Where to for New Zealand’s biodiversity management?

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Road map…

- How well does our biodiversity management align with our goals?
  - Are there smarter ways to address biodiversity loss?
- Are we better attempting to eradicate some predators everywhere
  - Or managing all major drivers of biodiversity decline at selected sites?
- A personal perspective
  - Based on 40 years involvement in conservation science in NZ

My role started in 1979…

- Central North Island logging controversy – mid-1970's
  - Clear felling of dense podocarp forest for pine plantations
- Government called moratorium on logging
  - Setup a multi-party research group to study logging impacts
  - Both kokako and other forest birds
- Responsible for the forest habitat component

Visually…

Two ‘retirement’ papers in 2023…

- NZ Journal of Ecology 47: 3515 – Leathwick & Byrom
  - The rise and rise of predator control: a panacea, or a distraction from conservation goals?
- NZ Journal of Ecology 47: 3557 – Leathwick, Whitehead, Singers, Daly
  - Establishing an evidence-based framework for the systematic conservation of New Zealand’s terrestrial ecosystems

Some historical context…

- Deer long recognised as a major threat to native ecosystems
  - Control by the Crown from 1930's, peaking in 1960's
- Crown control of deer redundant with 1970's rise of venison recovery
  - In turn collapsed with rise of farmed venison
- Possums declared a pest in 1946
  - Limited 1080 use in 1970's to protect rata-kamahi forests
  - Harvesting for fur peaked in 1970's
  - Extensive control from 1990s to reduce incidence of bovine TB
    - Ending as incidence of bovine TB decreases

More recent changes…

- Evidence of predator impacts and feasibility of landscape control
  - Birds – Innes et al; lizards – Reardon; invertebrates – O'Donnell
  - Mainland islands and fenced sanctuaries, e.g., Zealandia, Maungatautari
- A proliferation of conservation players
  - Promoted by the 2013 DOC restructure
  - Regional Councils, Iwi, philanthropists, businesses, community groups, etc.
- In 2016 led to the setting up of Predator Free 2050
  - Predation identified as 'the preeminent threat to New Zealand's biodiversity'

Two years of change…

- Large cuts in DOC's funding
  - From $880m in 2023/24 to $728m in 2026/27 – a 17% drop!
  - Comes on top of a 21% drop with end of *Jobs for Nature*
  - Reduction of 124 staff so far including chief science advisor
  - Tama Potaka – "*Some endangered native species may have to go extinct because it would be too expensive to save them*"

- Fast track legislation
  - Shane Jones – " Stewardship land is not DOC land, and if there is a mineral, if there is a mining opportunity and it's impeded by a blind frog, goodbye, Freddie."

Our new biodiversity strategy…

- Has two core nature-focused objectives
  - Ecosystems, from mountain tops to ocean depths, are thriving
  - Indigenous species and their habitats … are thriving

- Reflect our international obligations under CBD
  - Kunming-Montreal Global Biodiversity Framework in December 2022
    - Effective conservation and management of ecologically representative, well-connected and equitably governed systems of protected areas
    - Urgent action to halt human induced extinction of species

Current biodiversity management

- Increasingly focused on eradicating a subset of predators (PF2050)
  - Measurable benefits for (a small number of) predator vulnerable species
  - Some habitat benefit through reduction in possum browsing
  - Major gains in expanded social engagement
  - Significant technical innovation around predator control (ZIP)

- Other biodiversity pressures are now largely ignored almost everywhere
  - Other predators – mice, cats and hedgehogs
  - Ungulate browsers + wallabies, hares, rabbits
  - Weeds, human use, climate change, habitat loss, nutrient addition…

A major disconnect between…

- Our high level biodiversity goals
  - And the current allocation of effort for biodiversity conservation
- Most effort benefits only a small subset of (iconic) species
  - Management of browsers and other pressures has steadily decreased
  - Most likely in response to social pressure from hunters
- The majority of our conservation narrative is now species focused
  - Ecosystem goals and obligations receive only token mention

A puzzling amnesia…

- A century plus recognition of browser impacts on biodiversity…
  - Deer (x7), goats, pigs, possums, tahr, chamois, wallabies, rodents, hares, rabbits
- Extensive documentation of their impacts
  - In forest & scrub - Holloway, Mark & Bayliss, Fitzgerald, Wardle (x2), Husheer
  - In grasslands – Wraight, Parkes, Rose & Platt, Cruz et al.
  - On ecosystem function – D. Wardle
  - On fauna – takahe – Mills; NI kokako – Leathwick et al.
- And the significant recovery that occurred with wild venison recovery!

Ecosystem conservation…

- Geoff Kelly – pioneering thinker on ecosystem conservation
  - In a DSIR-publication *Land alone endures* (1980)
- A comprehensive framework for ecosystem conservation
  - National mapping of potential ecosystem cover
  - Analysis of protection and loss to identify priorities
  - Systematic survey of existing reserves
  - Action to conserve representative examples of all ecosystems
- His core principles prefigured those adopted by IUCN and CBD

Where did this thinking get lost?

- DOC's science capacity was biased from its inception
  - CRI's fought hard to retain ecosystem and habitat skills
  - DOC science composed largely of fauna conservation skills (ex Wildlife)
- DOC's perennial preoccupation with restructuring
  - In 2013 science restructured into a centralized 'service centre' model
    - 'Don't call us – we'll call you'
- Chief science advisor role disestablished last April

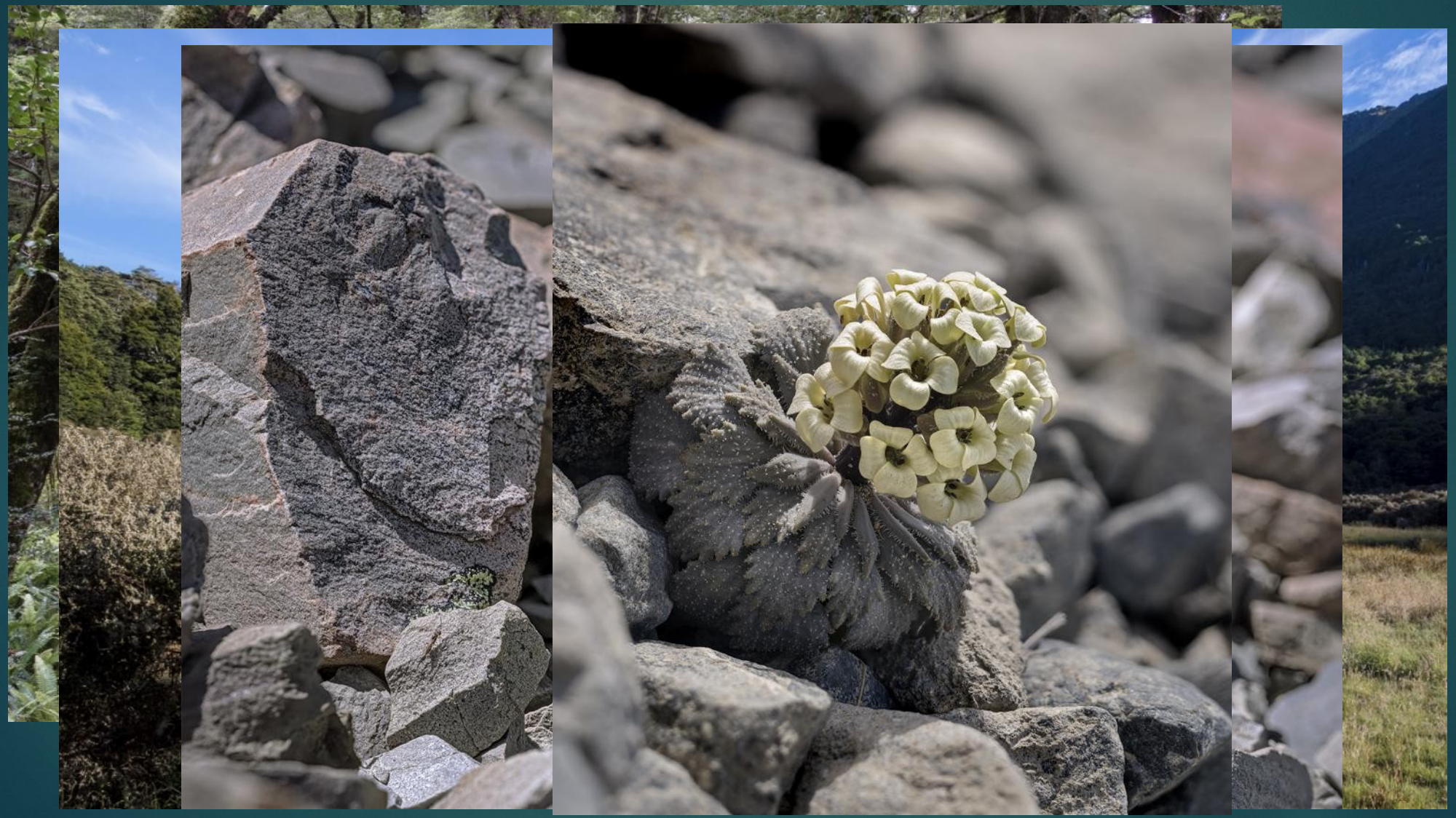
The advent of PF2050…

- The vision first proposed by Sir Paul Callaghan in 2011
  - A network of strategically located Zealandia replicates
  - Intensively managed, fenced sites within which all pests removed
- Politically morphed to become NZ's flagship biodiversity program - 2016
  - Management scope truncated down to just a subset of predators
  - Geographic scope went from 'at selected sites' to 'eradication everywhere'
- Substantial re-allocation of resources despite
  - Only weak alignment with our biodiversity goals
  - Significant unresolved questions about its technical feasibility
  - Failure to seriously consider alternative approaches…

Risks include…

- Profound browsing-induced alteration of ecosystem character
  - Return of ungulates to tussock grasslands
  - Disruption of forest regeneration processes
  - Removal of broad-leaved shrub tiers
  - Degrading of habitat value for predator-vulnerable species
- Loss of browse vulnerable species
  - Both rare plants and ecosystem keystone species
- Widespread weed invasion
  - Particularly conifers

For example…



The question…

- Are we better off
  - Attempting to eliminate a subset of predators everywhere?
  - Comprehensively managing all threats at a selected network of sites?
    - Chosen to represent a full range of ecosystems & species

- Noss (1996) – Ecosystems as conservation targets – TREE 11: p. 81
  - Recognises the complexity of nature
  - Caters for poorly known species
  - Reduces risks of future endangerment
  - Protects ecological functions as well as species

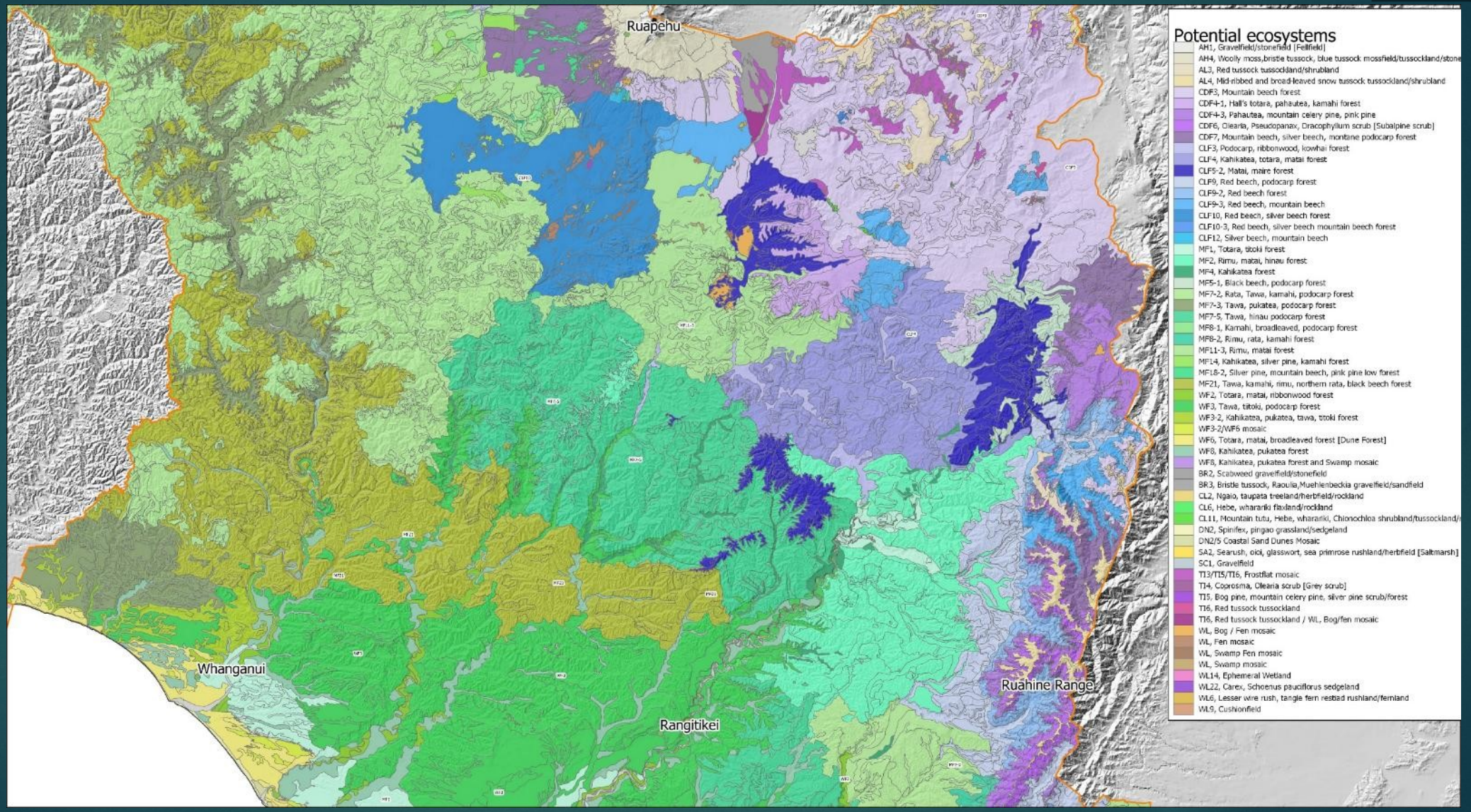
Is ecosystem conservation feasible?

- Explored this for the Horizons Region (paper 2)
  - What was the original ecosystem character?
  - How much remains?
  - Where are the ‘priority locations’ requiring protection/management?
    - If we are to protect what was once there…
- Data sources
  - Mapping of potential terrestrial ecosystem cover – Nick Singers
  - Current land cover from Land Cover Database (LCDB4)
  - Broad land tenure – DOC-administered lands

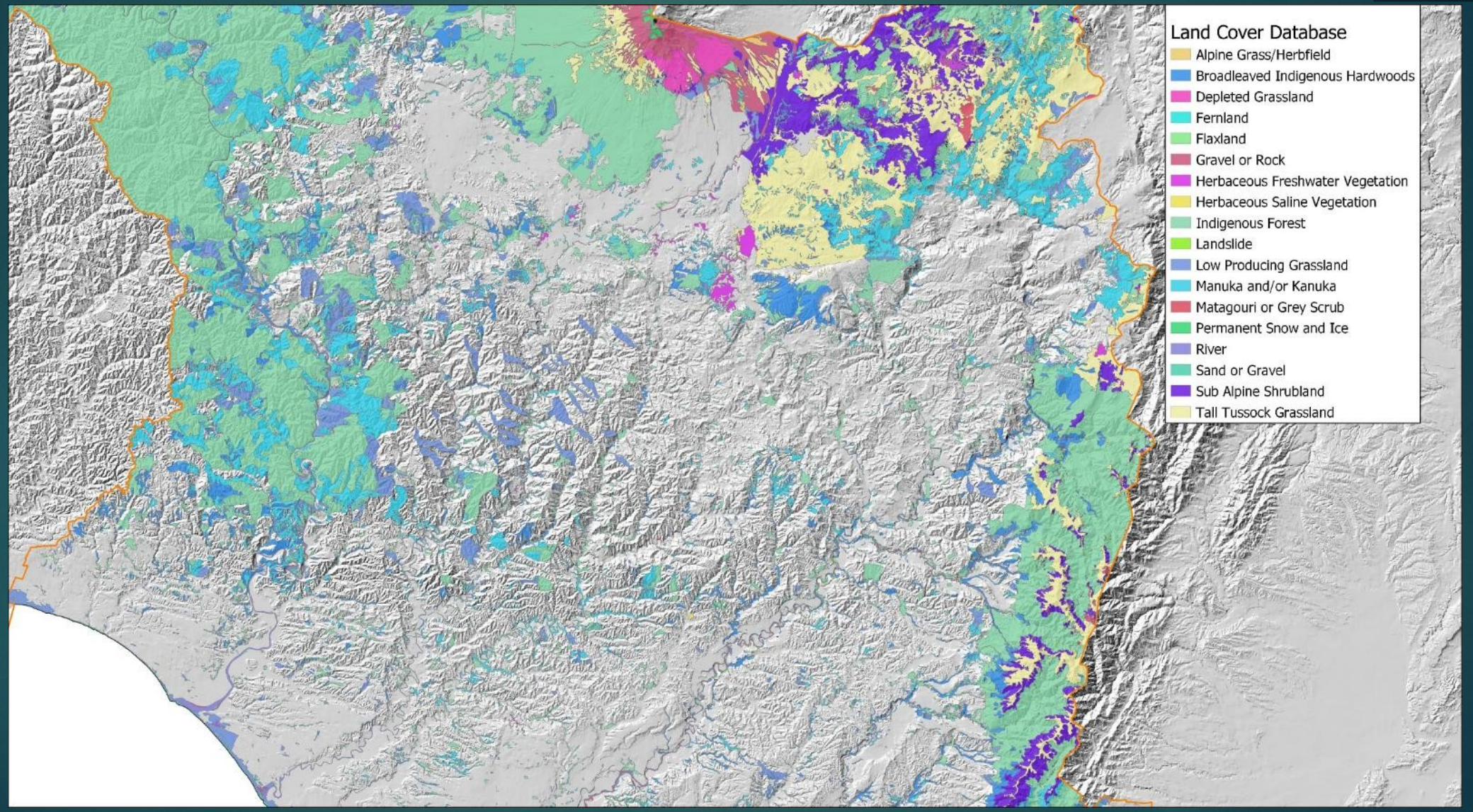
Analysis of ecosystem loss…

- Standard spatial analyses with Geographic Information System
- Calculated original extents of all ecosystems
- Clipped potential cover to current areas with indigenous cover
  - Distinguishing between primary and secondary cover
  - Calculate losses in extent

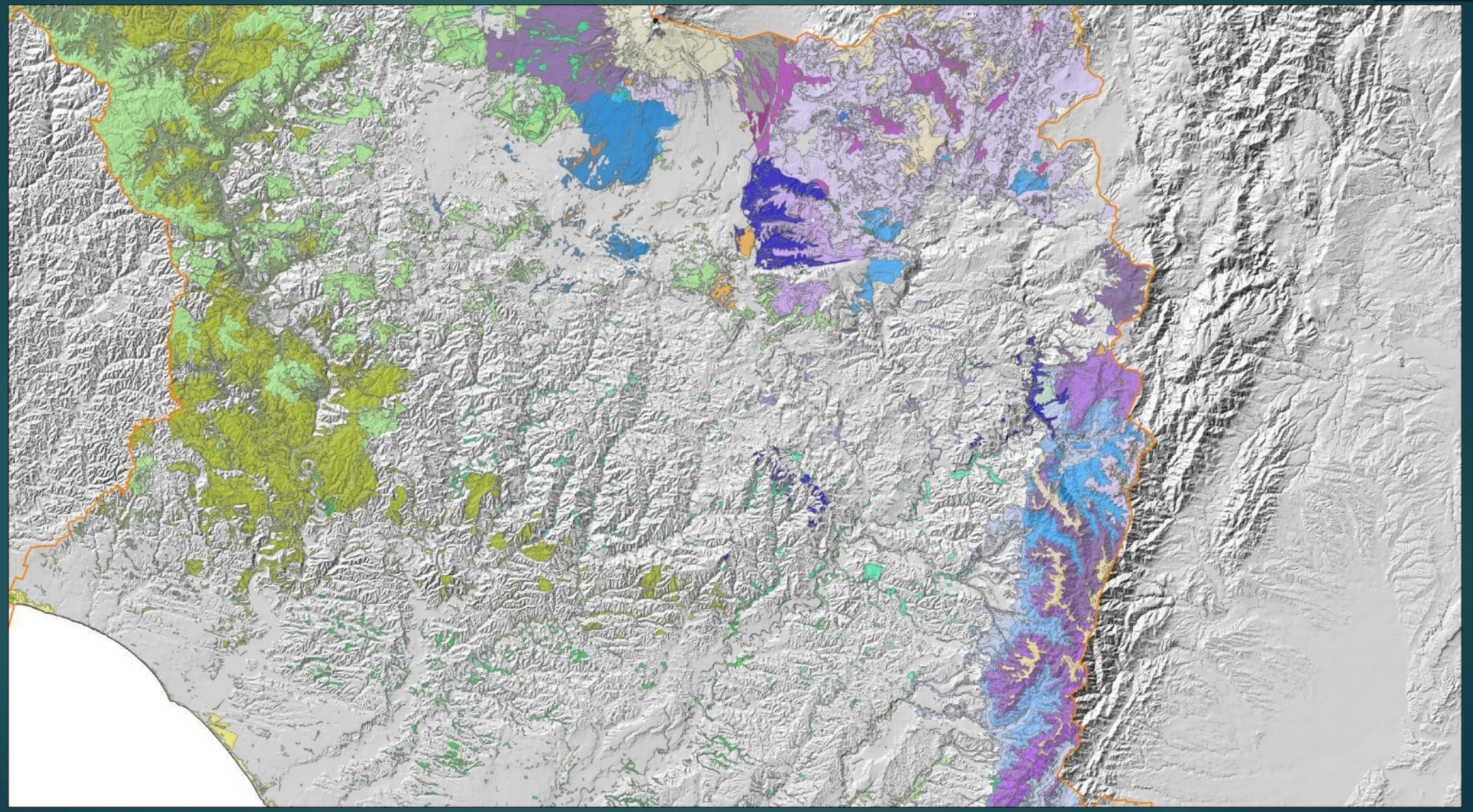
Potential ecosystems



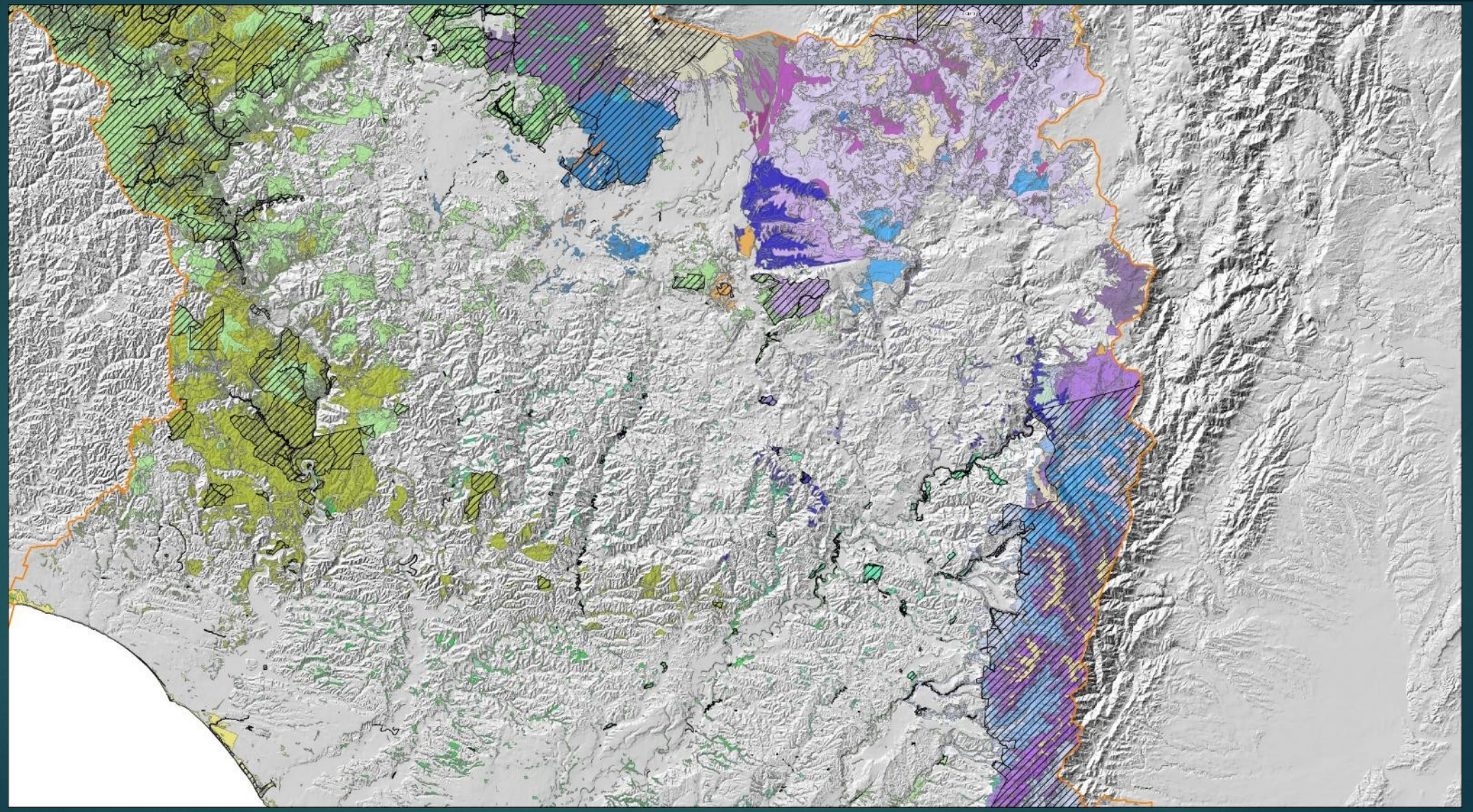
Land Cover Database



Current ecosystem cover



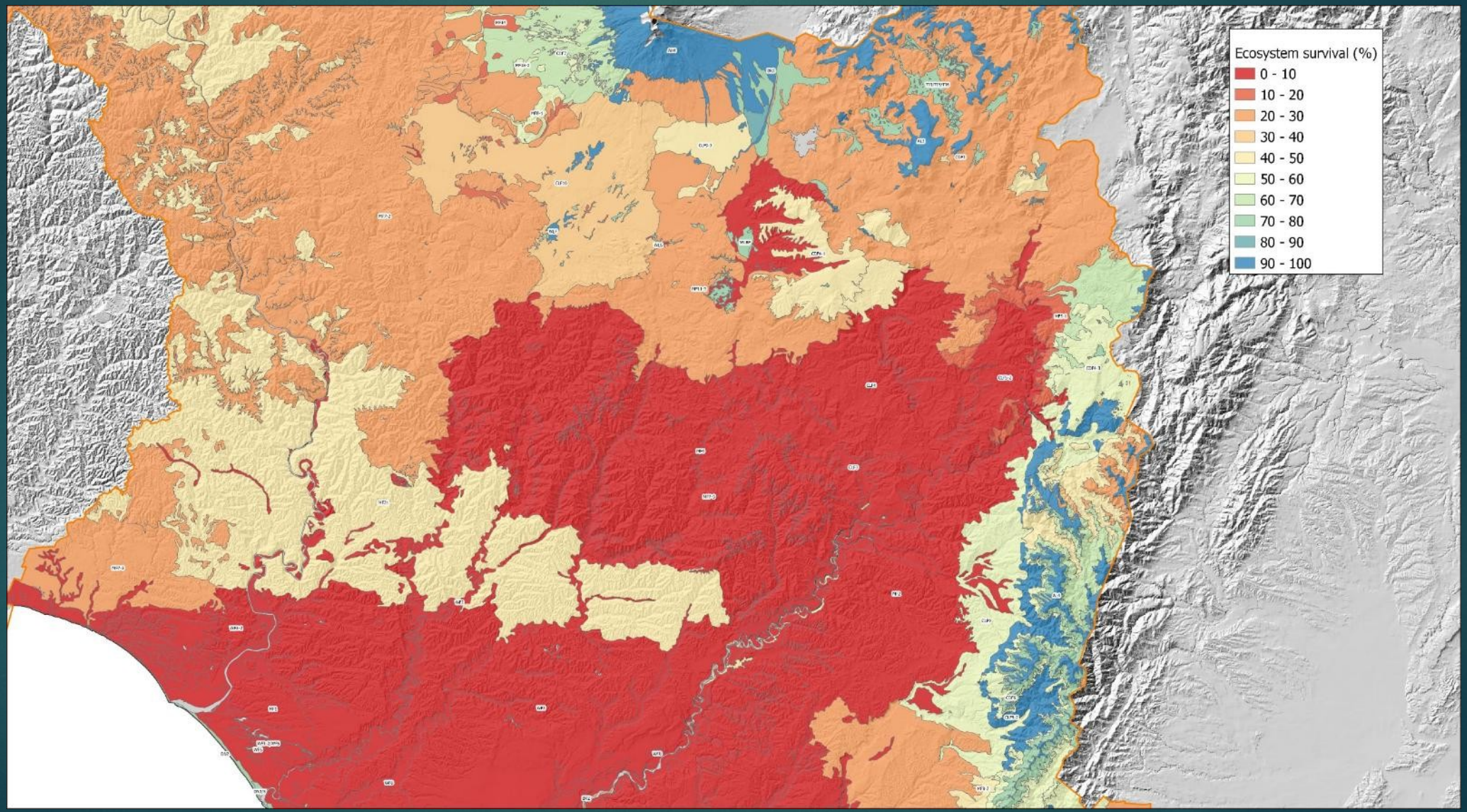
Current with DOC overlay



Results…

- Indigenous cover in the Horizons Region has been reduced to 34%
  - Forests to 33% - only 2/3 of what remains is primary
  - Wetlands to 37% - an underestimate of loss
  - Coastal to 53%
- Loss is heavily biased across environments
  - Minimal to moderate loss at higher elevations
  - Lowlands are largely decimated
- DOC administered land strongly biased to higher elevations
  - The left-overs – too cold, too wet or too steep to be ‘productive’!

Ecosystem survival…



For example

Identifying sites to manage…

- Kiwi's excel at '*How do we improve our management practices?*'
- Hardly ever ask '*Where are the highest priority places to manage?*'
  - Unavoidable, given the disparity between funds available for conservation and the cost of managing everything everywhere
  - Unavoidable, given the uneven survival of our ecosystems
- Substantial progress with the science of this internationally
  - Only limited and patchy uptake in New Zealand
  - Too applied for science funders – too technical for management agencies

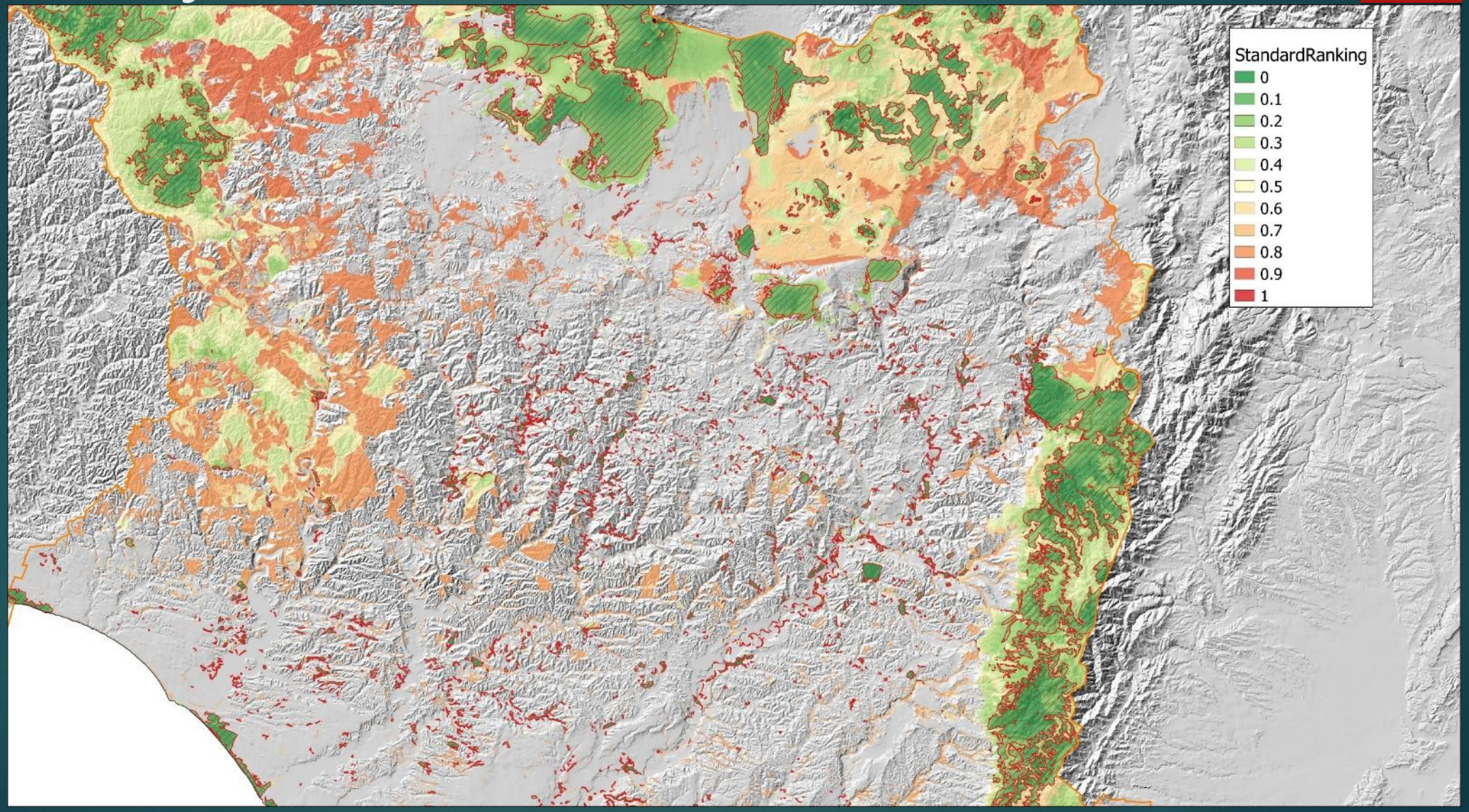
An analogy…

- Like selecting a sports team…
  - Team games require a range of skills
  - Some generalist, some specialist
- Selecting a team depends on
  - Who is available?
  - Who has already been selected?
  - Aims for an optimal mix of skills
- Selecting conservation sites is the same
  - Aims for an optimal mix of ecosystems

Identifying priority sites

- Spatial conservation prioritization software (Zonation)
  - Understood as applying a backwards removal process
  - What location(s) can be removed with least impact on representation
  - Proceeds until all sites are removed
- Produces a continuous ranking of the landscape
  - Based on the removal order
  - Subsets of any size can be selected
    - Each will maximize representation for the area selected

Spatially…



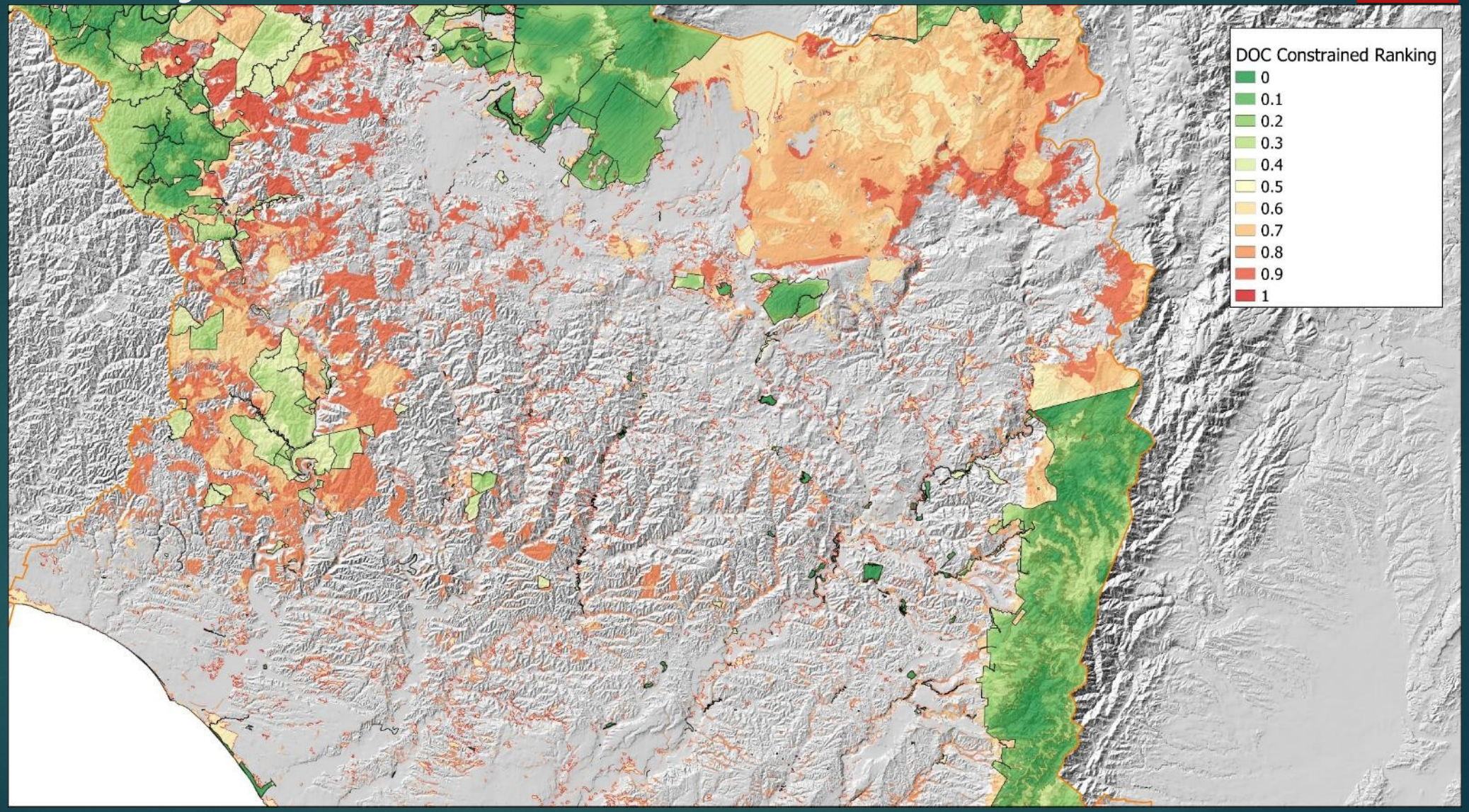
With $$$'s to manage the top 20%

- Representation of surviving ecosystems averages 78.9%
  - Those most diminished in extent have higher representation
  - Extensive ecosystems have lower % representation – but still extensive
- Only one third of the top 20% is on DOC-administered land
  - Two-thirds on land of other tenures
- By comparison, selecting the same area at random
  - Gives average ecosystem representation of 17%

Just managing DOC land?

- Configured so that DOC-administered land has highest ranks
  - Lower ranks assigned to non-DOC land
- Average ecosystem representation in top 20% is nearly halved
  - 40.0% versus 78.9% from initial ranking
- Even if we managed all DOC-land
  - 51.3% of the surviving indigenous cover
  - Average ecosystem representation rises to only 45%

Spatially…



Change is required…

- If we are serious about achieving our biodiversity goals
  - Need to stop lurching from one fashion to another

- Our current predator-focus…
  - Delivers benefits for only some species
  - Is of doubtful achievability
  - Carries high social risk
  - Leaves other major biodiversity pressures unaddressed
  - Ignores alternative well-founded, viable strategies
    - More congruent with the complex biological systems that we seek to conserve

How could we transition...?

- Adding browser control at our intensive predator management sites
  - Restoring both species *and* habitats, i.e. entire ecosystems
- Extending innovations in predator control
  - To the control of browsers
- Building on the social consensus for biodiversity management
  - Engaging with hunters about which sites will be managed for what…
- Becoming smarter about choosing where to manage
  - Managing representative 'teams', that include both the rare and vulnerable and the common and widespread

A complex social process…

- Analytical tools aren't the whole story
  - Requires humility on the part of technical practitioners
- A three legged stool
  - Social engagement + management practicality + technical robustness
- Balancing national goals and local aspirations
  - Good models already operating in some regions
  - Needs much greater clarity around who manages what where
    - Coordination among players was the Achilles heel in DOC's 2013 restructure

Signs of hope…

- MfE pushing towards meeting our Kunming-Montreal ecosystem goals
  - Planning for an ecosystem threat assessment
  - Requires an agreed ecosystem classification
    - Plus underpinning data infrastructure
- DOC developing an extended prioritization approach
  - Based on managing a full range of threats?
- However - “He who rides a tiger is afraid to dismount" (骑虎难下)
  - Once you've started a risky venture, it can be very dangerous to back out

This approach…

- More faithfully implements the original vision of Sir Paul Callaghan
  - Zealandia-style management at a carefully chosen network of sites where all pressures managed to lowest possible levels
- Provides a strong argument for protecting biodiversity on private land
- Recognises the full gains of our ‘Zealandias’
  - These are not just predator-free islands
  - They are predator *& browser-free* islands that protect entire ecosystems

From latest annual report…

- $61.6 million over 4 years “to expand the Predator Free work programme”
  - Substantial reporting on expansion with separate publications
  - Possum and rodent control applied across 1,008,730 ha

- $30.0 million over 4 years “to scale up the national programme of deer management and goat control”
  - “No changes have been made to programmes or funding in 2023/24”
  - Actions include support of Iwi in Raukumara, control of sika in Russell Forest, and conducting a national goat hunting competition
  - Deer control applied across 141,551 ha out of 8.5m ha DOC manages