided into seven fenced, isolated, management areas. Since 2020, more than 6,000 goats have been removed using a combination of funnel traps, traditional techniques, and ground shooting. To date, three isolated areas have been effectively cleared of invasive grazers, with 125, 426 and 885 goats removed from areas 1,2 and 3 respectively. This phased approach reduces the risk of reintroductions, builds-in flexibility in terms of methods used and areas of focus based on the available information, and reduces the time and costs associated with confirming eradication success. As 73% of the goats are captured alive and used for food and husbandry outside the park, the project fostered strong community involvement, generating local employment and opportunities for volunteers. This inclusive model improves acceptance within the local community, which for many years has been the main challenge to successfully implementing similar projects in the park. To monitor ecosystem recovery, a dry forest monitoring program was implemented to track vegetation recovery. Catch per unit effort data are monitored and distance sampling data are analyzed to estimate the size of remaining grazer populations. Combined, this knowledge is used to improve eradication methodologies. Capture strategies are continuously refined to enhance long-term restoration outcomes. This provides a replicable framework for invasive species eradication and ecosystem recovery outside of the park to achieve NEPP objectives as well as in other islands and territories.

145 Rodent eradication on Floreana Island: lessons learned from the first attempt

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In October 2023, Floreana Island (17,253 ha), with a resident population of approximately 150 people, a multi-species eradication was attempted for invasive rodents (*Rattus rattus* and *Mus musculus*) and feral cats (*Felis catus*). This was the first of its kind on an inhabited island in the Galápagos Archipelago. The presence of a permanent human population, substantial agricultural zones, diverse habitat types, and consistent alternative food sources, means the operation can be considered as one of the most complex eradication efforts attempted globally. With these known challenges, three aerial applications of Conservation 25D brodifacoum baits were spread across the island, adhering to or exceeding best practice recommendations for tropical island eradications with higher than standard sowing rates and extensive swath overlap. In parallel, para-aminopropiophenone (PAPP) in sausage baits were used to target feral cats followed by trapping and targeted baiting. Timing of the operation was carefully considered with awareness of the potential effects of El Niño and other operations risks discussed and accepted amongst the partnership. Following the final bait drop in November 2023, camera trap networks, drone surveys, detection dogs, and a trap and bait station network was used for surveillance. Survival of cats was higher than anticipated and continue to be systematically removed. Mice were subsequently detected in April 2024, and rats in August 2024. Despite comprehensive planning and bait coverage and having high confidence that all rodents had access to toxic bait, repeated detections via camera traps indicate the eradication objective was not achieved at multiple points. Here, we describe the methods and assess the outcomes of the first Floreana Island eradication attempt and discuss potential factors contributing to the less than expected efficacy. We then provide recommendations to integrate the lessons learned to continue the cat eradication process and a subsequent rodent eradication attempt.

146 Lehua Seabird Sanctuary: Approaching restoration post rat eradication on a remote Hawaiian Island

Marcela Brimhall
Kauai Division of Forestry and Wildlife, University of Hawaii - Pacific Cooperative Studies Unit

With the arrival of Western culture, the ownership of Lehua and the health of the island has changed many times due to a variety of reasons. This presentation will focus on restoration goals in a post Polynesian rat (*Rattus exulans*) eradication from the island. Since this eradication in 2021, the State has been using remote sensing

and other technologies to identify diversity, abundance and location of migratory seabird populations on the island. These data from these technologies will also be used to develop suppression efforts for invasive plants and restoration of native plant communities on this remote and soil depleted island. This data may also be used to develop restoration plans for the 109 archeological sites across the island. The State is also interested in migratory seabird population's guano impacts to the coral reef and marine fauna around the island. We hope to use this technology and others, to monitor the changes in the nearshore marine coral, fish and megafauna diversity and abundance associated with Lehua. This presentation will describe innovative uses of existing and new technologies to inform current and future land management decisions for the Lehua Seabird Sanctuary.

147 Building momentum: Technical advances and planning implications for Maukahuka – pest free Auckland Island

Stephen Horn, Finlay Cox, Rachael Sagar, Veronika Frank, Em Oyston, Jennifer Long
Department of Conservation,

Large or complex island eradication projects can take years to plan and initiate and often exist in a state of uncertainty until funded. Over time shifts in economic conditions, technology, and social licence can affect project feasibility and demand adaption. This has been the case for the Maukahuka Auckland Island Restoration Project, which aims to remove pigs (*Sus scrofa*), mice (*Mus musculus*) and feral cats (*Felis catus*) from New Zealand's largest subantarctic island; the only one remaining in the region with introduced mammalian pests. A feasibility study conducted between 2017 – 2020 confirmed eradication was achievable but highlighted significant logistical, technical, and organisational dependencies. The project was paused in 2020 due to the impacts of COVID-19. Following this hiatus, planning issues and dependencies identified in the feasibility study have been used to target investment in the highest priority tool development and information gaps. Advances include development of an aerially applied meat bait for feral cats, remotely reporting camera networks using AI and satellite communications to enhance detection and accelerate response, and evaluation of HOGGONE® pig bait as a knockdown tool. Other considerations are the lessons and risks highlighted from recent rodent eradication failures. These innovations are reshaping operational design and providing greater confidence in the likelihood of achieving eradication. They offer opportunities to streamline delivery timeframes, reduce resource needs and optimise the scale of supporting infrastructure, all contributing to simplifying project delivery. Critically the project continues to be guided by eradication best practice. Pressure to fast-track progress or deviate from the guidance derived from the feasibility phase risks undermining long-term success. Although Maukahuka is not yet funded, it remains a nationally important goal and momentum is again building. With appropriate investment, the project can deliver success on Auckland Island and strengthen predator eradication capability across New Zealand.

148 Managing rat re-emergence at scale: Learnings from predator free South Westland

Ana Menzies, Phil Bell
Zero Invasive Predators

Predator Free South Westland is an ambitious five-year project to eliminate rats, possums, and stoats from 114,000 hectares in the South Island of Aotearoa New Zealand. Zero Invasive Predators (ZIP) has been leading the research, development, and implementation of this project since its inception in 2021. This project is underpinned by a 'remove and protect' model; target predators are removed in a block-by-block fashion, and the boundaries protected from reinvasion. The overall boundaries of the project area are defined by big, fast-flowing rivers, alpine mountain ranges, and the ocean, because these natural barriers slow incursion by target predators. Here, focusing on ship rats, we speak to learnings on how constant surveillance and response readiness enables a project of this scale to be managed to protect a predator free core area. Across the project area, rat incursion and emergent populations are detected using a surveillance system of auto-reporting cameras and traps. Rat detections are managed using small, targeted aerial 1080 operations along geographic boundaries and 'flank' areas. Ground-based responses are used in areas where aerial tools are not suitable, such as townships and farmland. These techniques have been refined using models of rat breeding and movement, innovation in auto reporting camera technology, and an adaptive management approach whereby reemergence is not failure and is recoverable through scaled interventions. Our experiences shed light on how the traditional aerial-based model of eradications can be modified to manage reinvasion and survivorship quickly and effectively to achieve predator freedom at scale.

150 Advancing tools and treatments for marine pest management and eradication

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Pest management and eradication have long histories but are unevenly applied among systems. Marine applications are lagging behind precedents set in terrestrial and freshwater systems. There have been just eight successful marine eradications reported in the literature and several other efforts with mixed success towards achieving pest management goals. A key barrier to success is a lack of effective tools for marine pest management. Here, we examine the range of tools and treatments that have been deployed to date (or are emerging) in marine habitats ranging across physical, chemical, and biological treatments. We assess different approaches in terms of efficacy, quality control, and scalability, including emerging tools recently undergoing trials in New Zealand. Developing marine pest treatments that are ready to apply at the hectare scale in marina, port, or natural coastal environments would represent a step-change in capability and allow biosecurity practitioners to effectively eradicate invasive marine incursions. Such approaches can be developed to control for non-target effects or weigh any potential for collateral damage against positive and long-lasting benefits of effective pest management.

153 Rodent eradications on sub-Antarctic Islands: The response of invertebrate communities to single species and multiple species eradications

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Eradication programs have increased in number, scale and success, yet conservation benefits are rarely quantified for small and cryptic species such as invertebrates. Rodents have had significant impacts on invertebrate species globally, particularly on islands. Monitoring changes in invertebrate communities can provide insights into ecosystem response to management actions. We utilised existing datasets, some dating back to the 1970s, to investigate invertebrate recovery. We revisited previous sites, repeated survey methods and innovated new sampling methods to ensure greater representation of the ecosystem. House mice (*Mus musculus*) have invaded islands globally and are a major predator of invertebrates. Mice were eradicated from sub-Antarctic Antipodes Island and Macquarie Island in 2016 and 2014, respectively. We undertook pre- and post- eradication macro-invertebrate surveys on both islands to assess changes in invertebrate richness, diversity, and abundance. On Antipodes Island, where mice were the sole invasive mammal, overall diversity and abundance of invertebrates preyed upon by mice increased significantly. Positive responses within invertebrate communities on Macquarie Island were more variable following mouse eradication, since the concurrently eradicated invasive rabbits (*Oryctolagus cuniculus*) and ship rats (*Rattus rattus*) had transformed invertebrate habitat, with legacy impacts persisting beyond their eradication. Mouse eradications on islands benefit invertebrate conservation. However, restoration of invertebrate communities may take longer to be realised when multiple invasive mammals are eradicated, especially where non-native invertebrate species have also benefited.

154 Persistent seedbanks: Challenges in restoring ecosystem resilience through non-native plant management in South Georgia

Finbar Grealish, Kelvin Floyd, Bradley Myer
Indigena Biosecurity International

South Georgia is a remote sub-Antarctic island of approximately 3755 km². It harbours a unique and fragile terrestrial ecosystem characterized by its cold maritime climate, glacial landscapes, and limited ice-free habitat, with just 8% of land able to support vascular plant life. The island's ecological integrity has been significantly impacted by over a century of industrial exploitation, during which a suite of non-native plant and animal species became established. Former industrial sites leave a persistent legacy of non-native plant populations, many now expanding into adjacent catchments. The removal of reindeer in 2015, a major herbivore on the island, shifted vegetation dynamics—promoting native species regeneration but also removing browsing pressure on non-native species, facilitating their rapid spread into surrounding catchments. As a result, non-native plants are outcompeting native flora in places, threatening keystone species vital to South Georgia's ecological resilience. This project aimed to design and implement a non-native plant management strategy to dove-tail with the eradication of rats and reindeer. The strategy follows established management frameworks, incorporating pathway prevention, early detection and rapid response, targeted eradication, and adaptive monitoring. Historically, 84 non-native plant species have been recorded on South Georgia. At project inception in 2015, 40 species were known to be present. Monitoring has since identified 11 more, while 8 have been eradicated, bringing the current suite of actively managed species to 43. Forecasting predicts the likely eradication of 11

additional species within the next two management seasons. While control is generally effective, challenges remain with long-lived seedbanks and detecting inconspicuous species. New technologies, such as drone herbicide application, are being trialled to overcome logistical barriers. The project emphasizes that persistent, timely action, accurate record-keeping, and adaptive management are imperative to achieve success in a non-native plant management project which aims to support native habitat restoration.

155 Empowering island biosecurity and eradication efforts through technology

Simon Croft
Encounter Solutions Ltd

Island eradication efforts face particularly acute challenges including dense vegetation, limited logistics, and variable connectivity, alongside the need for sustained post-eradication surveillance. Wireless sensor networks offer effective solutions through real-time monitoring, low-power operation, and modular scalability. These systems can significantly reduce the demand for human resourcing by enabling automated feedback from traps, cameras, acoustic recorders, and environmental sensors. Insights from several island-based projects demonstrate the effectiveness of sensor network technology in supporting early incursion detection, improving animal welfare outcomes, and enabling efficient trapping programmes in topographically complex and heavily vegetated environments. These projects also highlight how coupling technology with social inclusion can foster more resilient and adaptive management strategies. Novel contributions presented in this paper include advances grouped across three themes. Adaptability: networks have been adapted for tree-mounted deployment and reconfigured into lightweight, customisable setups that can be tailored to island conditions. These include customisable antennas and mast configurations that can be cut to size and hoisted into trees, and interchangeable power options where the same equipment can operate either on battery in shaded areas or on solar panels in locations with more sunlight. A high-power amplifier has also been developed to extend range through dense forest canopies and relatively flat atolls. Resilience: recent island projects demonstrate cross-support between neighbouring island and mainland networks, and multi-backhaul systems (multi-cellular/multi-satellite/Wi-Fi) with automatic failover providing continuity during seasonal network congestion or operator outages. Operational logistics: the addition of mobile GPS-enabled nodes has broadened system value, providing staff safety monitoring features and streamlining trapping. Together, these advances illustrate how robust, field-tested wireless networks, integrated with adaptive configurations and resilient communication strategies, have demonstrably moved beyond pilot applications, with multi-island deployments providing evidence of impact. They provide practical pathways for reducing costs, strengthening collaboration, and enhancing the reliability of island biosecurity and eradication systems.

158 Tackling novel challenges in a landmark tropical island eradication

April Burt, Frauke Fleischer-Dogley, David Ringler, Martin Cagnato, Christina Quanz, Annabelle Constance, Veronique Banane, Araceli Samaniego, Grant Harper, Nancy Bunbury
Seychelles Islands Foundation

Aldabra Atoll, a UNESCO World Heritage Site and one of the most significant biodiversity hotspots in the Western Indian Ocean, supports globally important populations of giant tortoises, marine turtles, seabirds, and the endemic flightless rail. Its coral reefs, seagrass beds, and extensive mangrove forests provide critical blue carbon habitats, with the latter representing the largest blue carbon sink in Seychelles. Inland wetlands form a critical component of the atoll's ecological networks, sustaining complex and interconnected food webs. Despite decades of protection, invasive rats and cats continue to cause severe ecological degradation. Their eradication has been identified as the single most important conservation action for the atoll. With robust biosecurity now in place, the Seychelles Islands Foundation is preparing to launch one of the world's largest and most ambitious tropical island invasive mammal eradications —tackling a uniquely challenging set of conditions. Tropical islands such as Aldabra present eradication challenges rarely encountered in temperate regions: year-round rodent breeding, plentiful natural food sources, bait competition from non-target species, hazardous terrain, dense vegetation, and high endemic biodiversity. Aldabra introduces additional complexity with its vast, tidally inundated mangrove forests and inland wetlands—ecosystems that have rarely been targeted in previous eradications, especially not on the scale at which they are found on Aldabra. Aldabra's complexity demands innovation, including aerial and canopy baiting in mangroves, managing open wetland systems, and careful mitigation of risks to non-target species. This study is the first to systematically identify, and propose solutions to Aldabra's combined ecological and logistical challenges. By integrating these insights, we aim to maximize the chances of a successful eradication—safeguarding one of the planet's most exceptional ecosystems. In doing so, Aldabra will serve as a model for other large tropical island eradications and unlock tropical island restoration –

a powerful nature-based solution to climate change.

159 Manual control methods effectively reduce persistent yellow crazy ant invasion in Seychelles native palm forest

Lorraine Cook[1,2], Jessica Constance[2], Annabelle Constance[2], Constance Tragett[2], Luke A'Bear[2], Irma Dubois[2], Lee-Roy Estrale[2], Monica Griffith[2], Shanone Hibonne[2], Aurelie Hector[2], Marc Jean-Baptiste[2], Jake Letori[2], Andrew Meriton[2], Maria Monthy[2], Emmanuel Morel[2], Terence Payet[2], Gerry Rose[2], Brian Souyana[2], Jean d'Arc Suzette[2], Frauke Fleischer-Dogley[2], Nancy Bunbury[2]
[1]Horizons Regional Council, [2]Seychelles Islands Foundation

In 2009, invasive yellow crazy ants (*Anoplolepis gracilipes*) were first detected in the Vallée de Mai, an endemic palm forest and UNESCO World Heritage Site in Seychelles. Subsequent monitoring showed a steady increase in distribution and abundance of the ants until 2018 when they covered the 20ha site and were severely impacting native fauna, particularly invertebrates and herpetofauna, through predation. This necessitated targeted control of yellow crazy ants that was fast acting, inexpensive and avoided non-target impacts. A control programme began in 2019 with the aim of reducing yellow crazy ants in the Vallée de Mai to allow recovery of native fauna and reduce reinvasion from surrounding areas. The control consisted of manual distribution of fipronil baits by hand and in bait stations across the Vallée de Mai and subsequently expanded into adjacent palm forest. After five years, the project has been successful in reducing yellow crazy ant numbers by 95% or more across the treated areas, with a reduction of an average 294 yellow crazy ants per survey point prior to treatment to eight, using an average baiting rate of 5.1kg/ha of fipronil. One major challenge is the location of the Vallée de Mai on the large island of Praslin, which is thoroughly invaded by yellow crazy ants, meaning certain reinvasion from surrounding areas. Other challenges include steep terrain, dense canopy with thick, multi-layered palm leaf litter, a tropical climate with high rainfall, an extremely sensitive environment, and limited resources. In this presentation, we will show the initial pattern of spread of yellow crazy ants across the Vallée de Mai, describe the approach taken and control methods used, and demonstrate the effects of this on the yellow crazy ant population. We will also discuss lessons learned, challenges, and future prospects for the project.

160 Predator free Rakiura: not your typical island eradication

Phil Bell, Ana Menzies, Courtney Hamblin
Zero Invasive Predators (ZIP)

Predator Free Rakiura is the most ambitious island eradication ever attempted in Aotearoa New Zealand. Zero Invasive Predators (ZIP), with support from the Department of Conservation (DOC) and national and international philanthropy, are leading the development and implementation of this project. The pathway to a Predator Free Rakiura is not fully known – no one has operated at these scales or complexities before. ZIP is taking its 'learn by doing' approach to shaping the operational and R&D programmes of work, an approach to determining feasibility that often differs from tradition. Here, we describe how this approach is helping to solve technical challenges, including how to simultaneously eradicate three rat species with aerial toxins while navigating social and economic imperatives such as ensuring the continuation of a healthy fishing industry. Through listening to concerns and building projects to answer questions, we are charting the way towards a thriving Predator Free Rakiura for the local community and our valued wildlife that call this place home.

163 Defending zero density at Rotokare - Maintaining one of the largest essentially mouse-free spaces in mainland Aotearoa.

Fiona Gordon
Rotokare Scenic Reserve Trust

The fenced sanctuary movement in Aotearoa has led to significant gains in mainland species management. This has also allowed for greater community engagement, involving the general public in the recovery of some of Aotearoa's most vulnerable and pest sensitive species, which previously could only persist in remote and restricted spaces. The accessibility of these sanctuary spaces makes them vulnerable to reinvasion, particularly with smaller insidious pest species such as mice. While generally seen as a lesser threat, mice in high densities, and in the absence of other pest species, can have a profound impact on ecosystem health. Since the construction of its pest proof fence in 2008, the Rotokare Scenic Reserve Trust has managed to consistently maintain the 230ha sanctuary to zero densities for mice. Mice can be challenging to control and successfully eradicate once a breeding population is present. Though seasonal reinvasion occurs at Rotokare in Autumn, the Trust has been able to swiftly detect and remove invading mice, at a point where is it feasible to target and chase individuals.

Robust surveillance, targeted intensive trapping, and significant community support have been key factors in preventing reestablishment of mice. Using this approach, mice are typically maintained at below detectible levels from June-February. In three seasons, larger outbreaks have occurred. Using systematic monitoring, and targeted toxin pulses, the site has been returned to zero density on each occasion. Focused effort at high risk times has helped to prevent further outbreaks, with certain triggers (such as activity in forested areas) initiating more robust response measures. This was used to good effect in 2024, where early deployment of a broad response prevented a more serious outbreak. The Trust is continually adapting management practices to keep the site mouse free, for the benefit of the vulnerable taonga species it is home to.

164 Eradication success of ring-necked parakeets in Seychelles: Ecological insights, public engagement and lessons learned

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The ring-necked parakeet (*Psittacula krameri*), introduced to Mahé in the 1980s, posed a serious threat to Seychelles' endemic black parrot through competition and disease risk. In response, the Seychelles Islands Foundation led a national eradication campaign (2011–2019), during which systematic ecological monitoring of the species was combined with targeted shooting on flight paths and feeding areas. The eradication techniques developed led to the first successful large-scale eradication of the ring-necked parakeet in the world. This paper focuses on the ecological aspects of the operation based on data collected across all phases of the programme from all 547 birds, including roost counts, capture records, dissections, dietary analysis, and field observations. We present results on population size and dynamics, diet and behavioural ecology of the ring-necked parakeet. We also discuss eradication challenges and how these were resolved, including the size, terrain and high human population of Mahé, public perceptions of the eradication, the failure of several early capture methods, the high intelligence of the target species and the dispersal of ring-necked parakeets from Mahé to other islands. These data form a rare and valuable ecological dataset from the entire introduced population of ring-necked parakeets in Seychelles, capturing both the species' biology and its response to sustained control pressure. The paper offers insights from a successful large-scale parakeet eradication and provides practical guidance for controlling invasive psittacines.

165 Monitoring for monitoring's sake? Addressing knowledge gaps for island ecosystems to unravel the complexities of invasive mammal impacts

Nancy Bunbury, Alice Armand, Simon Watkins, Annabelle Constance, April Burt
Seychelles Islands Foundation

Tropical islands, rich in biodiversity and endemic species, have suffered disproportionately from invasive alien species (IAS), particularly from the black rat (*Rattus rattus*). While more than 500 successful rat eradications have been conducted globally, the ecological impacts of these interventions remain underexplored, especially in the tropics. Pre-eradication monitoring, where feasible, often lacks seasonal, multi-year, and ecosystem coverage due to logistical difficulties and costs. We evaluate the current state of pre- and post-eradication monitoring of ecosystem components on tropical islands to inform planning for the forthcoming large-scale rat and cat eradication on Aldabra Atoll, Seychelles. Drawing from published studies, grey literature and communications with practitioners, we identified substantial gaps in pre- and post-eradication ecological monitoring, particularly for ecosystem processes and functions. Monitoring to date has predominantly focused on birds and reptiles, with limited attention to vegetation dynamics, invertebrates (including land crabs), bats, marine ecosystems, rates of change, energy fluxes, and nutrient profiling and transfer across the land-sea interface. This lack of comprehensive and standardised monitoring hinders our understanding of the broad benefits and impacts of eradication efforts. Aldabra, due to its ecological status, long research history, and eradication plans, presents a unique opportunity to address some of these gaps. Following a systematic review of Aldabra's previous long-term monitoring programme, we developed new monitoring protocols to collect pre-eradication data spanning several years to address these knowledge gaps. We argue that integrating ecosystem-wide monitoring into eradication planning is not only feasible but essential for demonstrating the broader benefits of IAS removal, such as enhancing natural climate change resilience. Improved understanding of these benefits will justify further investment in scaling up invasive species interventions. Using Aldabra as an example, we provide recommendations to address monitoring gaps and structure monitoring and research programmes, to advance restoration science across tropical islands globally.

166 Bait preference in Pacific rats: learning from a field trial with unexpected variables

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Field research continues on Henderson Island, South Pacific following a failed Pacific Rat (*Rattus exulans*) eradication attempt in 2011. The type of bait to be used in a second attempt is one of the key questions being addressed. In June-July 2024, we compared the palatability of four non-toxic bait types to Pacific Rats: three Orillion formulations (Pestoff 20R 'standard', 'coconut lure', and 'high protein') and Bell Laboratories' Conservation 25. All were intended to be Bitrex (bittering agent)-free, and were presented overnight at 109 locations across the island's main habitats. The amount eaten was recorded the next day and paired with camera trap footage. Unexpectedly, the two globally used products performed markedly differently: Pestoff 20R standard was the consumed more and chosen first more frequently than Bell's Conservation 25. Subsequently it was discovered that Bitrex had been inadvertently added to the Bell Conservation 25 bait resulting in a rare, blind, and serendipitous test of this additive's potential effect on rat bait preference. Since Conservation 25 with no Bitrex was not part of the trial, we cannot conclusively say that Bitrex caused the lower consumption. Still, the pattern supports concerns that Bitrex may reduce palatability, particularly when alternative food is available, and adds to the limited and mixed evidence on the effect of Bitrex on bait palatability in rodents. The trial also provided a first look at new bait formulations (PestOff 20R coconut lure and high protein) in a tropical context. Coconut lure performed as well as the standard Pestoff 20R formulation, suggesting promise for future operational use. An improved repeat of the trial is in planning, but the current results already offer useful operational insights and reinforce the need for further research on how additives influence bait palatability of both target and non-target species.

167 A synthesis of eradication efforts and how they strengthen biosecurity actions in the U.S. Territories

Vanitha Sivarajan
U.S. Department of the Interior

The U.S. Territories are particularly vulnerable to the impacts of invasive species due to their isolation and unique ecological characteristics. Invasive species severely damage food security, economies, ecosystems, and cultures on islands, while compromising broader national security interests. Biosecurity, known as efforts to prevent the arrival and establishment of invasive species, is proven to be, by far, the most cost-effective way to address the harmful impacts of invasive species. The benefits of eradication efforts on islands can be linked to the increased efficacy of biosecurity actions on islands, which in turn can ultimately strengthen the ability of the U.S. Territories to carry out the critical role they play in national security. One example is the continued funding and technical assistance that the Department of the Interior's Office of Insular Affairs (OIA), along with the Government of Guam and University of Guam, provides to the Commonwealth of the Northern Mariana Islands in eradication efforts of the coconut rhinoceros beetle (CRB). The eradication efforts of CRB populations helps to prevent the loss of coconut tree populations, which is known as the tree of life in the Pacific region. Healthy coconut tree populations promote livelihoods, economic development, food security, cultural identify, and indigenous perspectives, which are all key for maintaining stable island economies that are necessary for military readiness, biosecurity, and national security objectives. The Department of the Interior's Office of Insular Affairs (OIA) works with other federal agencies, partners, and stakeholders to build the technical expertise and capacity of Territorial governments so that they can prioritize biosecurity actions for their vulnerable island communities. This talk will provide a synthesis of effective strategies led by OIA and Territorial governments in identifying and solving gaps in implementing successful biosecurity actions in the U.S. Territories.

168 Strengthening biosecurity to prevent invasive alien species introduction on Aldabra Atoll

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Invasive alien species (IAS) are amongst the leading factors that degrade island ecosystems, directly impacting native species populations and their habitats. The development and implementation of effective biosecurity measures is now a key conservation action for preserving the ecological integrity of the unique ecosystem of

Aldabra Atoll, a UNESCO World Heritage Site managed by the Seychelles Islands Foundation (SIF). This study outlines the main biosecurity interventions for Aldabra, including the procurement of pest-proof equipment, building and maintenance of capacity within SIF's biosecurity team, and the development of robust prevention, detection and response protocols - through consultations of biosecurity experts – which have been critical for minimising the establishment of IAS populations on Aldabra. The mapping and assessment of every pathway to the atoll, including visiting tourism vessels, has also enabled the identification of biosecurity gaps and areas of concern. Through these robust biosecurity procedures and ongoing improvements over the last 10 years, SIF has become a major contributor to IAS prevention and management within Seychelles, extending its expertise to projects such as the controversial development of the hotel on nearby Assomption island, which is a serious emerging biosecurity threat to Aldabra due to extensive construction and the anticipated increased influx of visitors to the atoll. While SIF exercises high standards of biosecurity, challenges remain that impact Aldabra's ecosystem such as already established invasive mammal populations, the development of Assomption as a tourism hub on the nearby island of Assomption, and the lack of resources to address marine biosecurity threats. This example of Aldabra can be used as a roadmap for other conservation islands implementing biosecurity measures, particularly in Small Island Developing States.

171 Progress in the eradication of feral cats on Guadalupe Island, Mexico

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Guadalupe Island (24,171 ha; 1,298 m high) is in the Mexican Pacific, 260 km off the Baja California Peninsula. A protected area managed by the Mexican federal government, it hosts a unique biodiversity, dominated by plants and birds. The island and its islets are a key breeding site for seabirds. Feral cats (*Felis catus*), introduced to the main island more than 100 years ago, are a serious threat, particularly to the Laysan Albatross (*Phoebastria immutabilis*) and the Guadalupe Murrelet (*Synthliboramphus hypoleucus*). The eradication of feral cats is both a national and a global restoration priority, particularly for the protection and conservation of birds. To protect seabirds from feral cat predation, the first crucial step was the construction, in late 2014, of a 730 m exclusion fence that protects 65 ha. Next, in 2017, with financial support from the National Fish and Wildlife Foundation, Marisla Foundation, and Packard Foundation, we initiated cat eradication, with trapping as the primary method. We have achieved notable progress with >2 million trap-nights and 2,900 cats removed. Yet, many challenges have arisen. The first and most pressing is maintaining year-round coverage across the island to maximize detection and capture probability. To overcome the latter, we are using tools such as a remote surveillance system (i.e., camera-traps combined with AI) and a LoRa surveillance system. Outstanding achievements include the return of seabirds to areas where they were previously extirpated, and a remarkable increase in Laysan albatross numbers, including the establishment of new colonies even beyond the fenced area. With the progress to date and the implementation of the surveillance methods, we expect to complete cat eradication by 2028, making Guadalupe the largest Mexican island to be cleared of invasive cats and the largest successful operation globally without the use of toxic baits.

172 Feral cats, cheap tracking tech and large island: Overcoming field challenges to inform future eradication

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Introduced feral cats (*Felis catus*) are key predators driving the decline or local extinction of native island fauna. On Aldabra Atoll, a large and logistically challenging site in the Indian Ocean, planning for a potential eradication operation requires detailed understanding of cat behaviour, habitat use, and activity patterns to optimise post-rat eradication detection and removal of survivors. As part of the eradication feasibility assessment, we deployed an integrated approach combining GPS tracking using low-cost Spot Trace satellite units with spatially explicit sight-recapture modelling (SECR) from camera trap data. This work was implemented across two 500-ha study grids on Grande Terre, Aldabra's largest island, spanning challenging coastal and inland environments. The field effort required substantial logistical coordination, physical endurance, and real-time adaptation to rugged terrain, high temperatures, and low visibility habitats such as dense Pemphis thickets and mangrove fringes. Captured cats were fitted with Spot Trace devices recording hourly GPS positions over several weeks, while camera trapping allowed for spatial modelling of density, movements and detection

probabilities. The dual data sources provided complementary insights: results identified key habitats and high-use habitats, supporting more efficient design of targeted trapping and hunting response strategies for locating surviving cats after baiting operations. We obtained the first estimate for feral cats on Aldabra of 460-620 individuals. This study demonstrates both the feasibility of using affordable, robust GPS technology and the critical importance of intensive, field-based monitoring to understand the behaviour and habitat selection of cats. Such information is fundamental on large islands like Grande Terre, and, when integrated with the development of sensitive low-density detection tools, constitutes a critical foundation for eradication planning and success.

175 Mexico's approach: Comprehensive island restoration

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For nearly three decades, Mexico has systematically advanced the ecological restoration and protection of its 4110 islands, recognizing their critical importance to national sovereignty, biodiversity, and sustainable development. These islands are biodiversity hotspots, harbouring 8.3% of the nation's vascular plants and terrestrial vertebrates and 4% of its endemic species. They are also home to 360,000 residents whose livelihoods are intrinsically linked to the health of these insular ecosystems. Eradications of invasive mammals have been central to island restoration in Mexico, with 60 populations removed from 39 islands. These efforts have protected 206 endemic species and 227 seabird breeding colonies. In some cases, post-eradication measures, such as vegetation and seabird population restoration, have been crucial for ecosystem recovery. Beyond ecological gains, the program has generated socio-economic benefits and institutional growth, including the National Strategy for the Conservation and Sustainable Development of the Mexican Insular Territory, a National Island Biosecurity Program, the legal protection of all Mexican islands, and the formation of specialized personnel at the highest levels. This long-term effort, along with environmental education, has contributed to the social construction of a conservation and biosecurity culture among island communities and government officials. Led by Grupo de Ecología y Conservación de Islas (GECI) and with Mexico's federal government support, this overarching program was recognized in 2025 as a World Restoration Flagship by the United Nations. Islands are now a priority and part of Mexico's first National Environmental Restoration Program. Future goals include eradicating invasive mammals from remaining islands by 2040 (about 70 eradications on 34 islands. While Mexico's successful approach has attended the country's unique historical, cultural, social, and economic contexts, there might be useful experiences and lessons learnt for other regions and countries.

177 Mapping five invasive plant species in Anguilla with focus on eradicating the tropical bull nettle

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Anguilla is a small tropical United Kingdom Overseas Territory (UKOT) island in the Caribbean. The island is 91 square kilometers and has a few uninhabited satellite cays. Anguilla has a rich ecosystem with a few endemic species, mostly located on the offshore cays. Anguilla's biodiversity is threated by the introduction of various invasive species. In an effort to address this issue, an invasive species prioritization workshop was held in 2020 and the stakeholders ranked and identified various flora and fauna species for eradication. The Department of Natural Resources in collaboration with GB NNSS and Durham University secured funds from Darwin Initiative to specifically focus on mapping the distribution of the top five invasive plant species throughout Anguilla. Here, we focus on mapping the distribution of these five plant species, namely: Yerba Porosa (*Porophyllum ruderale*), False Puncture Vine (*Tribulus cistoides*), Madagascar Rubber Vine (*Cryptostegia madagascariensis*), Brazilian Jasmine (*Jasminum fluminense*) and the Tropical Bull Nettle (*Cnidoscolas urens*). The results showed that that the least spread and most manageable species for management/eradication was the tropical bull nettle, a shrub that is mainly found in tropical climates, and can easily alter ecosystems. It is usually characterized by its very fine hairlike spikes on every component of the plant. These spikes can easily protrude human skin and severely impact individuals once they come in contact with the plant. Based on the surveys conducted, four main sites were found with the invasive tropical bull nettle. These sites were closely monitored, and treated with two herbicides (Garlon 4 Ultra and Round Up Pro Max) in an attempt to control / eradicate the plant. The results indicated that the treatment has been very effective, and with continued use, it is hoped that the tropical bull nettle will be effectively managed or eradicated from Anguilla.

179 Community-led biosecurity drives bird recovery on Antigua and Barbuda's predator-free islands: A Caribbean SIDS model

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Invasive mammals are among the greatest threats to island biodiversity, but local leadership is delivering powerful results. Caribbean Small Island Developing States (SIDS) like Antigua and Barbuda, are especially vulnerable to alien predators. Introduced during European colonization, the black rat (*Rattus rattus*) and small Indian mongoose (*Urva auropunctata*), are among the most damaging, causing widespread biodiversity decline. Since 1995, the Environmental Awareness Group (EAG), a local NGO, and its partners have led one of the Caribbean's most ambitious eradication and rewilding efforts through the Offshore Islands Conservation Programme. This initiative integrates invasive species removal, long-term biosecurity, and community capacity-building to restore nature. The targeted islands lie within a marine management area, support over 122 bird species, and are globally designated as both an Important Bird Area and Key Biodiversity Area. We assess the ecological benefits of invasive species removal through long-term monitoring. The EAG has eradicated invasive mammals from 16 offshore islands, installed permanent bait stations, and conducts biosecurity checks every five weeks. Bird monitoring methods including point counts, transects, and circumnavigations were adapted to site-specific contexts. Results show compelling evidence of ecological recovery: native species like the Lesser Antillean Bullfinch (*Loxigilla noctis*) and the Vulnerable West Indian Whistling Duck (*Dendrocygna arborea*) are nesting and foraging more successfully. Breeding seabirds including the Brown Noddy (*Anous stolidus*) and Bridled Tern (*Onychoprion anaethetus*) were markedly more abundant on predator-free islands. Ecosystem resilience is rebounding across 72 hectares of restored habitat, with three reinvasions successfully intercepted. Crucially, over 50 trained volunteers sustain ongoing monitoring efforts, contributing data to national databases, and championing conservation as citizen scientists. This locally led programme demonstrates that small NGOs in SIDS can lead enduring ecological restoration. EAG shares its tools, protocols, and success regionally - offering a scalable, community-based blueprint for invasive species management and biodiversity recovery worldwide.

180 Vertebrate eradications in the Western Indian Ocean: Achievements and challenges ahead

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Islands free of invasive vertebrates are essential to conserve the world's native biodiversity, and eradication of invasive predators and competitors is a key step to rehabilitate islands. We use data from the Database of Island Invasive Species Eradications to update the number and success of vertebrate eradications in the Western Indian Ocean. We compile from bibliography, experts and practitioners key lessons learned, and highlight challenges ahead. There has been 114 successful invasive vertebrate eradications (out of 154 attempts) from 23 wild species in 73 islands, including 92 for mammals (128), 21 for birds (26), and 1 for reptiles and amphibians (1). Rodents and feral cats represent the majority of these (59 successful; 67.8% of 87 attempts). This includes 25 successful outcomes for black rats (66% of 38), six for brown rats (86% of seven), 11 for house mice (58% of 19) and 17 for feral cats (74% of 23). Rodent eradications are more complex and challenging in tropical islands, especially with extensive areas of mangroves, for which a technical solution is being sought. Challenges include the eradication of insectivorous mammals (e.g. shrews, tenrecs), birds (e.g. mynas, house crows), reptiles (e.g. Agamidae) and amphibians (e.g. toads). The majority of these eradication attempts have been in Seychelles, French territories and Mauritius. Lessons learned include the key importance of species/ecosystem knowledge and feasibility studies, expert consultation, thorough but flexible planning and partnerships. Biosecurity to prevent (re)invasions is insufficiently institutionalised, and early detection and rapid reaction capacity to deal with incursions often deficient. Very significant benefits have been observed for species and ecosystems, including economic ones through ecotourism development, which has also brought new threats to some islands. Recent achievements, currently planned operations, key limiting factors and future prospects are presented for each territory. A call is made for regional cooperation and knowledge transfer.

181 Incomplete cat management on Australian Islands: Ecological outcomes affected by strategy, tools, and coordination gaps

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Free-roaming domestic cats (*Felis catus*) are a widespread invasive species that challenge conservation efforts, especially on islands where they pose a serious threat to native wildlife. In Australia, cat eradication and control projects have been carried out on several islands, but many of these remain only partially implemented. As a result, the ecological goals of these projects are often not achieved. This study explores the ecological and human dimensions of cat management on Australian islands. While the focus is on effective biodiversity conservation, the research also considers how social and ethical factors influence project outcomes. Using a qualitative, interdisciplinary approach, we conducted semi-structured interviews with professionals working on cat management projects across different five islands. The research focuses on the key obstacles practitioners face in the field: (1) limited awareness or access to available eradication and control tools on some islands; (2) lack of consistent policy support or sufficient, long-term funding; and (3) incomplete implementation of projects, which often renders efforts ineffective, even where community engagement is relatively strong. Preliminary findings show that while engagement with communities is generally strong, many projects face ecological setbacks due to incomplete or inconsistent implementation. Key issues include a lack of awareness of available tools, unclear policy direction, and limited or irregular funding. These factors prevent long-term success and often undermine ecological outcomes. The results highlight the need for more consistent policy support, improved coordination between island projects, and better sharing of ecological knowledge and tools. While ethical and social dimensions remain relevant, the study emphasises that ecological effectiveness must remain central. Strengthening communication between practitioners and aligning practical strategies with conservation goals will be crucial to improve outcomes. This research underscores that even with strong local engagement, partial action is not enough; successful cat management requires ecological, institutional, and strategic alignment.

182 The potential of edge technology to enable the protection of island biodiversity: A case study from Ulva Island using the Sentinel Adaptor

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Detection of invasive species is a critical capability for island management. Latency between target species interaction, device servicing, and a response being initiated remains a significant limitation within the island biosecurity toolkit. Near real-time notification of detections could substantially improve the ability of island managers to respond effectively to incursions—or to more efficiently conclude an eradication operation. This need is especially consequential in the context of remote uninhabited islands, where servicing is less frequent due to cost and logistical constraints. Edge devices are capable of processing data locally, at or near the point of collection, and can transmit pre-processed, highly compressed results via a communications network. Recent advances have enabled the development and prototyping of edge devices that can run computer vision-based detection and classification models on trail camera imagery. We present a case study of edge devices supporting island biosecurity operations. Drawing on operational experience and data from Ulva Island—a pest-free sanctuary in Rakiura/Stewart Island with a history of self-assisted Norway rat incursions, failed responses, and re-eradication efforts—we describe a successful deployment of Sentinel Adaptors (Conservation X Labs) at a sample of trail camera sites as part of a revised biosecurity network on the island. These were installed in what proved to be accurate anticipation of multiple Norway rat incursions that occurred throughout the season. This trial demonstrates the potential of edge devices to improve the efficacy and efficiency of island biosecurity efforts. It highlights their role as a rapid detection tool which can focus response effort capable of preventing eradication failure. We also outline the operational challenges, lessons learned, and current limitations that must be addressed for such technologies to become truly fit-for-purpose.

183 Invasive species and climate change: Strategic approaches to assuring security in the Pacific

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The health, security and overall well-being of Pacific Island communities and the ecosystems that support them are inextricably linked. These ecosystems, however, are being threatened by invasive species, which drive losses to biodiversity and threaten ecosystem health and functioning. When combined with climate change impacts, invasive species can pose serious threats to food security and trade, ecosystem function, public health and safety, natural and cultural resources, development, and entire Pacific Island economies. To help mitigate these growing threats, several ongoing initiatives by the USGS Pacific Islands Climate Adaptation Science Center (PICASC) focus on the nexus of invasive species and climate change in the Pacific. These initiatives include an active Community of Practice, the Pacific Regional Invasive Species and Climate Change Management Network (Pacific RISCC) focused on island knowledge exchange of adaptation strategies, the development of several EDRR research projects led in partnership with island governments, including the eradication of pests on low-lying islands, and leadership in the National Invasives Species Council and the Department of Interior Office of Insular Affairs focused on co-developing emergency response with U.S. Territories to decrease the spread of invasives pre, during, and post natural disasters. This presentation will highlight interagency and community efforts to identify, prioritize, and address invasive species management needs across the USAPI to build ecosystem, food, health, economic, and national security.

188 Ko'ko' for Cocos – Go! Native! – What would Che'lu do? An adventure in wildlife recovery in the face of invasive species

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Cocos Island, or Islan Dåno' as it is known in CHamoru, is a small islet, only a few miles across the lagoon from the southern village of Malesso', Guam. Since 2006 the Guam Department of Agriculture's Division of Aquatic & Wildlife Resources (GDAWR) has been working with multiple partners to create and maintain safe habitat for a breeding population of Guam's territorial bird, the ko'ko' (Guam rail, *Hypotaenidia owstoni*). In 2008 DAWR partnered with the US Department of Agriculture Wildlife Services Guam Office to eradicate the rodent populations on Islan Dåno', develop a biosecurity plan, and initiate the control of monitor lizards (hilitai; *Varanus tsukamotoi*). The Guam Division of Forest and Soil Resources enhanced the strand forest by planting native trees and reducing invasive vines. The GDAWR conducted several awareness campaigns to garner public support for Guam's native species and the biosecurity protocols necessary to protect the native species on Islan Dåno'. Sixteen ko'ko' birds were released in 2010, successfully bred, and spread throughout the islet. The federally-endangered Slevin's skink was rediscovered in 2017, and other small lizards are thriving since the eradication of the rodents. The Ko'ko' for Cocos Project is a successful story of invasive species management to provide a safe habitat for many native species that no longer exist on Guam due to the brown treesnake and other invasive species. Guam's native species are surviving on a small off-shore oasis, and despite the 2020 documentation of a breeding population of brown treesnakes (BTS, *Boiga irregularis*) on Dåno'. This is not the end of the story, yet the beginning of a new era in resource management for the Ko'ko' for Cocos Project.

189 A mixed aerial bait application and hand-broadcast bait bola approach for rodent eradication in the Chagos Islands - combining emerging techniques for tropical islands.

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Drones are increasingly being used for application of toxic bait for rodent eradications worldwide. Their main constraint is lift capacity which reduces their effectiveness on larger islands as the required duration to achieve comprehensive bait coverage raises the risk of failure through bait gaps between applications. However, they have the advantage of small size for ease of transport making logistics substantially easier than using helicopters and are therefore cost effective for isolated islands. We present a rat eradication that the Chagos Conservation Trust recently undertook in the northern Chagos, in the middle of the Indian Ocean, some 1000km from the nearest commercial port. Ship rats were targeted on four small islands comprising some 154ha in total in the northern Peros Banhos atoll, using drones with 50kg lift capacity in November 2025. The operation was conducted from onshore the islands or from the stern of the 60m long support ship as wind and sea conditions dictated, so was highly flexible. As an adjunct to the aerial operation, 6ha of mangroves and Pemphis on two islands had bait bolas (2 baits tied between string) hand broadcast across them, being only the 4th time bait bolas have been used for rat eradication. Bait bola hook-up rates were high, and any baits that reached the mudflats remained in good condition for several days after application, despite repeated inundation with seawater. For

many tropical islands the use of drones, and often with bait bolas for associated mangroves, is likely to increase the number and size of islands that can be effectively cleared of invasive rodents.

190 Biological consequence and forensic resolution of pest incursions at Tāwharanui and Shakespear Open Sanctuaries

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Tāwharanui and Shakespear Open Sanctuaries are exclusion-fence-protected peninsula wildlife sanctuaries of 588 and 550 ha respectively in North Auckland, New Zealand. Developed in 2005 (Tāwharanui) and 2011 (Shakespear), both sites integrate intensive conservation management with other land use including popular regional parks, working farms, a military training base, and a municipal wastewater treatment plant. The combination of coast-to-coast exclusion fencing with largely unrestricted public visitation of nearly one million visitors per annum results in the sanctuaries being inherently leaky to incursions by introduced mammalian predators. Of 10 target mammalian species, 8 were eradicated at Tāwharanui and 9 at Shakespear. Incursions of all but one eradicated species have been detected and resolved since eradication. Extant fauna and flora have responded positively to reduction of introduced predator and herbivore impacts. Additionally, 18 populations of 12 reintroduced species of locally extinct taxa (birds, lizards), have been established by translocation. A case study will discuss a significant and problematic stoat (*Mustela erminea*) incursion of a single pregnant female and her litter birthed within Shakespear Open Sanctuary in 2020 that resulted in the local extirpation of the reintroduced hihi (*Notiomystis cincta*) and substantial reduction of the reintroduced tīeke (*Philesturnus rufusater*), both highly predator vulnerable species absent from mainland New Zealand except in pest-free sanctuaries. This paper will cover the detection and removal of incursive pests, including bespoke techniques and genetic forensic analyses that informed the incursion response and confidence in its conclusion. The variable biological impacts of this and other incursions upon key resident bird species across a range of predator vulnerability will be discussed.

191 Empowering and safeguarding Cayman's sister islands from invasive mammals: Charting the path to eradication, a timeline of feral cat management and ecological recovery on Little Cayman, Cayman Islands.

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Feral cats have long posed a serious threat to biodiversity on the Cayman Islands Sister Islands. First documented in Cayman Brac in 2001, with an alarming density of 4.7 cats/km² was recorded via road transects over a 114 ± 26 ha area. This initial research sparked early conversations about controlling invasive mammals across the Sister Islands. Subsequent ecological assessments revealed significant predation by feral cats on Sister Island Rock Iguana (*Cyclura nubila caymanensis*) hatchlings and nesting seabirds, including Brown Boobies (*Sula leucogaster*) and Red-footed Boobies (*Sula sula*). From 2014 to 2025, the Department of Environment (DoE) conducted annual surveys, revealing a pronounced age-class bottleneck: by 2019, 89.4 ± 4.4% of the Sister Island Rock Iguana population were adults. Despite head-starting efforts, Little Cayman's population continued to decline, reaching an all-time low of approximately 1000 individuals in 2022. Community members on Little Cayman also reported a noticeable decline in native wildlife sightings, including Curly-tailed lizards (*Leiocephalus varius*), Sister Islands Green Anoles (*Anolis maynardi*), snakes, and numerous bird species. In response, DoE initiated targeted feral cat control under the guidance of the Cayman Islands Department of Agriculture (DoA) and the Humane Society. Since implementation, 238 cats have been removed, resulting in a clear ecological rebound noted by both residents and monitoring teams. Necropsy and dietary analysis of culled feral cats revealed broad and concerning consumption patterns. Gastrointestinal contents showed mature parasites (71.3%), plant matter (56.6%), trash (50.7%), cat food (22.4%), foreign matter (44.1%), and animal remains (45.4%), underscoring their opportunistic feeding behaviour and broad environmental impact. Thanks to funding from the Darwin Initiative (Projects DPLUS128 and DPLUS207) and support from the RSPB, the Empowering the Cayman Islands Sister Islands project has built vital biosecurity capacity and community engagement. With the assistance of the Humane Society, National Trust, DoA and DoE, we achieved 100% compliance in pet cat sterilization. Enhanced staffing enabled the development of educational programs focused

on responsible pet ownership and the importance of native species protection. Today, Sister Island Rock Iguana numbers have rebounded to 2014 levels. This presentation celebrates Little Cayman's transformative journey, highlighting how evidence-based conservation, strong advocacy, and international collaboration have positioned the island for sustained invasive species eradication and ecological recovery.

194 Accounting for heterogeneous detectability in invasive eradications

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A key challenge in conducting an eradication campaign is inferring the size of the remaining population towards the end of the campaign. Interest often centres on when the remaining population size reaches zero. However, information on the size of the population throughout the campaign can assist campaign managers in adaptive management and resource planning. The size of a remaining invasive population during an eradication campaign is often inferred through removal models, which rely on detection and removal of individuals from the population. Current models assume that individuals within a population are detected at equal rates relative to catch-effort. This contrasts with the substantial volume of evidence on the existence of differences in detection rates within populations and across time. We show that this assumption leads statistical models to underestimate remaining population sizes, which can be catastrophic when these estimates misinform stopping rules. We also show the degree of underestimation increases dramatically as variation in detectability within the population increases. Our results suggest that more work is required to progress statistical models for inferring remaining population sizes to applicable maturity and that, in the meantime, conservation managers should rely on heuristic stopping rules founded in biotic knowledge.

196 Determinant factors for the abundance of house mice (*Mus musculus*) on Trindade Island, South Atlantic

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Biological invasions are a major driver of biodiversity loss, with the house mouse (*Mus musculus*) ranked among the most damaging invasive species on oceanic islands. On Trindade Island (20°30′S, 29°20′W), house mice are currently the only remaining invasive vertebrate species, posing significant threats to endemic fauna and ongoing ecosystem recovery. Effective eradication efforts require a sound understanding of the species' distribution and habitat use. We assessed the influence of environmental factors on house mouse relative abundance to provide insights for future eradication planning. A total of 365 Sherman traps were deployed across nine sites, with at least 15 traps per site. Environmental variables, including altitude, slope, vegetation cover, tree cover, shrub cover, crab burrow density, and rock cover, were recorded within a 2-meter radius around each trap. A global Generalized Linear Mixed Model (GLMM) was used to analyze the relationship between mouse relative abundance and these environmental factors, with environmental variables as fixed effects and site as a random effect. Results showed that mouse relative abundance increased significantly in areas with steeper slopes and lower altitudes, while other variables such as vegetation and rock cover had no significant influence. These findings highlight the role of topographical features in shaping mouse distribution and suggest that steep, low-altitude areas may require special attention during eradication planning. By identifying key environmental drivers of mouse abundance, this study provides valuable data to inform eradication efforts on Trindade Island and potentially on other islands with similar characteristics.

197 Rapid response to eradicate the invasive Common Myna (*Acridotheres tristis*) from the Akrotiri Sovereign Base Area and adjacent areas of Cyprus

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The common myna (*Acridotheres tristis*) is one of the most alarming avian invaders on a global scale; its presence extends into diverse ecosystems across the world. Its range is continually expanding, posing significant challenges to biodiversity conservation and human health. Among the regions susceptible to the invasion of such

avian species are the Mediterranean islands, including the island of Cyprus, which was invaded for the first time by common myna in January 2022, with several individuals first seen in the Akrotiri Sovereign Base Area, a UK Overseas Territory (UKOT). The primary objective of this study was to assess the distribution of common mynas across Cyprus and present the management measures that were undertaken on the island following its arrival. Since the initial sighting of common myna in the Akrotiri Sovereign Base Area, 57 records from 21 locations were documented from across the island. Through field observations and data validation processes, 42 of the records were confirmed, with which we produced a distribution map for Common Mynas in Cyprus. Shooting was the main control method employed to eradicate common myna up until December 2024, with 21 individuals culled from locations in the UKOT and around Limassol. Successive shooting periods have yielded discernible reductions in common myna sightings, suggesting the potential efficacy of this approach when implemented promptly and intensively. In conclusion, this study underscores the critical importance of continuous monitoring, public awareness, and proactive management strategies to mitigate the impacts of the common myna invasion on the island of Cyprus.

198 Using LoRaWAN to support the eradication of feral ferrets (*Mustela furo*) on Rathlin Island

Elizabeth "Biz" Bell[7], **David Tosh**[1], Gillian Gilbert[2], Claire Barnett[2], Michael Rafferty[2], Fionbharr Butler[2], Ulf Keller[2], Jordan Hunt[2], Sophie Thomas[3], James Crymble[4], John Kelly[5], Mike Little[6]
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Management of invasive species on islands is expensive largely due to labour costs and the remote nature of islands. Technology can provide opportunities to reduce costs and increase efficiencies but adoption of new approaches takes time. Thankfully, the ambitions of international targets e.g. UN SDGs and national projects e.g. Predator Free 2050, have provided motivation to find new technologies that improve existing approaches and increase the likelihood of targets being achieved. Here we report on the LIFE Raft project's development of an Internet of Things (IoT) solution using LoRa technology to support the eradication of feral ferrets (*Mustela furo*) on Rathlin island. The only permitted methods for targeting feral ferrets were traps, as no toxicant is licensed for use against mustelids in the UK. Available resources meant, an all island trapping approach using trap sensors was favored. Due to poor mobile (cell) network coverage, LoRa sensors were preferred over sim card trap sensors and a Long Range Wide Area Network (LoRaWAN) was established. Off the shelf door sensors were modified and attached to over 400 kill and live traps deployed across the island. A combination of mains and standalone solar powered gateways were distributed across the island following coverage modelling and a simple online platform was developed to monitor sensors. We discuss the outcomes and benefits of this approach in the context of the aspirations of the project (e.g. to maintain high levels of animal welfare and to protect the local pet cat population) and limitations upon it (e.g. staff time) and compare costs in relation to different approaches. We demonstrate how this widespread technology can be adapted and used to facilitate an eradication project and advocate the adoption of this technology to help similar projects in achieving their desired eradication outcomes.

201 Regulation and social licence underpin layered protection of inhabited islands

Imogen Bassett

More than half the islands in Tamaki Makaurau Auckland's Hauraki Gulf are free of introduced mammals, due to huge advances in mammalian eradications over the last 60 years. The remaining islands pose different challenges, with significant resident human populations (more than 9,000 in the case of Waiheke Island), swelling by thousands more visitors and tourists each summer. Not only are different techniques required for achieving mammalian eradications on inhabited islands, but the suite of species requiring management, to achieve comprehensive ecological protection, is also much more diverse, including latent and emerging threats from garden plants, pets and a variety of hitchhiking or self-dispersed taxa. A Swiss cheese model of protection is required, from risk reduction at ultimate and proximate source locations through to detection and response on-island, and site-led/asset-based management for taxa that cannot be prevented or eradicated. Aotearoa New Zealand's Biosecurity Act provides a suite of regulatory tools that can be used to support action throughout these layers of protection. Among other things, the Act provides for powers of inspection, regulation of trade and breeding of pest taxa, stopping movement of pests or risk goods, ability to direct individuals or landowners to take pest management actions or refrain from actions that exacerbate pest risks, and powers to enter private property to search for or control pest animals. However, regulatory tools are fundamentally underpinned by social licence; how we communicate and with work island communities and indigenous peoples is the lynch pin in effective regulation and delivery of island biosecurity. Social science-informed behaviour change strategies

seek to understand, validate and work with their audience's values and priorities, rather than assuming fact provision is synonymous with behaviour change.

202 Past, present and future of DOC's approach to mammalian pest management

Stephanie Rowe
Department of Conservation

Invasive alien species are one of the biggest threats to Aotearoa New Zealand's native species and ecosystems. The Department of Conservation (DOC), mana whenua, other agencies and many New Zealanders work across public, rural and urban lands and make significant investments in invasive species management, especially mammalian pests. I will present on the past, present and future of our approach to mammalian pest management. After an invasive species has established, eradications provide the best biodiversity outcomes of all interventions. Aotearoa New Zealand is a leader in eradicating mammals and can draw on more than 60 years of experience in removing invasive mammals from more than 100 islands. Successful island eradications and biosecurity have created more than 35,000 ha of mammalian pest free habitat and have led to the establishment of invaluable refuges for our most vulnerable species. However, eradication is only feasible when reinvasion can be prevented, or incursions managed effectively. This is currently only possible on islands or in mainland sanctuaries with pest-proof fences. On the mainland, repeated large-scale suppression operations remain the main tool to reduce the negative impact of invasive mammals, but we're getting closer to holding large mainland areas free of predators. In 2016, the New Zealand Government launched the Predator Free 2050 programme (PF2050) with the aim of eradicating mustelids, rats and possums from the whole country. DOC leads this programme and is now implementing a revised strategy that builds on existing knowledge from island eradications and lessons learned from the first phase of PF2050, which increased public engagement with predator control and initiated the research and development of tools and techniques within landscape-scale predator control projects. The challenge is to identify knowledge and capability gaps and transfer existing practical knowledge gained from eradications, landscape-scale suppression work, Mātauranga Māori and community projects to the mainland while simultaneously driving research to achieve the goal at an unprecedented scale and level of ecological and social complexity. Protecting gains obtained in the past, present conservation work and investments into the future will allow for achieving the overarching goal of protecting and restoring Aotearoa New Zealand's unique biodiversity.

203 Fight for our whakapapa : Exotic *Caulerpa* the seafloor coloniser

Nicola Rata-MacDonald
Tumu Whakarae, Ngāti Manuhiri Settlement Trust

This abstract explores mana whenua perspectives on the cultural and ecological impact of the invasive seaweed *Caulerpa brachypus* and *Caulerpa parvifolia* in the Hauraki Gulf, with a focus on the experiences and responses of Ngāti Manuhiri since its discovery in 2023. As kaitiaki (guardians) of the moana, Ngāti Manuhiri view the spread of exotic *Caulerpa* as a direct threat to the mauri (life force) of the marine environment and to their cultural identity, which is intrinsically tied to traditional harvesting practices, intergenerational knowledge, and whakapapa (genealogy) connections to the seabed and coastline. The presence of *Caulerpa* has significantly disrupted customary gathering of kaimoana, particularly in the waters around Aotea (Great Barrier Island) and Kawau Bay, where dense mats of the seaweed have smothered vital habitats such as pāua, kina, and mussel beds. Ngāti Manuhiri have led and collaborated on various strategies to remove, reduce, and eliminate Caulerpa from their rohe moana. These include direct physical removal trials, the use of weighted mats to smother the weed, and the implementation of rāhui (temporary prohibitions) to protect impacted areas while supporting scientific and cultural research. The Ngāti Manuhiri Settlement Trust has also worked in partnership with government agencies and marine scientists, advocating for Indigenous leadership in biosecurity responses and incorporating mātauranga Māori alongside Western science. Public education campaigns have been deployed to prevent the unintentional spread of Caulerpa via boats and fishing gear. The ongoing incursion of exotic Caulerpa in the Hauraki Gulf is not only a biodiversity crisis but also a cultural one. Mana whenua responses underscore the importance of Indigenous-led environmental management and the integration of traditional knowledge systems in efforts to restore the mauri of the marine ecosystem for future generations.

204 Improving efficiency and effectiveness of rat trapping - an engineered long-life lure

Stephen C. Young[3], Michael D Jackson[2], Oisin Ammundsen[3]
[1]RatTek Manager, [2]Victoria University of Wellington, [3]RatTek Field Manager

Pest control programs require an annual budget for consumables such as lures, traps and trap boxes. However,

these consumables are usually a small part of the overall budget compared to the labour required to replenish and service traps. Researchers at the Victoria University of Wellington (VUW) spent 10 years testing and refining compound-based attractants that are more attractive to rats than standard food-based lures. The benefit of using compounds is that they can be encapsulated for slow release to produce long-life lures that can increase trap efficacy and reduce labour costs. Our company has industrial design, odour measurement and agrochemical manufacture skills. We used these skills and worked with the VUW researchers to encapsulate the patented compounds to develop novel slow-release long-life rodent lures. Unlike the present range of food-based lures, these new lures have no need for electromechanical dispensers or rechargeable substrates which need to be collected in and recycled or serviced. The new lures are single-use, bio-based, non-toxic, mould and insect resistant and biodegradable. They weigh less than 1 gram each, meaning thousands can be easily carried at a time, and they last three months in field conditions without significant reductions in attraction. At a few dollars per trap per year they are a minor expense compared to potentially huge savings in labour that might be achieved. Further, their longevity will increase trap efficacy and improve control operation outcomes. Our trials on Aotea Great Barrier Island show how this technology can be incorporated into a rodent control operation. The new lures produced cost savings of over 25% per year and as part of the overall program we will achieve our target rat density.

205 Improving efficiency and effectiveness of rat trapping - a novel design lightweight stackable trap box

Oisin Ammundsen[2], Marcus J King[1], Stephen C Young[3]
[1]Director Trap Tools, [2]RatTek Field Manager, [3]RatTek Manager

As New Zealand works toward its 2050 pest free aspirations, large scale pest-controlled areas are being established. As the size of these pest control operations grow, we are continually looking for ways to meet target rat densities while minimising costs and toxin use. We also aim to raise the bar for both animal welfare and health and safety compliance. Trap box design can help us meet these targets, but in the design, we must consider not only the operator but equally important the rat behaviour. Rats tend to be wary of new things in their environment and may be reluctant to enter boxes. Additionally, while a device may have passed National Animal Welfare Advisory Committee (NAWAC) tests, in practice a percentage of animals which do enter traditional trap boxes are caught in inhumane ways, such that they don't die immediately, or they escape injured. Additionally, any box must follow Department of Conservation (DOC) guidelines to minimise bycatch. To address these issues, we designed and manufactured a new trap box to accommodate the NAWAC approved Victor snap trap. In our proof-of-concept trials, the new double side entry "run through" design achieved a higher percentage of humane kill and fewer missed catches than existing best-practice trap boxes. The boxes weigh just 650 grams compared to 4000 grams for a wooden box and are stackable, reducing packed volume. The combination of low weight and stackability means 20 boxes can be carried in a standard backpack. The boxes can also be transported by drones rather than helicopters in remote or steep country. Overall, using the boxes could lower toxin use, reduce costs, and improve health and safety compliance. In this paper we present efficacy and cost comparisons of the new design versus traditional wooden boxes in Taranaki and on Aotea Great Barrier Island.

206 How predator free New Zealand has captured the hearts and minds of New Zealanders

Jessi Morgan
Predator Free NZ Trust

Predator Free New Zealand represents one of the most ambitious conservation goals in the world: the eradication of introduced mammalian predators from mainland Aotearoa. While New Zealand has pioneered island eradications, extending this success across diverse landscapes and communities presents a new and complex challenge. Since the government announced the Predator Free 2050 goal in 2016, public enthusiasm and participation have grown dramatically, revealing strong national alignment with the vision of restoring native biodiversity. The Predator Free New Zealand Trust, established in 2013, has played a central role in inspiring and mobilising communities to contribute to this mission. This presentation will explore key lessons from over a decade of engagement—how trust, shared language, accessible tools, and recognition of local effort have empowered citizens to take ownership of conservation. By making conservation part of everyday life and positioning it as a shared societal responsibility, the predator free goal has succeeded in transforming a national aspiration into a community-driven movement that supports Aotearoa's unique wildlife to flourish in our forests, farms and cities.

Poster Papers

9 Bridging scales and disciplines: Collaborative pathways for *Prosopis juliflora* management in the Horn of Africa

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Invasive species pose a critical threat to global biodiversity, with *Prosopis juliflora* emerging as a major concern in Ethiopia's lowland regions. This invasive plant significantly impacts local biodiversity and undermines the livelihoods of pastoralist and agro-pastoralist communities. This study aims to synthesize current knowledge on *P. juliflora* research and management efforts in Ethiopia through a systematic evidence synthesis. Using the ROSES (Reporting Standards for Systematic Evidence Syntheses) framework, we reviewed 85 relevant studies published over the past three decades. Our findings reveal a sharp increase in *P. juliflora*-related research, with the majority focusing on natural sciences (52.9%). However, transdisciplinary studies remain rare. Most research collaborations were either international (48.2%) or local (41.2%), while national-level collaborations were limited (10.6%). Geographically, zonal-level studies dominated (31.8%), with limited work at national (5.9%) and regional (2.4%) scales. Despite this growing body of research, studies on *P. juliflora* management remain scarce. Critical gaps include a lack of integrated, transdisciplinary approaches and a need for long-term experimental and observational studies. These findings highlight the need for transdisciplinary research and multiscale collaboration for managing *P. juliflora* in the Horn of Africa. The proposed multiscale collaboration bridges scientists, local people, investors, and the governments of neighbouring countries.

11 Cultivation and testing of 'Auhuhu (*Tephrosia purpurea*) for use in Anchialine and Hawaiian Fishpond restoration

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We have been investigating ways to eradicate invasive fishes found in anchialine pool environments in Hawaii for over 10 years. Invasive fishes found in anchialine pools and wetlands throughout the Hawaii are a major concern because they threaten aquatic species endemic to the Hawaiian Islands. Sites with invasive fishes on Hawaii Island range from large brackish water fishponds at Kaloko-Honokōhau National Historical Park to much smaller (<100 m2) anchialine ponds. For thousands of years Polynesians used plants with piscicidal properties to stun and collect fish for sustenance. In Hawaii, auhuhu (*Tephrosia purpurea*) and the endemic *Wikstroemia sandwicensis* were plants traditionally used by native peoples to capture fish, with auhuhu one of 30 canoe plants brought by Polynesians to Hawaii. In an effort to integrate Hawaiian traditional cultural practices with anchialine habitat restoration, we have been investigating using auhuhu to rid anchialine ponds of invasive fishes. In 2017 auhuhu seeds were obtained from the Greenwell Garden in Kona, and we started our first attempts at cultivation. We tested auhuhu in the laboratory to better determine the relationship between amount of plant biomass needed to stun and kill fish in different water volumes. Over the past eight years students from Kamehameha Schools have assisted in the project by growing auhuhu and evaluating the effects of auhuhu on non-native fishes and native invertebrates. In March 2022, we field tested auhuhu to eliminate tilapia (*Oreochromis mossambicus*) and guppies (*Poecilia reticulata*) from anchialine pools in Kaloko National Park, including using auhuhu alone and in combination with commercially-available rotenone in another pool. With the help of Kamehameha Schools students, we are conducting further tests on the effectiveness of fresh versus dried auhuhu as a piscicide. If dried auhuhu is found effective then it would greatly facilitate treatment and restoration of larger ponds containing invasive fish species.

23 The statistical analysis of small data sets: an overview

Markus Neuhaeuser
Koblenz University of Applied Sciences

When dealing with (invasive) species on islands, sample sizes might be small. There are various reasons for this. For example, species might occur in low numbers; or sampling might be difficult due to inherent inaccessibility of islands, including strict regulation on human disturbances. In case of small sample sizes, classical statistical methods relying on asymptotic approximations should be avoided. Instead, special approaches to small data sets should be applied. These methods often involve computer-intensive methods such as permutation tests and bootstrapping to obtain exact results. A modified Chebychev's inequality can also be applied in the case of small

samples. We give an overview on the statistical analysis of small data sets, including statistical tools developed for time-to-event variables, applicable to eradication data. The analysis of time-to-event data might be especially challenging in case of small samples when the rate of censoring is high; permutation methods are a good choice in this situation. Moreover, using example data we present the comparison of multivariate samples using modern non-parametric statistical methods.

35 Rigging the game in your favor: A comparative analysis of aerial treatment rigs across the Hawaiian Islands

Wynter Lim
State of Hawai'i, Department of Land and Natural Resources, Division of Forestry and Wildlife

Invasive species are among the most serious threats to island biodiversity, often establishing themselves in steep, remote areas where ground-based control is impractical or impossible. In Hawai‘i, aerial treatment via helicopter has become an important tool for addressing these challenges. While the concept of aerial application is well established, the specific methods, equipment, and rig designs used vary significantly across islands and organizations. To support and accelerate the knowledge transfer of these eradication methodologies, the State of Hawai‘i, Division of Forestry and Wildlife (DOFAW) conducted outreach to conservation practitioners statewide. The goal was to document the wide range of aerial treatment rigs and techniques currently in use. These include both improvised and highly specialized systems, each adapted to local needs, environmental conditions, and available resources. This effort provides a foundation for sharing practical, field-tested insights across organizations and island contexts. It also highlights key operational considerations, design innovations, and lessons learned that can help guide future aerial treatment efforts. Through this work, DOFAW aims to reduce redundancy, foster collaboration, and improve the effectiveness of invasive species management. By equipping land managers with proven tools and strategies, we can help protect biodiversity and support healthier island ecosystems and communities worldwide—rigging the game in favor of those working to protect them.

42 Lessons from island restoration in Palau: Integrating ecological and community-led approaches

Tutii-Elbuchel Chilton, **Loyola Darius**, Richard Griffiths, Jesse Friedlander, Tommy Hall
Island Conservation

Over the past decade, Island Conservation's work in Palau has shifted from species-specific interventions to a more holistic approach, integrating ecological goals with social and cultural systems. In this paper, we share our vision for restoration in Palau, highlight the challenges that have and continue to be faced and share the lessons we have learned from the projects that have been implemented. An underlying theme that has been reinforced from our work in Palau is that no two islands are the same, each has presented its own distinct governance, habitation, and environmental challenges. Restoration to date in Palau has succeeded not just through invasive species removal, but through building trust with communities, investing time, and supporting long-term stewardship of outcomes. Biosecurity, behavioral change, and inclusive planning has been essential to ensure lasting ecological outcomes and will continue to guide our work in Palau.

48 Strange bed fellows or conservation partners – offshore wind farm development and rodent eradication

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Invasive species are the primary land-based threat to seabird species worldwide. Invasive species eradication, particularly rodents from islands has long been recognised to provide significant benefits to seabirds globally. Rodent eradication is also recognised as a tool to alleviate pressure to seabirds from other factors including Offshore Wind Farms (OWF) developments. As OWF development increases to meet Net Zero targets, turbine collisions could significantly impact seabird populations. Developers are increasingly required to provide compensatory measures to offset impacts. At the same time, regulators across jurisdictions face growing pressure to establish clear guidance, and to assess and approve appropriate offset strategies. While eradication practitioners possess the technical capability to carry out these measures, a significant gap in understanding remains between key stakeholder groups, hindering progress. Tetra Tech is a leading global environmental consultancy working at the intersection of Regulators, OWF developers and conservation partners in the UK and Australia. Our environmental approvals specialists, ornithologists and eradication practitioners bring unique perspectives. Leveraging our experience, this presentation aims to help develop collaborative partnerships

between Regulators, OWF developers, conservation partners and eradication practitioners. Specifically, it will explore the role of eradication as an effective compensatory measure and examine the key challenges and critical steps needed to develop successful partnerships for conservation outcomes, including: Assessing residual impacts requiring compensation; Risk-based policy and guidance documents; Scoping and prioritisation of benefit species, eradication target species and islands; Demonstrating ecological efficacy of offsets; Practical feasibility of eradication and biosecurity; Managing non target impacts; Addressing social acceptability; Additionality; Long timeframes in planning, implementation and lag to seabird recovery; Funding required and sources (including biosecurity in perpetuity); Knowledge gaps and sharing; Delivery approach, coordination and partnerships; UK case studies relevant to Australia and New Zealand.

49 Traditional owner decision making in managing island invasives: informing knowledge through cultural and oral exchanges

Simon Tedder
Torres Strait Regional Authority

Traditional owners have a deep connection to air, land and sea environments of their islands due to cultural values and spiritual beliefs. These connections require a level of decision making that is not often matched by non-indigenous ways of assessing feasibility, such as review of scientific literature and knowledge systems. Impacts of colonisation on traditional owners of islands has also resulted in a lack of trust in such western knowledge systems. We provide an example from the Torres Strait, where decision making about rodent eradication on Warul Kawa stalled due to these challenges. By connecting traditional owners of Warul Kawa with indigenous peoples who have hosted successful island eradications across Oceania, we observed greater clarity and confidence in decision making to initiate their own eradication operations. The shared cultural and spiritual paradigms of indigenous peoples, enhanced levels of trust in indigenous perspectives and preference for oral exchanges over peer reviewed journals, are important considerations to facilitate when supporting traditional owner decision making in island eradications.

55 Monuriki Island Poster

Melania Bulimaitoga, Steve Cranwell, Miliana Ravuso
Birdlife International, Pacific Secretariat

Monuriki Island, Fiji, is an area of global ecological and cultural significance. BirdLife International, in partnership with the Island landowners, NatureFiji-MareqetiViti, the National Trust of Fiji, and many others have sustained a restoration programme on the Island since 2010. In March 2012 Pacific Rats (*Rattus exulans*) and feral goats (*Capra hircus*) were successfully eradicated to support the recovery of the endemic and Critically Endangered Fijian Crested Iguana (*Brachylophus vitiensis*), and Fiji's largest colony of Wedge-tailed Shearwater (*Ardenna pacifica*) and one of the few remaining examples of dry forest. Fijian Crested Iguanas (sourced from Monuriki) were successfully bred in captivity and released on the island. Alongside this, a weed control programme and reforestation of critical native species has contributed to the recovery of the island's highly threatened dry forest habitats and the protection of endemic flora and fauna. Ongoing monitoring on Monuriki Island includes systematic surveys and tagging of Wedge-tailed Shearwaters to track population trends, alongside regular assessments for invasive alien species (IAS) using IAS management tools. These actions support long-term biosecurity and conservation goals. The 'Survivor' film industry, which operates annually on the island, complies with strict biosecurity protocols to prevent the reintroduction of invasive species. BirdLife International has developed biosecurity capacity through a stakeholder endorsed biosecurity plan and the training of communities, tourism operators, and other stakeholders in its implementation. With no incursions in the 13 years to date this biosecurity capability marks significant progress in safeguarding native biodiversity. Through a combination of scientific research and community-led conservation, Monuriki Island is becoming a model for island restoration and species recovery in Fiji. This poster serves to communicate these achievements, raise awareness, and inspire continued support for the protection of Fiji's unique natural heritage.

58 Layered for impact: Multipronged advocacy and outreach to safeguard island biodiversity

Chelsee Neverman
Auckland Council

Tīkapa Moana / the Hauraki Gulf Marine Park is a globally significant biodiversity hotspot, home to rare seabirds, marine mammals, and pest-free island sanctuaries that protect taonga species such as tuatara, kiwi,

and New Zealand storm petrels. Yet, these islands face growing threats from invasive species, often transported via recreational and commercial vessel movements. Boaties—diverse, mobile, and often disconnected from traditional communication channels—represent one of the most challenging audiences to reach in marine biosecurity advocacy. Auckland Council's approach embraces the "Swiss cheese" model of layered interventions across a porous waterfront border, with, many ferry departure points, over 200 boat ramps, 12 marinas, and countless moorings. A multipronged strategy has been deployed, combining digital, print, radio, and event-based outreach with the cornerstone of the programme: face-to-face engagement. The 2024/25 Biosecurity Champion programme exemplifies the power of personal interaction. Over five months, 18 champions engaged more than 18,000 individuals, delivering tailored messaging such as "Check, Clean, Close" and "Bag It, Bin It." These conversations built trust, raised awareness, and influenced behaviour—especially among those with low self-perceived risk. The biosecurity outreach trailer, interactive displays, and strategic presence at high-traffic departure points and events amplified impact, while daily data collection provided valuable insights into public attitudes and behavioural barriers. This presentation will showcase how clear, tangible messaging across multiple platforms, combined with well-trained ambassadors, can drive behaviour change, accelerate the uptake of basic biosecurity practices, and safeguard island biodiversity. It offers a replicable model for engaging hard-to-reach audiences in island and marine biosecurity efforts around the world.

63 Protecting burrowing seabird habitat from invasive mirror bush (*Coprosma repens*) in Bass Strait, Tasmania.

Susan (Sue) Robinson[1], Karen Ziegler[2]
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Mirror bush (*Coprosma repens*) is a fast growing, highly salt tolerant woody plant introduced to Australia, from New Zealand, used for windbreaks in coastal areas. It readily smothers native tussock grass, an important habitat for burrowing seabirds. Mirror bush fruits are consumed and dispersed by birds such as silver gulls, Pacific gulls and common starlings. Biosecurity Tasmania have been successful in removing and managing this weed on high priority seabird islands in Bass Strait. Mature plants are removed using chainsaws, reciprocating saws and loppers. Low cut stumps and de-barked layered branches are pasted with herbicide gel containing picloram. To protect seabird habitat from weed waste and regrowth, all cut material is removed to coastal rock platforms where it dries for subsequent burning. Areas are revisited within a year to kill any regrowth and hand pull seedlings. One island had less than 1% regrowth of cut stumps, ten months after treatment.

64 New Zealand origin terriers assist invasive species work over the ditch.

Susan (Sue) Robinson, Mark Holdsworth
Forest Hill Conservation Dogs

Conservation dog pioneer Scott Theobold established a line of fox terrier / border terrier crosses that have been used extensively across New Zealand. A female terrier imported to Tasmania in 2009 followed this lead with herself and her progeny assisting many successful invasive species projects. As in New Zealand, the skill of these terriers has been important for locating low density rodents, rabbits, cats and possums as part of pest eradication work on Australian islands.

71 Steps towards scaling an interdisciplinary island-ocean monitoring approach for invasive vertebrate eradication

Coral Wolf[1], Amy Levine[1], Nathaniel Hanna Holloway[2], Elke Windschitl[1], Penny Becker[1], Stuart Sandin[2]
[1]Island Conservation, [2]Scripps Institution of Oceanography at University of California – San Diego

Invasive vertebrate species' presence on islands decreases seabird abundance and guano nutrient inputs, demonstrating negative impacts on coral growth, reef resilience, and fish biomass. Effective coastal marine conservation requires integrated restoration strategies, such as invasive vertebrate eradication, that bridge these island-ocean interfaces. Evaluating these efforts demands cross-disciplinary partnerships and monitoring approaches. To support this need, we developed a flexible, collaborative framework—the Island-Ocean Monitoring Menu—designed to guide Island-Ocean Connection Campaign (IOCC) members and other practitioners in assessing the impacts of invasive vertebrate eradication on ocean health. Here, we present the process and outcomes of applying this menu at three initial case study sites. We describe how the Monitoring Menu facilitated alignment of monitoring priorities, methods, and indicators across institutions and geographies. Key lessons learned include the importance of establishing data-sharing agreements, enabling adaptive implementation, and strengthening institutional and technical capacity. We ask whether tools like the Island-

Ocean Monitoring Menu can enable scalable, collaborative monitoring that is responsive to both local needs and marine conservation goals. To test this vision, we propose expanding collaboration with a broader network of partners to trial the menu and co-develop a more comprehensive body of island-ocean data.

72 Collaborative biosecurity for island ecosystems in Tīkapa Moana/the Hauraki Gulf

Kayla Rench
Auckland Council

Tīkapa Moana/the Hauraki Gulf is one of the world's richest regions for seabird diversity and endemic seabird species, with islands that provide crucial refuge from mainland threats. Auckland Council has been a key contributor to safeguarding these ecosystems through its long-term island biosecurity programme, underpinned by the Auckland Regional Pest Management Plan 2020–2030 and the Hauraki Gulf Controlled Area Notice 2020. These regulatory frameworks are vital in maintaining predator-free gains and preventing the arrival of invasive species that could devastate fragile island habitats. Over the past 15 years, Auckland Council's pathways biosecurity work has focused on aligning operational programmes with community needs, ecosystem pressures, and effective pest management. At the heart of this approach is a multi-layered surveillance and response network including public awareness and education, early detection, and rapid intervention that is anchored by a highly trained pest detection dog team. These detection dogs play a pivotal role in early detection and community advocacy, supporting islands such as Rakino to remain pest free for over two decades. Other biosecurity tools, such as AI-enabled surveillance cameras and detection networks, further enhance protection efforts. The integration of applied science and system-based responses reflects the gold-standard approach to conservation in Aotearoa/New Zealand, particularly for seabird-rich islands like Motukorea/Browns Island. Human-driven changes have made these island ecosystems more vulnerable than ever. This work acknowledges the complexity of the challenge and the importance of working with and alongside others in tackling predator pressures on biodiversity through sustained, biosecurity action to stop eradicated species from returning to pest free islands. The success of Auckland Council's biosecurity programme offers valuable lessons for global island conservation efforts.

76 Supporting island eradication in the Hauraki Gulf - one commercial transport operator at a time!

Karen Thode
Auckland Council

Auckland Council's Pest Free Warrant scheme uses Regional Pest Management Plan rules to regulate an important industry pathway, requiring proactive biosecurity measures that reduce the risk of pest spread. Since it began in 2009, Auckland's Pest Free Warrant Scheme has focussed on raising the profile of biosecurity amongst commercial vessel operators working across the Hauraki Gulf, to help protect its special islands and their taonga species. Initially a voluntary scheme, on 1 January 2024, after being phased in over several years, it became mandatory under Auckland's Regional Pest Management Plan for all Commercial Transport Operators to hold a warrant. Currently 167 sea, land and air operators are accredited, and no compliance action has been required. Face to face conversations have been key along with understanding an operator's business and tailoring the warrant's requirements to reflect this. Ongoing support and checks that pest control is robust at key departure points is helping to build trust, protect the islands and reduce the risk of rodent stowaways. This has set a great foundation for embedding basic biosecurity measures as "Business as Usual" amongst operators for the long-term benefit of the Hauraki Gulf islands. The Auckland Pest Free Warrant model is gaining national and international recognition, with similar systems and guidelines for commercial and recreational vessel operators, inspired by Auckland considered, for example, Predator Free Rakiura. In 2025, growing support for improving biosecurity in the Hauraki Gulf led to the launch of the Pest Free Partner Programme. This initiative aims to foster a sustainable biosecurity culture among business connected to, or supplying goods and services to and on the Hauraki Gulf Islands. By working alongside these businesses through education and information, the programme seeks to build a robust network committed to maintaining pest eradication gains and keeping the islands free of invasive species.

77 Midway seabird protection project: Overview and insights from an unsuccessful mouse eradication attempt

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In 2023, the Midway Seabird Protection Project aimed to eradicate invasive house mice (*Mus musculus*) from Sand Island, Midway Atoll, USA, where mice had recently started preying on adult nesting Laysan and Black-footed Albatross. The eradication operation used 2nd generation anticoagulant rodenticide, distributed via aerial broadcast with supplemental hand broadcast around water sources, via bait stations within and around most buildings, and via packets of bait in sewer, underground infrastructure, and deteriorated buildings. Bait availability monitoring during the operation revealed rapid bait disappearance, yet mouse detections continued on cameras and drones with thermal optics. Despite being executed according to plan, the eradication was ultimately unsuccessful, and the mouse population recovered in the months following the operation. Major components of the project were successfully implemented, including community engagement to manage alternative food sources, protection of human health and safety, monitoring of toxicant residues, and mitigation of impacts to endangered and other non-target bird species. A conspicuous challenge was a superabundance of invertebrates, which rapidly consumed bait while simultaneously serving as a readily available alternate food source which some mice preferred over the bait product as evidenced by captive trials. This issue had a significantly greater impact than expected and likely was exacerbated by unusually high rainfall in the months preceding the operation, which led to greener-than-usual conditions. Ongoing efforts are focused on understanding these and other factors that contributed to the outcome and identifying improvements to increase the likelihood of success in future eradication attempts on Midway and other complex island systems.

87 Chevron Australia's Barrow Island Quarantine Management System - A focus on workforce engagement

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Chevron Australia Pty Ltd

Chevron Australia's Quarantine Management System (QMS) for Barrow Island is internationally recognized as a best-practice model for biosecurity control and protection. Situated on a Class A Nature Reserve off the coast of Western Australia, Barrow Island hosts unique ecosystems with numerous endemic species, making biosecurity a critical element of constructing and operating the Gorgon Gas Project on the Island. The QMS was designed to prevent the introduction and establishment of non-indigenous species that could threaten the island's biodiversity. It achieves this through a multi-layered, risk-based framework encompassing multiple procedures and controls. These range from pre-border cleaning, inspections and tagging processes at Company approved quarantine facilities, to real-time monitoring and auditing systems on the Island itself. A central feature of the system is its strong emphasis on people engagement. All workers—from business partners to dedicated quarantine inspectors—are required to complete biosecurity inductions and training programs tailored to their specific roles and risks. Personnel are empowered to report issues, contribute to improvements, and act as frontline stewards of environmental integrity. Chevron also works with Business Partners to develop their own Quarantine Management Plans, which identify key risks associated with their scopes of work and ensure quarantine controls are customized to their operational context. This embeds quarantine practices and accountability into their day-to-day activities and fosters a culture of stewardship across the supply chains. Chevron's Barrow Island QMS demonstrates that industrial operations can not only coexist with conservation, but actively contribute to it. By combining science-based protocols, strong leadership, and inclusive workforce engagement, the system successfully preserves the Island's ecological heritage.

93 Assessing reproductive competitiveness between island wild-derived and laboratory house mice (*Mus musculus*) to explore a gene drive approach

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Invasive rodents harm biodiversity. These negative impacts are often seen on islands where pesticide eradication can sometimes fail. Gene drives may offer an alternative approach or support current eradication methods. *Mus musculus* are also a key genetic model system and an invasive species in many regions. The primary research focus is on island wild-derived house mice and their potential role in gene drive applications. As part of the multi-institutional Genetic Biocontrol of Invasive Rodents (GBIRd) program, we are investigating strategies to suppress Mus populations by biasing sex ratios toward males. Effective implementation of this theoretical approach would depend on engineered wild-laboratory males being effective and compatible mates in the already established island population. As an initial step in exploring this technology, we assessed the behavioral differences between wild-derived island mice and laboratory mouse strains. Results indicate that there may be a

fitness benefit to being a hybrid (wild-lab) mouse. Follow-up explorations have examined the detection of wild mice using environmental DNA (eDNA) in semi-natural enclosures, as well as the corticosterone levels of wild mice trapped from nearby poultry units, with experiments conducted in Raleigh, North Carolina, USA. However, these are only the first steps in creating a gene drive mouse, and much still needs to be explored, including the ecological, social, and global policy frameworks. To this end, a multi-interdisciplinary lens with many differing perspectives is necessary.

95 First insights into the feral dog ecology in Tierra del Fuego, Argentina

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Domestic dogs (*Canis lupus familiaris*) have expanded from cities to rural landscapes in the Argentinian sector of Tierra del Fuego, affecting wildlife and livestock. Although very little is known about their ecology and impact on biodiversity, sheep ranching reduced flock numbers by half over the last 25 years. To expand the knowledge about the feral dog ecology, we deployed 21 camera traps to assess their presence, activity and interactions with the native Fuegian culpeo fox (*Lycalopex culpaeus lycoides*), the introduced chilla fox (*Lycalopex griseus*), and guanacos (*Lama guanicoe*) in a ranch of 10,000 ha., located in a transitional ecotone between forest and steppe, between October 2018 and November 2023. We identified 117 medium to large-sized mongrels, alone or in groups of up to 14 individuals. They exhibited diurnal activity, peaking in the morning and late afternoon. We recorded pups in 87 occasions, mostly in autumn and winter. Temporal overlap was high with guanacos and moderate with nocturnal chilla foxes. The endangered culpeo fox was never recorded. Although guanacos wouldn´t shift their activity in response to dog presence, chases and injuries revealed direct impacts. Dog detections (corrected by effort) increased elevenfold, while chilla detections declined by 61%, suggesting competitive displacement. Feral dogs seem to favour forest patches of the ecotone landscape. Feral dogs seem to act like apex predators. The records of pups suggests that feral dogs are no longer reliant solely on the influx of dogs from cities. The ranches that still raise sheep address this issue using various tools, including livestock protection dogs. However, since half of Isla Grande is public property or protected area, it is essential to expand the management of this invasive species across the entire rural landscape through and integral management to mitigate their ecological and economic impacts.

96 Designing an independent volunteer program using arcgis online - two examples from Hawaii

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The Hawaii Division of Forestry and Wildlife has been working to develop a specialized volunteer program that allows participants to engage in management activities within forest reserves. Often, conservation programs are resource-limited and hyper-focused on pristine areas. A large majority of state-managed land remains underserved with limited conservation efforts. Working with the ArcGIS online platform, we have designed projects that allow permitted volunteers to participate in management activities without direct supervision. These projects allow participants to receive training, record data, and communicate their efforts geospatially with conservation staff. It provides accountability and allows professionals to maintain volunteer competency while implementing invasive species management techniques. We have outlined the development of two independent volunteer projects. Originating during the COVID pandemic, the first project worked towards creating volunteer opportunities while maintaining statewide restrictions on gathering. It focused on the removal of the mule's foot fern (*Angiopteris evecta*) from priority conservation areas. The structure was modified in 2024 to assist in the spread of *Tectococcus ovatus*, a biocontrol agent for strawberry guava (*Psidium cattleianum*). Both *A. evecta* and *P. cattleianum* are habitat-modifying species that are widespread across the island. Measuring the success of these projects relies on qualitative and geographic data from volunteers. For *A. evecta*, the overall goal is the reduction of plants. The goal for *T. ovatus* is to increase the presence of this species in targeted areas. These projects serve as proof of concept that volunteers can contribute to and assist in meaningful efforts within forest reserves. We have found that this framework can be adapted and amplified to fit emerging issues and ultimately increase social engagement and volunteerism.

97 Enabling island predator eradications with a readymade 1080 predator bait for New Zealand

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Eradicating feral cats and stoats from large offshore islands is critical to achieving New Zealand's biodiversity goals yet remains challenging due to limited tools. The Maukahuka - Pest Free Auckland Island project exemplifies the logistical challenges that make feral cat eradication infeasible using ground-based methods alone. A toxic bait that can be hand laid and aerially applied would complement existing techniques, as demonstrated by Australia's use of Eradicat® for broadscale feral cat control and island eradications. Modelled on Eradicat®, the readymade 1080 predator bait delivers a lethal dose of sodium fluoroacetate to both feral cats and stoats in a single highly palatable sausage bait. A bait development programme has been underway since 2022, with a focus on both progress toward dual regulatory approval and operational readiness. The goal is not only to develop the bait but to ensure it is deployable upon registration, with risks understood, best-practice use established, and manufacturing and delivery capability in place. Extensive, step-based field trials have tested efficacy across target species, while planning is underway to evaluate the value of prefeeding. Scalable manufacturing and aerial delivery systems are being developed to meet operational requirements. Cultural impact assessments, non-target species and environmental risk evaluations are also being conducted to support safe use. To support broad regulatory approval and operational flexibility, trials have been designed to span diverse ecosystems and delivery contexts. These include investigations into how environmental conditions and bait competition influence uptake, informing optimal baiting prescriptions. Initial results show high palatability and efficacy for target species and low risks for non-target species and the environment. Once available, this bait will fill a critical gap in New Zealand's predator control toolkit. It will enhance incursion response capacity and support landscape-scale control and eradications on high-priority islands such as Auckland, Rakiura, and Resolution.

104 Brodifacoum detection in abalone and fish species pre and post eradication, Flinders Island South Australia

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Flinders Island is an important regional abalone and small scale fisheries resource. The island is one of the largest offshore islands in South Australia. The long-term restoration and establishment of a safe haven at Flinders Island will contribute to the conservation of Australia's most at risk small native mammals. The eradication of cats, rats and mice, and removal of cattle and sheep from the island began onground works in March 2025 and is on track for completion by December 2025. One of the key components of the Flinders Island eradication program was the two aerial and ground-based applications of Pestoff Rodent bait 20R containing the active ingredient brodifacoum at nominal rates of 12kg/ha and 8kg/ha across the whole island. Detailed planning for the baiting operation along with all relevant permits was completed in 2024. One of the AVPMA permit requirements included the testing of fish livers for the presence of brodifacoum. Due to the importance of the island to the Elliston community and commercial Abalone fishing industry, this testing was expanded to also include abalone species. Samples were collected pre, mid and post baiting applications. With 41 samples collected, from 12 species. The brodifacoum detection results are expected by August 2025. Pending these results, if any traces are found in the first samples, additional abalone and fish liver samples will occur in August and September 2025. Minimal information currently exists for abalone species and brodifacoum detection post aerial rodent baiting using Pestoff Rodent bait 20R. The results from this testing will provide information on the detection of brodifacoum in abalone and fish species on Flinders Island pre and post bait application and enable the project to assess the accuracy of bait application along coastal areas both from a GIS perspective and marine species uptake within a 200m boundary.

109 Charting the future, eradication trajectories of tropical weeds.

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Weed eradication programs can be lengthy and expensive endeavours, but if successful they avoid large, ongoing biodiversity and economic impacts that are inherent with entrenched incursions. The National Tropical Weeds Eradication Program (NTWEP) is a long running campaign targeting *Limnocharis flava, Miconia calvescens, Miconia racemosa, Miconia nervosa* and *Mikania micrantha* in Australia. The NTWEP has developed a process to project forward eradication progress parameters to determine the future mean, minimum and maximum number of eradication reporting units to control or monitor for each of the five target weeds. Where control units have weeds present and monitoring units have weeds absent for a year or more. The input parameters include

a current frequency distribution of 'years since last detection', the mean rate of progression from control to monitoring, a reversion from monitoring to control curve, the mean frequency of seed production events and a decaying discovery trend. The output reflects recent variation around progression, reversion, reproductive relapses over the previous four years, and discovery trends to generate future mean, maximum and minimum scenarios for each weed. The results are in term of net categories of reporting units not individual spatial units. The projection process is more applicable to projects at an advanced stage which can generate progression and reversion parameters. The process makes assumptions about discovery, which are difficult on a large national scale but potentially simpler at smaller island scales, which can present fewer delimitation and containment issues for weed eradication projects. Documenting this process provides project managers with a method to aid decision making for advanced weed eradication programs including predictions of scenario endpoints. These predictions should assist jurisdictions to conduct informed, transparent and sufficiently resourced weed eradication projects to their successful conclusion.

110 Using social science approaches to engage Pacific communities in the management of invasive species to increase climate reslience

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The Pacific Regional Invasive Species Management Support Service (PRISMSS) is working to scale up the management of invasive species to help Pacific Island countries increase the climate resilience of ecosystems and communities. To date much of the work to eradicate invasive rats has been undertaken on uninhabited islands that are often used as fishing grounds by neighbouring communities. In order to support efforts to scale up the integrated management of invasive predators and weeds, PRISMSS is undertaking ongoing community-based research to understand how best to engage and involve local communities in the design and implementation of these Invasive Species Management (ISM) programmes. This research uses a mixed methods questionnaire to investigate community perceptions, values, understandings of invasive species, biosecurity and safeguard protocols, including the influence of gender, disability and social inclusion (GEDSI) and Traditional Knowledge (TK) on invasive species management. It is envisaged that this research will identify key entry points for programme design, alignment with community priorities, and a better understanding of how Pacific Island communities frame Pacific worldviews in relation to ISM and conservation interventions. It will also draw on how traditional knowledge and traditional gendered roles affect community engagement, participation, and leadership in ISM. This is important because it aims to inform why social inclusivity and culturally grounding for ISM initiatives are relevant for providing practical insights for in this space for governments, NGOs, and technical partners working across Small Island Developing States (SIDS). The findings from this prospective study will contribute to the growing body of social science research on invasive species management in the Pacific, offering guidance for co-developing strategies that resonate with community needs and enhance programme sustainability.

112 Invasive snails posing a risk to an invasive rodent eradication through off-take of toxic bait

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Comprehensive coverage of toxic bait is a key element for achieving a successful rodent eradication. Possible risk factors leading to incomplete coverage include bait gaps caused by poor bait application techniques and bait off-take by non-target species and where possible are mitigated to reduce these threats. Recent rodent eradications have been subject to significant bait removal problems by land crabs on tropical islands, and more recently, terrestrial molluscs on sub-tropical and temperate islands. In some cases, these species may have contributed to sub-optimal rodent eradication outcomes. During the recent Flinders Island rodent eradication operation, rodent baits were noticed to be almost entirely absent from an area in the northern portion of the island nine days after the first aerial bait application, whereas baits were still commonly seen everywhere else. The bait loss appeared to be due to consumption by invasive land snails (*Cochicella acuta/Theba pisana*) present in a high density in the area. Prior to the 2nd bait application, bait-loss monitoring sites were established to determine if the snails were consuming the baits and what factors exacerbated any resulting bait loss. Monitoring revealed that in the first four days after post-aerial baiting no baits were consumed. However, on day five bait consumption was noted and by day six almost all baits had disappeared. The factor leading to snails beginning to eat bait appeared to be the 8mm of rain that fell in the previous night and/or the associated increase in humidity. Analysis of rainfall during the eradication suggests that 5-6 days of dry weather after the 1st aerial

bait application reduced any bait off-take by these snails, allowing rodents unfettered access to the baits for 5-6 days. These results suggest that even in a Mediterranean climate, the risk from molluscs to eradication operations through bait off-take need consideration in future.

114 Transforming rodent eradications in tidal ecosystems: Floating bait stations with integrated cloud-based management

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Eradicating invasive rodents from ecologically sensitive and water-inundated habitats presents persistent operational and ecological challenges. Traditional ground or aerial baiting methods often fail in tidally influenced zones due to fluctuating water levels, inaccessibility, and strict regulatory constraints. As part of the 2024 Wake Atoll Rodent Eradication Project, floating bait stations were developed and deployed as an innovative and site-adapted solution to these challenges. The target environment spans over 33 hectares and is characterized by a densely vegetated, *Pemphis acidula* thicket ecosystem that is heavily inundated by the tide. In 2012 there was an operation that failed to eradicate Pacific rats on Wake Atoll and reviews identified this habitat as a high-risk area due to inadequate bait availability. In 2024, to effectively deliver bait to all potential rodent home ranges, 414 floating bait stations were constructed and anchored in place. The stations were deployed on a twenty-meter grid and installed four weeks prior to baiting to allow for rodent acclimation. This method ensured bait remained available at all tide stages, floated with water levels, and maintained structural integrity during adverse weather conditions. The stations were refilled every ten days and tracked using GPS-enabled tablets and cloud-based data collection software, allowing for real-time data collection and adaptive decision-making. The strategy demonstrated high feasibility, efficiency, and scalability. By enabling precise, sustained bait delivery in areas previously deemed inaccessible, floating bait stations offer a transformative approach for invasive rodent control in coastal, marsh, and island environments worldwide. This technique minimizes non-target exposure, protects sensitive ecosystems, and expands the operational range of ground-based eradication strategies. The Wake Atoll example highlights the value of tailoring eradication methods to habitat complexity and may serve as a model for future campaigns in similarly challenging landscapes.

122 A genetic approach for house mouse management on islands: A case study from Italy

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The Mediterranean basin represents a biodiversity hotspot of global importance but synanthropic rodents are a constant presence and threat on Mediterranean islands and islets. However, data about rodent invasions from this area of the world is scarce, especially for the house mouse (*Mus musculus* ssp.). This study employs a genetic approach to investigate three key aspects of house mouse invasions and consequent management: rodenticide resistance, phylogeography of house mouse populations on islands, and their dietary habits. Anticoagulant rodenticide (AR) resistance was examined through the analysis of VKORC1 single nucleotide polymorphisms (SNPs) in 11 islands in Italy. Missense mutations appear widespread in Italian islands. Among the SNPs found, the well-known resistance-giving mutation Tyr139Cys even increased its frequency in a specific case. This was right after a four-year rat eradication campaign to which mice survived, suggesting selective pressure on resistant genotypes exerted by prolonged AR use. Phylogeographic analyses using mitochondrial DNA revealed a complex pattern of colonization on Italian islands, often mediated by human activities and sometimes dating back to thousands of years ago. Even some small islands show different haplogroups not represented in mainland Italy, thus suggesting ancient colonization waves. Conversely, other locations exhibit a single haplogroup each with a high similarity to some found in mainland Italy, indicating more recent single founder events. Regarding house mouse dietary habit, DNA metabarcoding of gut and intestinal content showed a diverse diet based on arthropods (mainly lepidopterans) and large-seeded plants. Given the high conservation value of many lepidopteran island populations in Italy, this result raises some concerns, giving greater consideration to invertebrates recover in planning house mouse eradications. In conclusion, implementing a genetic approach to rodent management on islands allows a better understanding of several key aspects that can enhance the success of island conservation programmes.

123 Understanding socio-economic factors for successful island restoration

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The eradication of invasive species is a demonstrably effective tool for island restoration, powerfully demonstrating how local efforts can address a global driver of biodiversity loss. Eradication and restoration produces both ecological and socio-economic benefits across marine and terrestrial realms. Thus, eradications align with current conservation approaches and policy trends including 'rewilding' and 'net gain'. However, most successful eradications have occurred on uninhabited islands, often due to challenges surrounding community support. While ecological techniques for managing invasives are broadly transferable among contexts, we lack similarly effective approaches for inhabited locations, and often know little about the factors influencing social motivations and perspectives, even among within-island contexts. Understanding why individuals and communities are motivated to support or oppose projects, what drives preferences, and how and whether mitigation measures can enhance acceptability is therefore crucial for success. Here we focus on gaining this much-needed sociological understanding around island eradications within a UK context. We use quantitative and qualitative assessments to identify key themes around stakeholder support and participation, and socioeconomic and cultural priorities and concerns, relating to different management approaches on multiple UK offshore islands. We deploy economic survey methods to evidence factors influencing public acceptance or rejection of measures across contexts. This interdisciplinary approach bridges the 'knowing-doing' gaps between scientific enquiry, ecological economics, community engagement and applied management. By demonstrating clear and measurable uplifts in socio-ecological outcomes, we demonstrate how eradications can be tangible, scalable contributors to achieving ambitious policy and practitioner goals.

125 The BirdLife International Network of Alien Invasive Species partners acting globally for biodiversity restoration

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Managing invasive species remain a high priority for BirdLife, as they are the primary cause of declines for seabirds globally, and particularly for globally threatened birds that are endemic to islands. BirdLife comprises 123 independent NGO partners spread across all regions of the globe. Our work involves building capacity in our national partners to manage AIS activities, with a specialist team based in the BirdLife Pacific Office, Fiji. From there and working with partners such as, RSPB in UK and their work in overseas territories, such as Henderson and Gough Islands, SOP-MANU in French Polynesia, along with BirdLife Malta, HOS in Greece, SPEA in Portugal and BIOM in Croatia in the Mediterranean and Atlantic Ocean, BirdLife is targeting AIS management and eradications on sites where there are high biodiversity values and where species and habitat restoration can be achieved. As a network we share information about techniques, advocacy and community engagement. For example, the use of drones is becoming more widespread and there are learning steps to be considered in deploying this technology in new areas. To increase BirdLife's contribution to global advances in this field, we aim to make share knowledge and technical resources, and to contribute to databases and methods development.

126 Foraging ecology of the invasive smooth-billed ani (*Crotophaga ani*) across diverse vegetation zones on Santa Cruz Island (Galápagos)

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The smooth-billed ani (*Crotophaga ani*) is an invasive bird species introduced to the Galápagos Islands in the 1960s, suspected of negatively impacting native fauna and flora through predation, competition, and the dispersal of seeds of invasive plants. This study investigates the foraging ecology and wariness (flight initiation distance, FID) of the smooth-billed ani across urban and rural habitats of Santa Cruz Island, Galápagos (Ecuador). The ani primarily foraged in open areas on ground-level substrates, using gleaning as the dominant foraging technique. Off-ground foraging was more likely in areas with higher mid-layer vegetation cover and taller herbaceous plants. The ani demonstrated a foraging behaviour adapted to local environmental conditions. Individuals in urban zones predominantly foraged on road surfaces and elevated substrates such as branches and leaves. Meanwhile, individuals in rural zones foraged mainly in grass, suggesting a preference for natural, vegetated substrates where such cover was more abundant. Prey items included invertebrates (especially grasshoppers), fruits (*Tournefortia psilostachya* and *Lantana camara*), and, rarely, vertebrates. The FID ranged from 2.3 to 48.8 meters. At tortoise farms, which have frequent human presence from tourists, anis allowed observers to

approach closer before taking flight than birds in pasture lands. However, this difference disappeared when starting distance (SD) was included as a covariate in the model. SD itself remained a strong, positive predictor of FID, indicating that birds flew off earlier when approached from further. These results suggest that the apparent difference in wariness between habitats likely reflects variation in observation conditions rather than habituation to humans alone. Together, these findings suggest that the anis' generalist foraging strategies and preference for human-modified habitats may facilitate its success as an invader. Understanding its behavioural flexibility and habitat use is crucial for assessing its ecological impact and informing management strategies in the Galápagos Islands.

127 Developing bait bola technology for aerial baiting in mangrove and other forest canopies

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Invasive rodents have been successfully eradicated from islands worldwide, restoring native species and their habitats, boosting island resilience to climate change and supporting social wellbeing. There is growing interest in large-scale eradications but many tropical islands are unable to reap the benefits of rodent eradication due to technological gaps in baiting large areas of mangrove forest, a common habitat of tropical islands. An emerging product is bait bolas (bait pellets connected by string), which, on deployment, entangle in the mangrove canopy, preventing them from being washed away, ensuring the rats can access it. Scaling-up the use of bolas requires mechanisation of bola production and the development of a method to aerially deploy bolas effectively, without the bolas getting entangled with one another. The estimated cost of developing mangrove baiting technology is around US$850,000. We estimate that a combined total of around two million hectares of biodiverse tropical island could become feasible for eradication were this technology available. We call on beneficiaries and philanthropists to invest in this technology now, to unlock significant biodiversity and climate resilience gains.

129 Planning the removal of 'native' species from UK islands: The prickly problem with hedgehogs

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Nations consisting of multiple islands can face additional challenges with eradication projects, as species native to some islands may be non-native and invasive on others. One such challenge in the United Kingdom involves European hedgehogs (*Erinaceus europaeus*), native to mainland Great Britain but not to many other islands within the UK. Hedgehogs were deliberately introduced to South Uist (Outer Hebrides, Scotland) in the 1970s (<10 individuals) to control garden pests and later spread to two linked islands. They have been shown to be a major factor in the decline of an internationally important assemblage of wading birds, causing up to 60% nest failures in some species in some areas. Hedgehogs are well-known and popular animals in UK culture and are a species of conservation concern themselves, being Red Listed in the UK and globally Near Threatened. Lethal control has proven unacceptable to the UK public leading to the need for a novel approach to this invasive species. The Saving Uist Nature (SUN) project partnership, formed of NatureScot, RSPB and the Scottish SPCA, has developed detailed, peer-reviewed operational plans for the live capture and removal of hedgehogs from the island of Benbecula, and their translocation to their native range in mainland Scotland, following IUCN guidelines. Working with live animals creates significant operational and welfare challenges. A particular complication concerns females with dependent young. In order to avoid orphaning dependent young, adult females exceeding an agreed weight threshold and caught at specific times of year will be tagged, released and followed until the young hedgehogs are old enough to be brought into captivity. This project will be significantly more complex than a project using lethal control and is only considered feasible due to detailed knowledge of the ecology of hedgehogs on the islands.

130 Future funding for island restoration programmes: Is the answer blowing in the wind?

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The UK is a world leader in offshore wind deployment with over 15GW operational and over 80GW in the pipeline. As part of the deployment of offshore wind and the associated impacts, many large-scale projects have been required to deliver ecological compensation for their impact on seabirds and other protected features of the Marine Protected Area network. Delivering ecological compensation measures that are effective has been incredibly challenging. It is now agreed that this must take a strategic approach, with a central body of delivery with developers requiring to deliver compensation working through a government-led system. As part of this, Predator Reduction (both eradication of invasive mammalian predators from offshore islands and control in mainland colonies) is considered a suitable measure to benefit seabird species affected by the construction of offshore windfarms. The RSPB has been heavily involved in the development of this programme of measures to deliver predator reduction on the ground, at the strategic scale, driving financial investment to conservation measures and unlocking the challenges of offshore wind consenting. Measures are required to be in place for the expected life span of the wind farm – at least 30 years – presenting an opportunity to fund long term biosecurity as well as initial eradication (or control) measures. The scale of the compensation measures required, and the financial resources available to secure them, has made eradications that were previously deemed too costly to become financially feasible. This source of funding could therefore be used to unlock both strategic conservation action and renewable energy deployment, combatting the current climate and nature emergency. This model – and the benefits it could bring - could be fruitfully applied in other coastal nations.

132 Creating a "Digital Twin" for the eradication of rats and ferrets on Rathlin Island

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Rathlin Island (1372 ha) is located just 4 km from the County Antrim coast of Northern Ireland. The island has a permanent community of ~150 people, an active economy (including agriculture and tourism) and frequent small ferry connection to the mainland. Rathlin is designated a Special Protection Area (SPA) for a range of breeding bird populations that are threatened by introduced Norway rats (*Rattus norvegicus*) and feral ferrets (*Mustela furo*). The LIFE Raft project took a phased approach; ferret eradication started in September 2023, and rat eradication started in October 2024. The Rathlin Island rat eradication programme is the largest to be attempted using exclusively ground based baiting methods on an island with a permanent ('non-staff') community. Over 6500 rodenticide stations and 11,300 monitoring points were deployed during the project. Digital technologies were initially designed to collect data on trap and rodenticide use. Utility of this initial system led to the evolution of a range of apps, interactive maps and a central data hub, effectively creating a live "digital twin" of the island and eradication programme. The technologies used on the project included LORAWAN monitored ferret traps, a network of 172 trail cameras, 4G AI enabled cameras, FieldMaps for location of traps, bait stations and routes linked to Survey123 apps for collecting field data, Dashboards for monitoring, and a Real Time Data Hub for sharing data across project management. The benefits of using digital technologies were found to be: 1.Time savings through efficient data capture directly in the field. 2.Time saving through efficient trap, camera and bait station visits. 3.Real time oversight of progress and problems encountered, allowing for analysis of impact and prompt, targeted follow up. 4.Analysis of performance, improving operational management. 5.Sharing information and insight across all levels of project management leading to better, more rapid decision making.

139 Combining long-term marine non-indigenous monitoring data with global species distribution information to predict the spatial and temporal scale of marine bioinvasions

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More than 350 non-indigenous marine species have been recorded in New Zealand waters, yet only about half are believed to have established populations. Among those that have established, invasion trajectories, including spread, abundance, and time since first detection, vary greatly. Understanding what drives these differences remains an active field of research. We hypothesise that interaction between species traits and environmental characteristics of native and invaded environments determine the scale and pace of marine bioinvasion trajectories. Understanding the factors that influence the spread and success of invasions can help develop quick and reliable tools to inform effective and efficient management of new invaders. Here, we used the New

Zealand Marine Biosecurity Porthole database to examine whether different biological and environmental traits are correlated with variation in invasion spread and success among non-indigenous species (NIS) in New Zealand waters. To achieve this, we classified species based on their establishment status, occurrence patterns (number and geographic extent of detections), and invasion history (time since initial record), then compiled species traits and global distribution data from public sources. We used statistical models to explore how species traits, invaded environment characteristics and global distribution metrics predict the establishment success and invasion spread of species in New Zealand. In this presentation, we share the main findings of these analyses and discuss the performance of this extensive dataset and our quantitative framework for assessing marine invasion risks, along with its potential application as a practical tool for prioritising biosecurity efforts and early detection programs in New Zealand and other similar temperate marine regions.

141 Planning for the European rabbit eradication on Clarión Island, Revillagigedo Archipelago, Mexico

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Clarión Island is the most remote territory in Mexico, at ca. 1,000 km from the mainland. As with other oceanic islands, its isolation has promoted speciation, resulting in a high degree of endemism: 15% of its plant species and eight vertebrate species are endemic. However, with human establishment in 1979, several invasive species were introduced, such as sheep, pigs, rabbits, and iguanas. The Grupo de Ecología y Conservación de Islas eradicated sheep and pigs in 2000-2002. During the same period, attempts were made to eradicate the European rabbit (*Oryctolagus cuniculus*), resulting in the removal of over 28,000 animals through hunting and trapping. However, because the remaining animals were not captured, the project was ceased, and the population recovered. In 2018, an assessment was carried out to evaluate the rabbit population on Clarión Island and its impacts on the environment. From 2019 onwards, studies and fieldwork have been conducted to develop a comprehensive rabbit eradication plan. Palatability tests and field experiments ruled out the use of anticoagulant poisons via grain pellets, due to the high risk of primary and secondary poisoning of other native vertebrates. Drawing on technical assessments and global best practices, the eradication plan was finalized in 2024. The strategy relies on using the Rabbit Hemorrhagic Disease Virus (RHDV) as the primary method, complemented with hunting and trapping of the remaining individuals as the secondary method. Based on current information, rabbit eradication on Clarión Island can be completed within three years at an estimated cost of approximately US$1.1 million. The operation is planned to be implemented between 2027-2030 if funding and permits are secured in 2025-2026.

144 Vertebrate predator prey interactions and their effects on anthropogenic infrastructure

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As invasive and non-native species continue to spread globally, understanding the myriad of effects they have is important for society and conservation. Invasive species effects are evaluated as single species impacts, such as documenting how an invasive predator adversely affects native fauna populations on which they prey. However, interspecies interactions can interactively magnify individual effects of invasive species, which was an effect we considered in this study. In Guam, USA, the brown treesnake (*Boiga irregularis*) has caused most native birds to be extirpated and those birds that remain are primarily non-native birds that use anthropogenic environments. Throughout Guam, both non-native birds and brown treesnakes cause damage to electrical infrastructure by short-circuiting networks, resulting in hundreds of annual outages. We collected all electrocuted brown treesnakes that caused power outages from 2022-2024 and documented stomach contents. We found bird and bird eggs were the most common prey items and were present at much greater rates than is published for these snakes in urban Guam. These data may support that invasive birds nesting in electrical infrastructure also function as a primary attractant for the snakes. Thus, in this case, a predator-prey interaction among two invasive vertebrates appeared to magnify individual species impacts to human infrastructure, which may be an important consideration when designing effective management plans.

149 Genetic technologies use for invasive species management: Conversations with the New Zealand public.

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The use of genetic technologies for invasive species management, while contentious, complicated and complex science, is a topic ripe for public conversations to enable constructive dialogue and deliberation to better understand people's perspectives. In this context, we ran a broad national dialogue on gene technologies use for environmental purposes using a three phase novel dialogic and deliberative process. In total we engaged 378 New Zealanders in 38 engagement events, with 43 focus groups, deliberating on 69 scenarios that addressed the use of genetic technologies in four invasive species contexts. The small group conversations which captured people's nuanced decision-making, revealed that while many people see the potential of gene technologies, they do not give unconditional acceptance for the release of GMOs. Instead their decision-making was influenced by wider socio-cultural, environmental, economic, ethical and political considerations. Objections when raised, did not emerge because people lacked information and so needed to be educated, and nor because people did not know enough to be able to hold valuable opinions. The research showed that people require scientists considering genetic technologies for invasive species management, to engage in holistic responsible innovation which seeks protection of the future "through collective stewardship of science and innovation, which Stilgoe and co-workers state seeks, in the present". This embraces science of care and not simply science of cure. This social research is one of the most comprehensive deep dives into what New Zealanders think about gene technology and so provides deep insight to inform science innovation and policy-making.

152 How to selectively stop invasive pink salmon from migrating up Europe's largest salmon river

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With its anadromous stretch of approximately 120 km, the Tana River flows along the border of Norway and Finland and is widely considered one of Europe's most important salmon rivers. In recent years this key habitat for native Atlantic salmon (*Salmo salar*) has been increasingly threatened by the spread of invasive pink salmon (*Oncorhynchus gorbuscha*). The increasing presence of pink salmon in northern European rivers poses great ecological risks, including competition for spawning grounds, disruption of native species' life cycles and further unknown long-term ecosystem effects. Funded by the Norwegian Environment Agency, we address this challenge in the Norwegian fauna by developing and deploying a fish migration barrier and trap system. Spanning the river's 400-meter width in the lower parts of River Tana, the barrier is specifically engineered to fully obstruct upstream fish migration, effectively guiding all fish toward designated trap entrances for controlled capture. This system allows for species identification and selective handling before any upstream passage is permitted. Fish entering the trap are directed into a holding chamber prior to species sorting based on morphological cues. Native salmonids are released upstream with minimal handling time, while pink salmon are retained for removal. Special emphasis is placed on minimizing injury, stress, and delay for native species migration, while maximizing capture efficiency for pink salmon. Several catch chambers were also integrated with entrances facing upstream to allow downstream migration for Atlantic salmon kelt and smolt. The design also supports continuous visual inspections by use of video monitors and sonar mounted along the barrier facing downstream and directly to the trap entrance. With this poster I intend to elaborate the technicalities in how the barrier is designed, optimizing pink salmon catch, while simultaneously preserving the critically endangered Atlantic salmon stock in River Tana.

156 What are we missing? Evaluating trail camera detection performance for invasive house mice (*Mus musculus*)

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Commercially available PIR trail cameras are widely used to detect invasive mammals as part of biosecurity surveillance and conservation monitoring. While effective for large mammals, their performance for smaller species such as house mice (*Mus musculus*) is less well understood. Mice are an increasingly important focus in eradication and island incursion surveillance contexts where early detection of survivors or invaders is critical. Anecdotal reports by experienced practitioners suggest small mammals are often present in a camera's field of view without triggering the device. This small study quantified the proportion of mouse encounters detected

by four commercially available passive infrared (PIR) trail camera models and one thermal camera. Video files from a continuously recording camera provided an independent baseline for mouse detections throughout. Detection probability was calculated as the proportion of baseline continuously recording video bins where the trail camera also recorded mice during the same time period. 1-minute and 2-second time bins were investigated. While there was some variation between trail camera models, all four models captured fewer than 50% of actual mouse encounters when encounters were binned to a 1-minute interval. Mouse detection probability dropped much further when binned to a 2 second time period. The Cacophony thermal camera showed a higher mouse detection probability than the PIR trail camera models tested. The onboard AI model was unlikely to correctly identify mice to genus level, but had higher success to order (rodent) level. Although limited in scale, the findings from this study contribute to the broader evidence base on detection tool performance and may help inform further refinements in detection strategies in high stakes eradication and biosecurity contexts. Trail cameras may remain a practical and cost-effective tool for pest monitoring but should be deployed with an understanding of their limitations, which we begin to quantify in this study.

157 Restoring Aldabra: Reclaiming an ecological legacy on one of the world's largest raised atolls

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Aldabra Atoll, a UNESCO World Heritage Site in the Western Indian Ocean, is known for its wealth of biodiversity and relative ecological intactness. However, the atoll has been subjected to ecological degradation from invasive black rats (*Rattus rattus*) for over a millenium, and feral cats (*Felis catus*) for more than a century, leading to extensive loss of biodiversity, including the extinction of native landbirds, suppression and local extinctions of breeding seabirds, reptile and invertebrate populations, and widespread vegetation damage. This study synthesizes recent scientific evidence and eradication feasibility assessments about the ecological impacts of mammal eradications on island ecosystems, and applies these findings to Aldabra. Research from comparable islands shows clearly that the removal of invasive mammals yields rapid and cascading ecosystem benefits, including the recovery of seabird populations, restoration of land-sea nutrient flows, accelerated coral reef growth, increased marine biomass, and regeneration of native vegetation. We predict a future restoration scenario for Aldabra following the successful eradication of rats and cats. Predicted outcomes include: ground-nesting and small seabird recolonization within a decade, resulting in a substantial increase in nutrient subsidies to terrestrial and marine habitats; improved coral growth and fish biomass; recovery of landbird populations and diversity through natural recolonization and reintroduction; expansion of reptile and bat populations; restored mangrove fauna and increased invertebrate abundance across all habitats. These ecosystem shifts will enhance Aldabra's overall biodiversity, ecological functions, and resilience to climate change. A comprehensive feasibility study is nearing completion to assess the logistical and ecological viability of a full-scale eradication of both species. Aldabra's relatively intact ecological status compared to other islands makes invasive mammal eradication a critical and achievable step toward restoring the atoll's natural heritage and reinforcing its role as a keystone ecosystem in the Western Indian Ocean.

161 Building invasion-proof communities: From predicting invasibility to post-eradication restoration

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The long-term success of island conservation hinges on shifting from reactive eradication to proactive management that secures ecosystems against future invasions. While identifying which communities are most vulnerable is critical, effective management must also aim to restore them in a way that builds lasting resilience. Here, we introduce a bioenergetic modelling approach to explore the underlying mechanisms that govern community invasibility. By simulating the introduction of non-native species with diverse traits into recipient communities of varying network structures, the model generates clear risk profiles that help identify those communities most at risk. These insights can inform and prioritise biosecurity, guiding targeted management strategies towards the most susceptible ecosystems. Crucially, this research extends beyond risk assessment to inform post-eradication management. Following a successful invasion simulation and the subsequent removal of the invader, we test competing restoration strategies aimed at improving invasion resistance. This allows us to explore how different approaches to rebuilding the food web, from simple replacement to strategic reconstruction, affect its robustness. By re-invading these restored communities, we can thus identify the strategies most likely to create resilient, invasion-resistant ecosystems. This research aims to bridge the gap

between predictive modelling and applied decision-making in an effort to enhance the enduring success of island conservation programmes by supporting the full lifecycle of invasion management.

162 Restoring seabird habitats through targeted rodent control: Efforts on Mianhua Islet, Taiwan

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The invasive rodents pose a significant threat to seabird breeding colonies worldwide, and Taiwan is no exception. Mianhua Islet (approx. 13 hectares), an uninhabited island located about 25 nautical miles off Taiwan's main island, serves as a breeding site for the Streaked Shearwater (*Calonectris leucomelas*), with an estimated breeding population of only 10–20 individuals. Although the islet has been designated as a wildlife reserve for nearly three decades—effectively minimizing human disturbance—the reproductive success of shearwaters continues to be undermined by the presence of invasive Norway rats (*Rattus norvegicus*). Our study documented multiple instances of Norway rats entering seabird burrows, with one confirmed video recording of an individual removing an egg. Since 2021, we use automated cameras to track breeding activity while simultaneously implementing invasive rodent control. In 2022, due to the limited and declining effectiveness of traps, we transitioned to bait station deployment. Forty bait stations, each containing 300 grams of Coumatetralyl, were deployed across the island from September through the following March or April. In 2023, five additional cameras were installed to monitor Norway rat activity, followed by four more in 2024. Footage from the nesting areas revealed a marked reduction in rat presence following bait deployment, and overall rodent activity across the island has shown a consistent downward trend. Data also indicate that rat activity hotspots are closely associated with vegetation structure, particularly in dense shrub zones. Despite three consecutive years of bait station operation, the invasive Norway rat population has not been fully eradicated, and activity persists within and beyond shearwater nesting sites. To strengthen eradication efforts, we plan to switch to a more potent second-generation rodenticide, flocoumafen, with the goal of achieving complete removal of the invasive population and restoring the island's seabird habitat.

169 Using UAV photogrammetry to improve the calibration of bait bucket spread

Blake Hornblow, James Griffiths, **Em Oyston**
Department of Conservation

Effective aerial baiting is critical for successful island pest eradications, yet there are significant knowledge gaps around factors that influence bait density and distribution on the ground. Current bucket calibration methods rely on small transects that do not fully capture the variability of bait spread under operational conditions. Factors such as hopper design, bait bridging, wind conditions, and hopper dynamics (pitch and yaw) can all affect bait distribution during application. Assessing bait spread over larger areas can help resolve these issues. In this study, we conducted trials using unmanned aerial vehicle (UAV) photogrammetry combined with GNSS receivers to validate results. High-resolution orthomosaics were generated from imagery, and baits within these images were detected using AI object detection tools. This approach enables precise mapping of bait distribution over large areas. Trials have demonstrated that UAV photogrammetry is an effective tool for capturing detailed bait spread patterns. This technique could support improved calibration of bait buckets and evaluation of how different hopper designs and other conditions influence bait sowing patterns. Gaining robust knowledge and confidence in bait deposition will increase the likelihood of success during island eradications. Significant improvements in understanding bait spread could enable smaller overlaps in sowing lines, which would reduce flight time, aviation fuel use, and the overall length of baiting operations — all critical factors under tight logistical and weather constraints. Ultimately, these advances could benefit conservation projects by improving the cost-effectiveness of island eradication and pest control operations, protecting native wildlife, and enhancing the success of large-scale eradication efforts.

173 Evidence-based baiting in mangroves: habitat use of black rats revealed by spool-and-line tracking

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Mangrove forests are among represent some of the most challenging environments for invasive rodent

eradications, due mainly to their tidal dynamics and year-round food sources availability. On Aldabra Atoll, the presence of black rats (*Rattus rattus*) within 1700 ha of mangrove habitats poses a major obstacle to atoll-wide eradication planning. Understanding rat spatial use in these habitats is essential to design effective baiting strategies that ensure complete exposure. We conducted spool-and-line tracking trials within mangrove habitats to generate fine-scale multi-dimensional spatial data. Rats were equipped with lightweight quilting cocoons and released under natural conditions. The recovered thread paths were subsequently analysed to quantify total distance travelled, differentiate ground versus arboreal movement, and identify key features such as feeding locations and nesting sites. Despite the operational difficulties of working in tidally influenced and densely vegetated terrain, this method provided high-resolution behavioural data. Results showed that rats routinely used both ground and arboreal pathways, with a significant proportion of movement occurring in the canopy (up to 8 m high). We provide eEvidence supports that bait present both on the ground and in the canopy — an highly likely outcome highly likely when bait is distributed aerially in the form of bolas — would maximise bait encounter rates. Moreover, spool-and-line tracking proved to be a low-cost, highly informative method suitable for use in remote tropical field conditions. Incorporating rat movement ecology into operational design increases the likelihood of success, particularly in contexts where conventional eradication methodologies are not technically feasible. These findings provide essential empirical data to optimise baiting strategies within Aldabra's challenging mangrove habitats, and will inform the future design and operational requirements for the development of an effective aerial bola delivery system.

174 The ecology of the invasive Smooth-Billed Ani (*Crotophaga ani*) in Galapagos

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Invasive birds can severely disrupt and threaten native biodiversity on islands. In Galápagos, where a total of 68 species are considered invasive, the smooth-billed ani (*Crotophaga ani*) is the only invasive bird species. Anis were introduced to the archipelago in the early 1960s and have since spread across most of the major islands. The social behaviour of anis includes communal nesting and roosting. Although some research has been carried out on anis in Galápagos, their impact on native biodiversity is little understood. Evidence suggests that anis pose a threat to local biodiversity by competing with and predating on native species, and by spreading invasive plants. This research aims to understand key aspects of anis' ecology to inform a management plan for anis in Galápagos, and to serve as a framework for other avian invasive species control on islands. On Floreana Island, a rodent and feral cat eradication was attempted in November 2023. To evaluate the potential influence of non-target effects on anis, we monitored ani roosts on Floreana across three seasons: 2023 (pre-eradication), and 2024 and 2025 (post-eradication). We found an increase of 66.3% in the total number of anis, and 72% in individuals per group from 2023 to 2024, and a slim decrease of 4.6% in both numbers between 2024 and 2025. Approximately 67% (26 of 39) of anis banded in 2023 were located in the same territories in 2024 and 2025, two moved to neighbouring territories, and the remaining 13 were not resighted. Most resighted juveniles (91%, n = 10) and all resighted fledglings (n = 5) were in their natal territories, suggesting a low dispersal level. Additionally, we present preliminary results on population density, territory use, group composition, and dietary habits of anis on Santa Cruz, the largest ani population, across five different habitat types.

176 Restoring the Chatham Islands - predator free Chathams

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Located 800km from mainland Aotearoa, the Chatham Islands are home to nearly 10% of the country's endangered species, and a community of around 660 people. The Chatham Islands Landscape Restoration Trust is working to bring conservation and ecosystem restoration projects to life, to see the unique biodiversity of our islands thriving and its community flourishing. Its flagship project is Predator Free Chathams, focused on eradicating invasive possums, feral cats and rats from the archipelago.

178 From rats to riches: Redonda's recovery post eradication, through the lens of the endemic reptiles

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Redonda is a remote, unpeopled island located 34 miles southwest of mainland Antigua, nestled within the Eastern Caribbean. It supports globally significant seabird colonies, such as the Masked Booby (*Sula*

dactylatra) and Brown Boody (*S. leucogaster*), and is home to several rare endemic lizard species, including the Critically Endangered Redonda Ground Dragon (*Pholidoscelis atratus*) and Redonda Tree Lizard (*Anolis nubilus*). However, prior to 2016, the severe ecological degradation from invasive mammalian predators led to the near-total loss of ground vegetation, widespread tree die-off and heavy predation on native fauna and flora signaling to an impending ecosystem collapse. In response, an ambitious ecological restoration program was launched in 2016-2017, successfully eradicating over 6000 invasive Black rats (*Rattus rattus*) and removing a herd of feral goats (*Capra hircus*) on the island. This passive restoration approach led to a dramatic ecological rebound, including a 108-fold increase in vegetation cover, a six-fold increase in *P. atratus*, and a three-fold increase in *A. nubilus* by 2019, just two years post-eradication. Now, seven years after the eradication, Redonda has successfully maintained its invasive alien mammalian species free status, allowing for the assessment of the long-term population trends of the endemic lizards following the removal of the high predation pressure. Population surveys conducted between 2019 to 2024 indicated continued growth, confirming the sustained benefits from the restoration; however, a decline in population density was observed in 2024. Drawing on behavioral observations and ecological indicators, we are currently investigating potential factors contributing to this shift and discussing implications for ongoing recovery and long-term management of Redonda's endemic reptile species.

184 Data-driven adaptive management: Integrating statistical modeling and cloud-based data management for the Wake Atoll rat eradication project

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Adaptive management is a critical component to successful invasive species eradication and requires a balance between effective data collection, concise data analysis and timely decision-making. This poster presents a case study from Wake Atoll, where existing statistical modeling tools and a cloud-based data management system were leveraged to support decision-making during the detection and response phase of a complex rat eradication project. The approach focused on utilizing a digital app to streamline workflows and enable remote collaboration and management, while applying probabilistic models to estimate the likelihood of eradication success and guide decisions around monitoring effort. Together, these tools enhanced the ability to adapt and respond to new information quickly and maintain confidence in progress toward eradication goals, while maximizing available resources. Reprioritization of monitoring methods and descaling of staff effort are both examples of decisions that were made as a result of using these systems. This approach was unique in that it was critical to effectively execute a campaign style eradication strategy—similar to a hunting and trapping project—which contributed to the successful eradication of two rodent species. Key takeaways are the potential for such tools to: improve operational efficiency, reduce response times, and support more informed decisions regarding detection and response strategies. This case underscores the broader applicability of these systems in invasive species eradications, particularly in contexts in which logistical constraints and uncertainty demand flexible, data-driven strategies. Furthermore, it offers an example of how these tools can support a campaign style approach to complete a rat eradication, where traditional methods might fall short.

185 Eradicating rabbits from Deen Maar Island, Western Victoria.

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Deen Maar is a 140-ha volcanic island 10km off the southwest coast of Victoria, Australia. Deen Maar Island holds deep cultural significance to the Eastern Maar and Gunditjmara Traditional Owners, and it supports critical breeding habitat for seabirds. This presentation outlines a rabbit eradication project, undertaken to address the long-term ecological and cultural impacts of rabbit populations, first introduced to Deen Maar in the 1860s. This project employed best practice eradication methods, and in collaboration with Eastern Maar and Gunditjmara Traditional Owners, these methods were adapted to align with the island's cultural sensitivities. A key method for the project was the extensive use of thermal drones which proved highly effective for detection and monitoring. The Deen Maar Island Rabbit Eradication Project highlights the value of integrating new technology and expertise with culturally informed land management.

186 Effects of sterile males on reproductive rates for fertility control in house mice using the t-haplotype

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Invasive house mice (*Mus musculus domesticus*) are one of the major mammalian pests worldwide, causing massive damage to local flora and fauna. Half of the large-scale eradication attempts using rodenticides have been unsuccessful so far. The efficiency of rodenticides is limited by the accessibility of the habitat and the increasing number of species that are developing resistance to rodenticides. Natural genetic biocontrol methods, like inherited sterility using a selfish genetic element found in house mice in nature, the so-called t-haplotype, could help to overcome these limitations. Homozygous males carrying this gene are fully sterile while heterozygous males transmit t to up to 95% of offspring due to gene drive rather than the expected Mendelian rate of 50%. However, despite the theoretical possibility of such a management method, some key questions remain unanswered. Wild house mice show a polygynandrous mating system with dominance playing a major role in the social structure of males. These factors could possibly influence the efficiency of this method. In this study, we performed seasonal enclosure experiments with different proportions of sterile males (0-80%). During the experiment we measured offspring production and survival and assessed male dominance by measuring social interactions at nest sites and by tube tests. We found that a population composition of 60% sterile males results in ~40% fewer offspring born, while 80% sterile males leads to ~80% fewer offspring born. Moreover, we found high offspring mortality rates over all trials leading to a further decrease in population growth. Males carrying the t-haplotype did not differ to wildtype males in dominance. These results indicate that induction of male sterility could be an important management tool.

187 Candidate gene for control of invasive house mice (*Mus musculus*) lowers fertility in both sexes.

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There are currently limited means of controlling invasive house mouse populations (*Mus musculus*) on islands. Despite being the most widespread method for rodent control, poison dissemination threatens endemic species while raising concerns regarding their sustainability and welfare. We are investigating whether the t haplotype, a naturally occurring genetic driver in house mice, could be used as a more humane and specific alternative. In t-heterozygous males, the t-haplotype gains a transmission advantage by "sabotaging" wild-type sperm, whilst t-homozygous males are sterile. Therefore, control might be achieved by elevating the frequency of sterile males through the release and reproduction of t-carrying males into target populations. To accurately assess the impact of sterile t releases, we measured the t haplotype's fertility effects in both sexes. For males, we studied the sperm's quantity and quality: Although fertile, the t-heterozygous male samples had lower motile sperm concentration than wild-type. The t-homozygous male samples had even lower overall sperm concentrations, with these few cells being static and thus unable to achieve fertilisation. For females, we studied offspring production in the lab: Surprisingly, t-homozygous females had litter sizes reduced by half compared to wild-type and t-heterozygous mothers. Given the severe t-related fertility costs observed in both sexes, we would also expect mice to evolve behavioural strategies such as female polyandry or mate choice to avoid them. However, preliminary results have shown that wild-type females do not seem to discriminate against them when choosing a mating partner. Altogether, our results suggest that the t-haplotype may be a promising tool for pest control.

192 Can occupancy modelling help eradication planning? A case study from the LIFE Raft project

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The advancement of technology and statistical techniques, to collect and interpret data, provides an opportunity to increase the range of tools available for eradication planning. Here we examine whether occupancy modelling, an approach that accounts for imperfect detection and gives a probability of the true presence of a species in an area, can help inform eradication planning. We do this using data collected as part of a feral ferret (*Mustela furo*) eradication on Rathlin Island, Northern Ireland. In 2021, the LIFE Raft project started efforts to protect Rathlin's internationally important seabird colonies by eradicating feral ferrets and brown rats (*Rattus norvegicus*). To determine ferret population abundance pre-eradication, and where the species occurred, a grid of 144 trail cameras were established across the 1371 ha island. Trail cameras were run for a period of 4 weeks in Winter

2022/23 and Autumn 2023 to produce pre-abundance estimates and ferret occupancy models on the island. Variables used to construct the models of ferret occupancy, included habitat variables derived from Copernicus satellite data and landscape features. In Autumn 2023, a network of 402 live and kill traps was established across the island to eradicate ferrets. Pre-eradication models were subsequently compared to models using ferret presence data derived from where ferrets were trapped in the project's trap network. We discuss the pitfalls and benefits of the approach using our case study and highlight the use of this accessible technique to help inform future eradication projects.

193 Towards novel principle-based strategies to reduce bait quantities for rodent eradication: Lessons from a case study of a high-concentration, low sowing-rate application in a coastal desert ecosystem of the Humboldt Current

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Invasive rodents represent a significant threat to biodiversity on islands and the use of conservation baits containing rodenticide is one of the most effective methods for protecting these unique ecosystems. When planning an eradication, bait application strategy choices drive project logistics and thus cost. Current best practice prioritizes balancing the likelihood of success and environmental risk, rather than reducing total bait quantities. We employed a strategy that utilized a ~1g (9.5mm diameter) pellet with 50ppm brodifacoum concentration, and reduced the number of applications to a single island-wide application. This approach sought to reduce the total bait quantity while maintaining the bait encounter rate and active ingredient per unit area the same or greater than more commonly used strategies employing at least two applications of a ~2g pellet with 20-25ppm brodifacoum concentration. We tested this strategy during an attempt to remove invasive black rats (*Rattus rattus*) from the arid desert island of Pajaros 1, Chile. These strategy choices reduced total bait quantities by 75% compared to conventional approaches. The eradication was declared successful, a first for invasive rats on islands in Chile. The use of small, high concentration baits and single application strategies have broad utility for reducing rodent eradication costs in island ecosystems within the Humboldt Current and could be considered and trialed elsewhere when bait quantities are the main drivers of cost, complexity, and logistics; each of which may impact project feasibility.

195 Re-evaluating the vertebrate species introductions to the Hauraki Gulf Islands in the 19th Century

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Common knowledge has it that Governor Sir George Grey introduced five species of wallaby (tammar, parma, swamp, black-striped, and brush-tailed rock wallabies) to Kawau Island around 1870, along with a few other animals which did not establish, and that John Reid introduced rock wallabies to Motutapu Island in the early 1870s. Through archival research I have discovered that Grey actually introduced at least seven species of macropod to Kawau Island, with the true number likely to be closer to 14. These include red kangaroos, eastern grey kangaroos, common wallarroos, grizzled tree kangaroos, Bennett's wallabies, yellow-footed rock wallabies, and eastern bettongs, among others. He also introduced long-tailed macaques, emus, cassowaries, and a large collection of other birds. These introductions were almost entirely conducted, during his second term as Governor of New Zealand (1862 – 1868), and many of the animal were delivered to Kawau Island on navy ships, assisted by the military, during the Waikato and Taranaki wars, which Grey had started, and while he was the head of the military. Many of these species established for a considerable time, but due to environmental degradation, regular intensive hunting pressures, and deliberate large fires, only four wallaby species likely survived to the 1960s when the first proper survey of the island's fauna was conducted. Grey also introduced rock hyraxes and angulate tortoises to Motutapu Island prior to his acclimatization work on Kawau. It appears extremely unlikely that John Reid introduced any wallabies to Motutapu, but instead the previous owner Robert Graham introduced them in the 1860s. Graham was a high-ranking politician and good friend of Grey, and he also introduced these wallabies to Motuihe Island. Graham conducted considerable acclimatization efforts on both of these islands with species including emu, ostriches, fallow deer, sparrows, and hares.

200 Adaptive patterns of anti-predator escape behavior in a globally introduced bird species

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Introduced species can represent quasi-experimental, anthropogenic case studies of both ecological and evolutionary principles. When these species are firmly established, competitive interactions between native and introduced species interactions, including foraging, spacing, and breeding competition, may be among the ecological costs incurred from such species invasions. In turn, genetic and/or plasticity-driven changes in behavior and morphology could also take place in the invading species with increasing introduction lag (time since the onset of introduction). Critically, however, introduction lag is difficult to study in any single non-native population without long-term observations, and, instead, it requires geographically repeated measures of the focal response variables across invasive populations that were introduced at different times. Here we tested a priori predictors of predator-avoidance behaviors through the flight initiation distance (FID) assay of a widely distributed invasive bird species, the common myna (*Acridotheres tristis*). The species was extensively and consistently sampled throughout most of its independently introduced ranges across all hemispheres. Critically, FID increased with greater introduction lag. We also detected additional functional patterns in that FID increased towards the rural range within a continuous metric of urban-rural gradient and also at shorter distances from the Equator. Any robust study of FID must also include proximate predictors as well and, accordingly, we found that FID increased with greater starting distance, with lower immediate human density, with flighted over walking escape responses, and at lower heights of a bird's perch above ground but was unrelated to myna group size. Respectively, these factors are informative about the sensory cues triggering anti-predator behaviors in invasive mynas and imply an adaptive set of patterns of anti-predator responses in the introduced ranges of this species. Control measures of invasive common myna populations should take into account their extensive behavioral and cognitive flexibilities and adjust the planned management methods accordingly.