



Manaaki Whenua  
Landcare Research

# Climate smart landscapes for New Zealand

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LINK Seminar  
5 October 2020

# Sandra Lavorel - Recent research

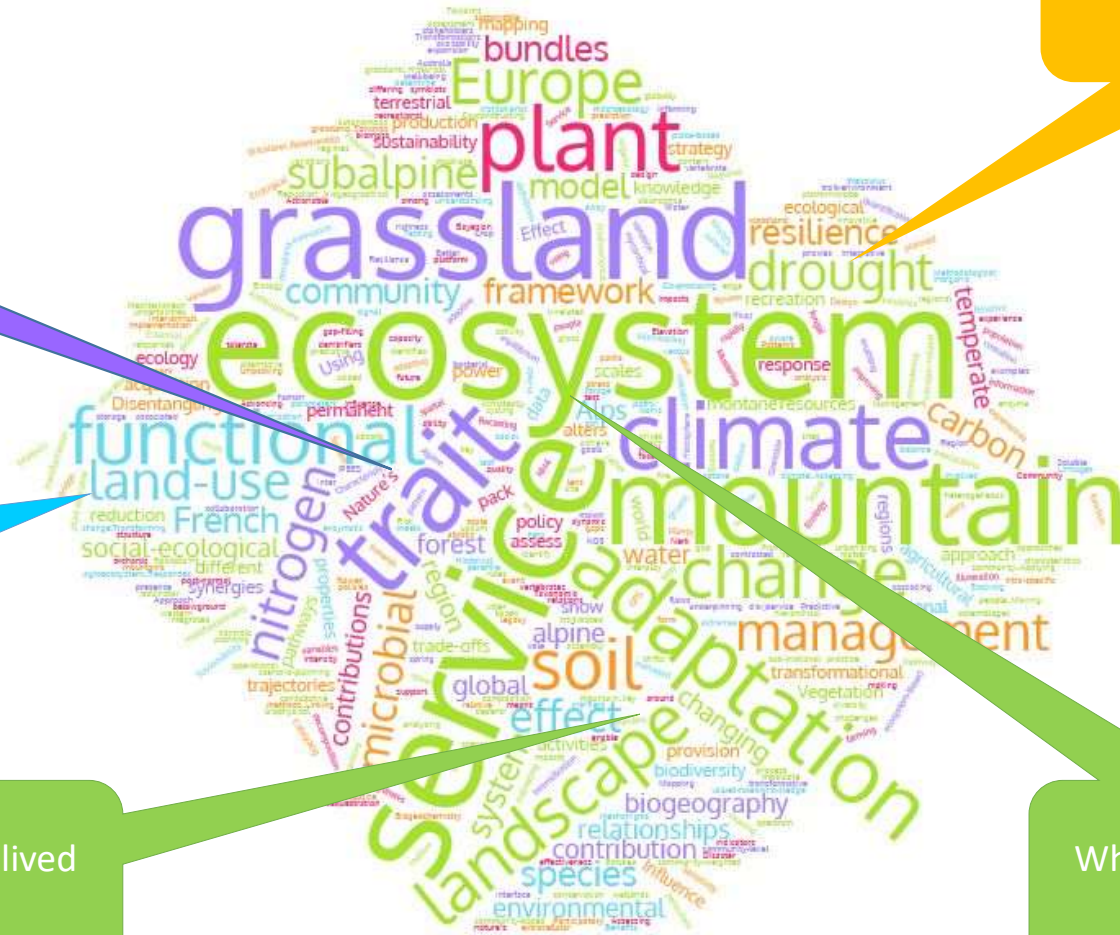
# What plants and other biota DO in ecosystems depending on their traits

## MANAGED ecosystems

## ADAPTATION in lived landscapes

## CLIMATE change resilience

## What ecosystems do for PEOPLE



# What good is biodiversity for humans?

- Nothing !
  - Intrinsic value of nature
- Essential for life on Earth
  - Role of biodiversity for ecosystem functioning and the biosphere
- "Services" to society
  - Nature's contributions to individual et collective quality of life
  - Accounting for nature's services in private and public decisions



# Ecosystem services or Nature's Contributions to People in policy

Strategic Plan for  
Biodiversity 2011–2020  
and the Aichi Targets  
*“Living in Harmony with Nature”*

*The Strategic Plan for Biodiversity 2011-2020 – A ten-year framework for action by all countries and stakeholders to save biodiversity and enhance its benefits for people.*



 SUSTAINABLE DEVELOPMENT GOALS





# What good is Nature for People's adaptation to climate change?



Nature-based Solutions  
to address global societal  
challenges

Editors: E Cohen-Shacham, G Walters, C Janzen,  
S Maginnis



*“Actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits”*

Encompass multiple types of actions including: protecting biodiversity, conserving and restoring ecosystems, targeted management of species, specific ecosystems or ecological functions, ecological engineering etc.

# Nature's Contributions to Adaptation

## Climate change mitigation



## Resilience and transformability



## Risk mitigation

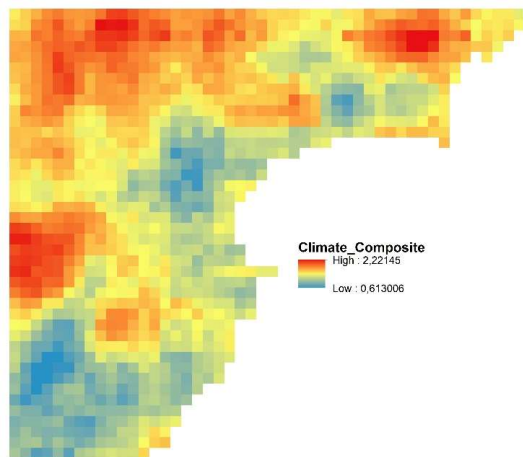


## New economic activities and values

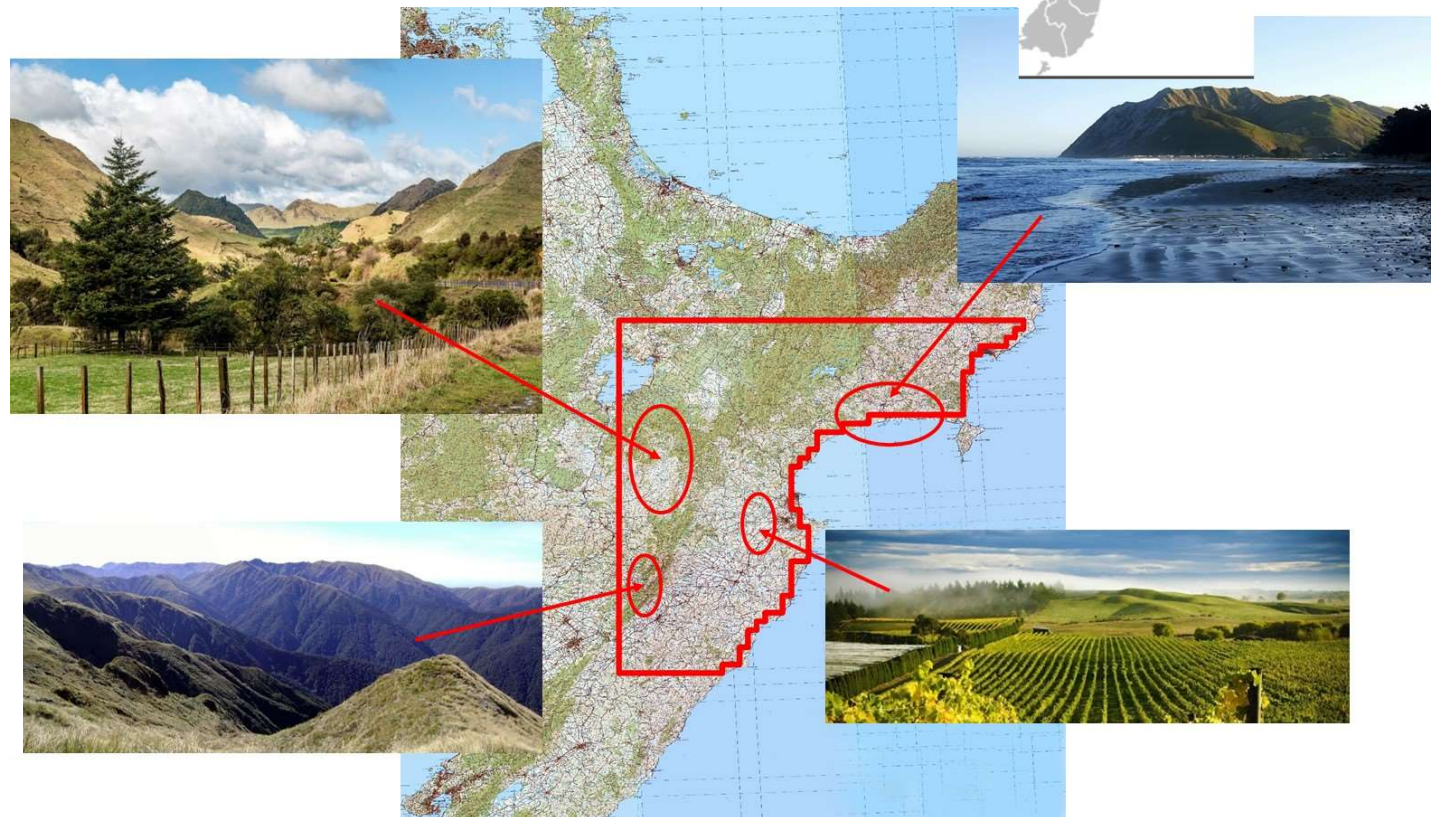




# Climate change syndromes experienced by people in landscapes



Combined values of the 3 most informative climate variables: change in Mean Temperature, change in Potential Evapotranspiration Deficit, and increase in values in the 99th percentile of rain events (extreme rainfall)



# Nature's contributions to adaptation in New Zealand

Pasture diversification and regenerative agriculture



Plantings and wetland restoration on farms



Secondary succession and native restoration



Wilding conifers



Tussock grassland protection



Native forest protection



Urban plantings and wetlands

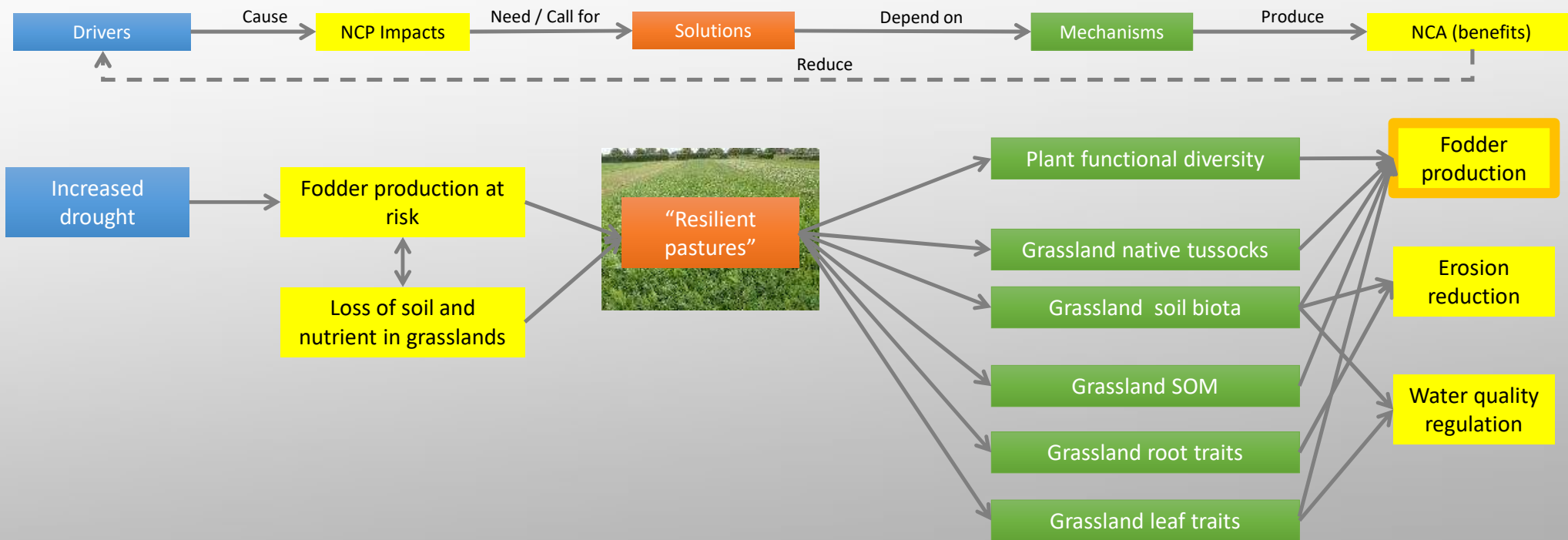


Coastal vegetation restoration

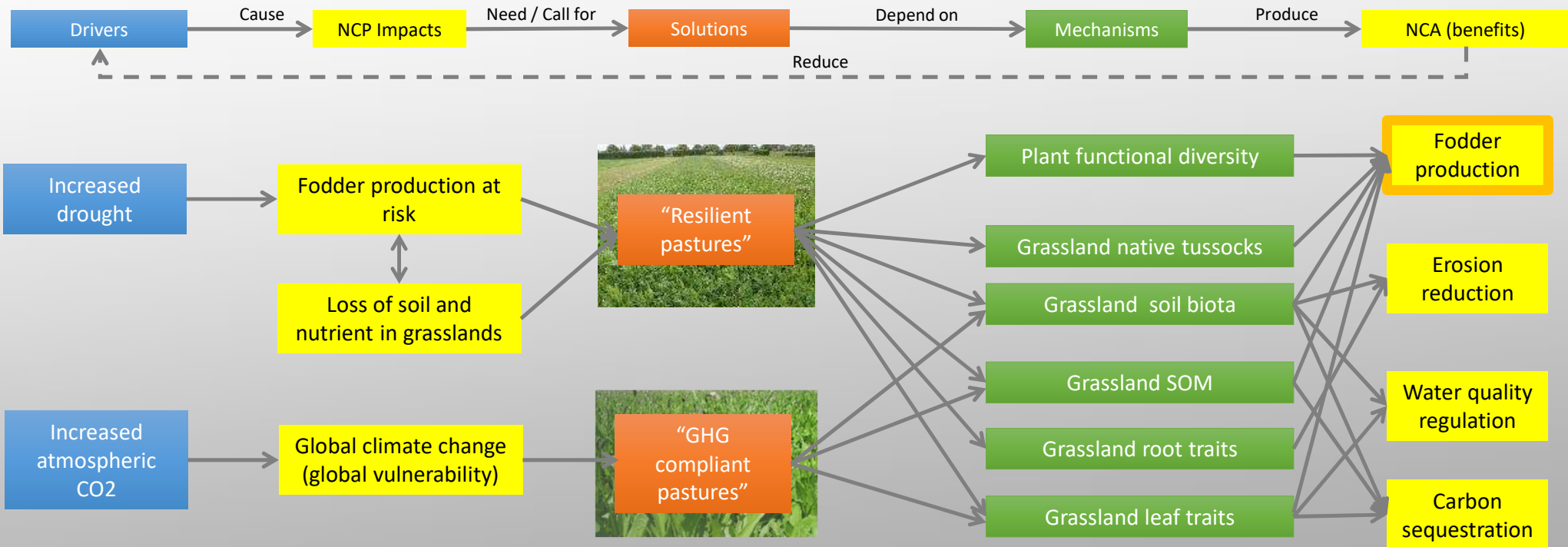




# Nature's contributions to adaptation of New Zealand pastures



# Nature's contributions to adaptation of New Zealand pastures

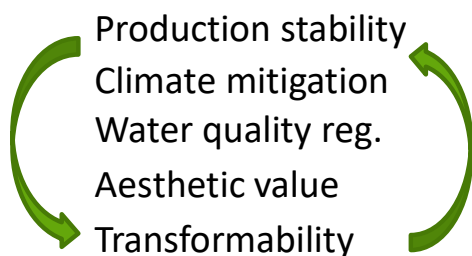




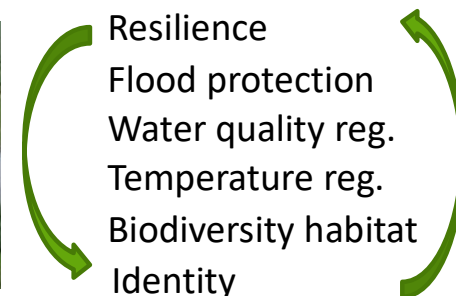
# Co-benefits and trade-offs for nature's contributions to adaptation to combined climate exposure in New Zealand



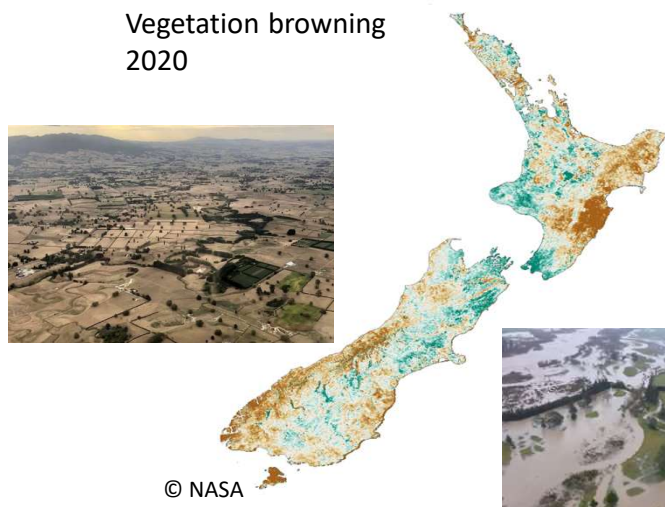
## Pasture diversification and regenerative agriculture



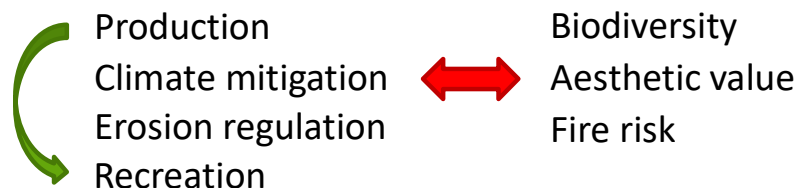
## Native plantings and wetland restoration on farms



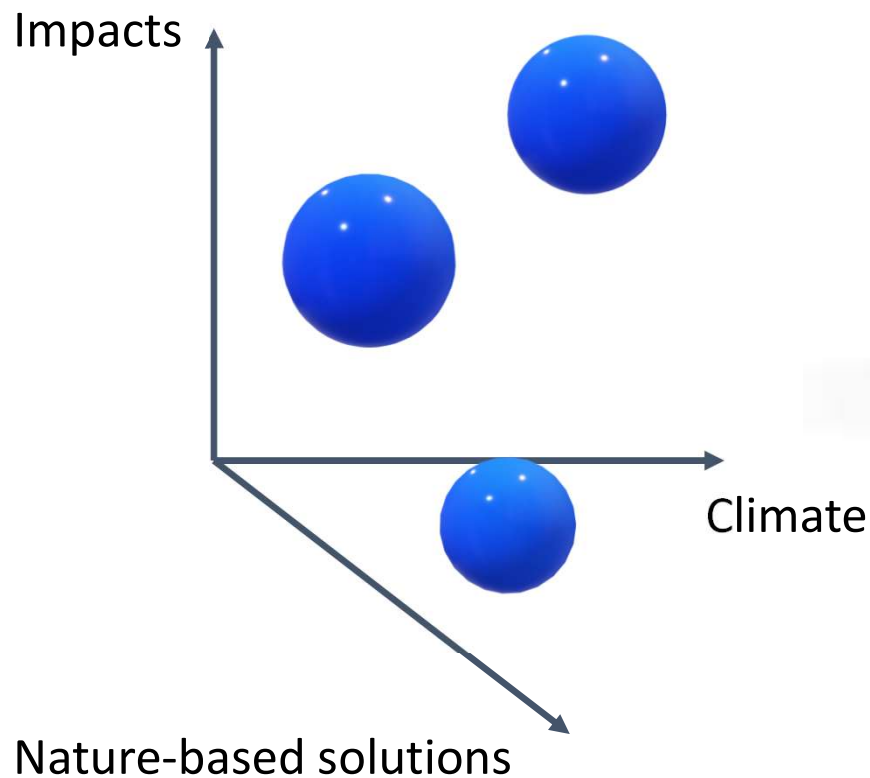
Vegetation browning  
2020



## Wilding conifers



# Integrated adaptation responses to multiple impacts of multiple drivers



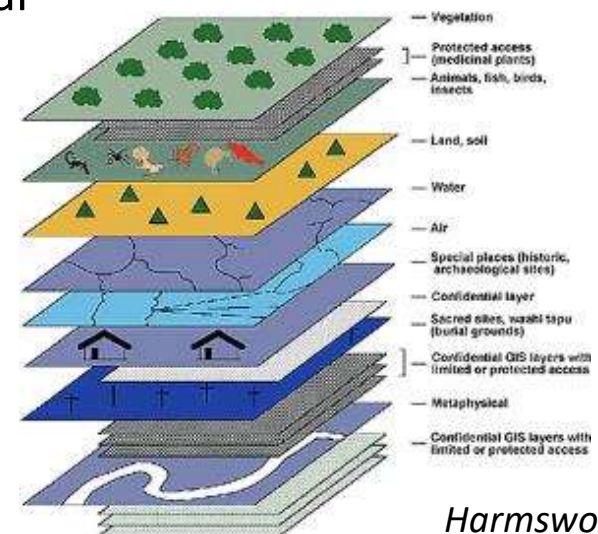


# Why landscapes matter for integrative adaptation



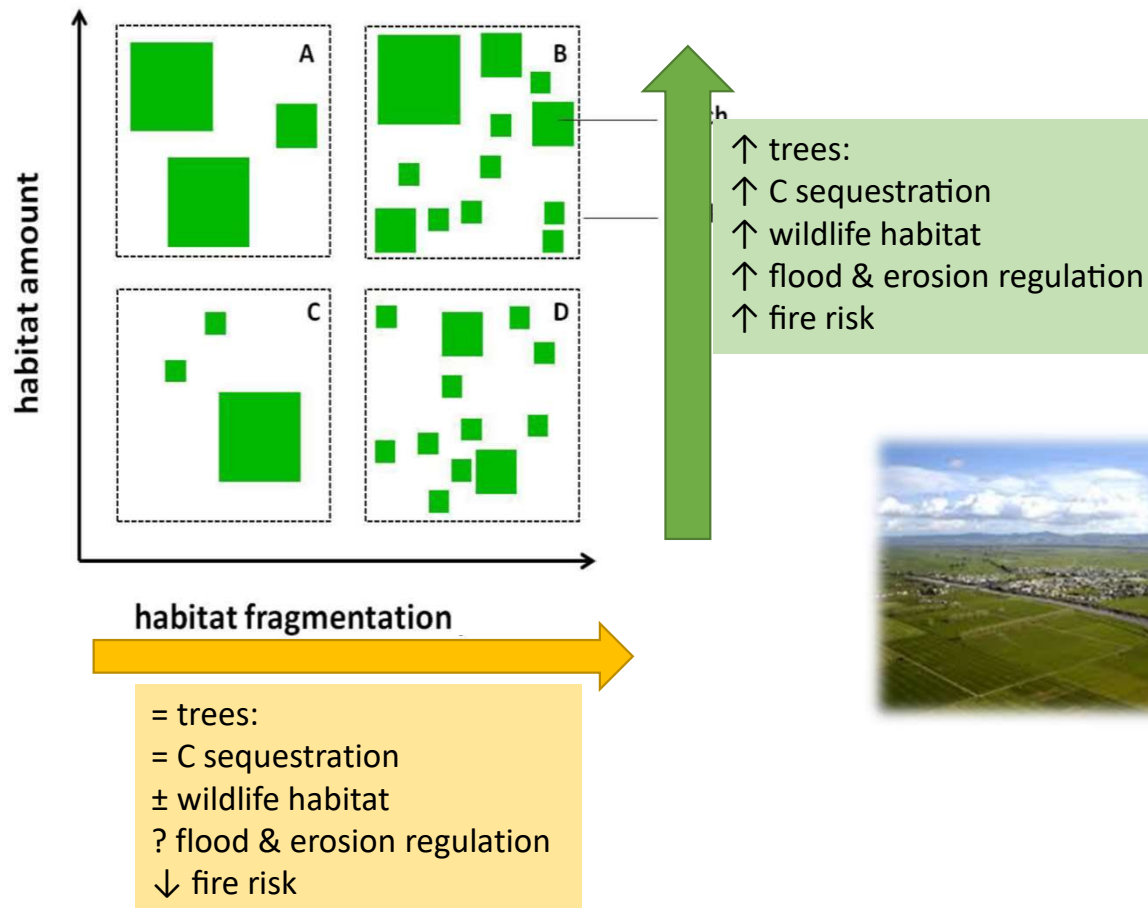
- Unique challenge of integrating multiple values in New Zealand
- Climate policy context
- Adaptation impetus and actions on the ground
- Rethinking 'fortress conservation' approach

- Decisions and management operate at landscape scale
- Ecological processes
- Individual and collective values
- Ki uta ki tai



*Harmsworth 2013*

# Why landscape pattern matters for multifunctionality and nature-based adaptation

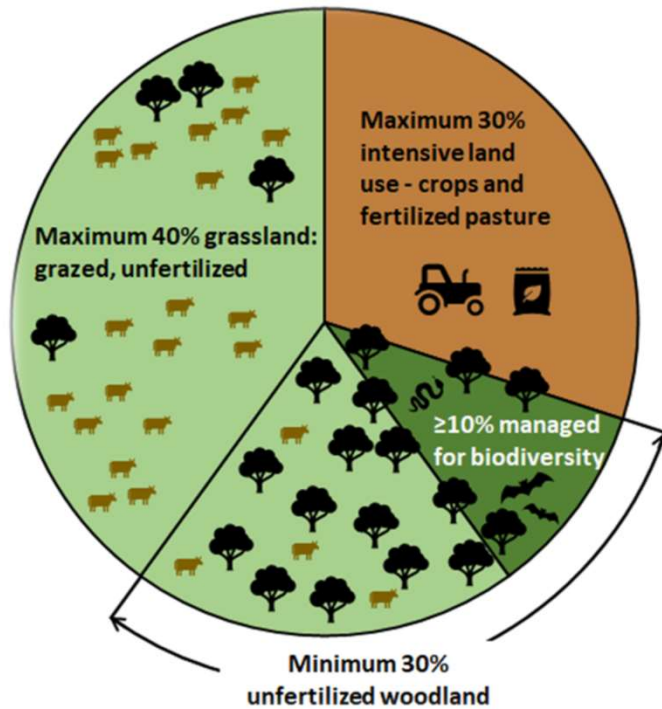


*Illustrations from the Hauraki Plains*



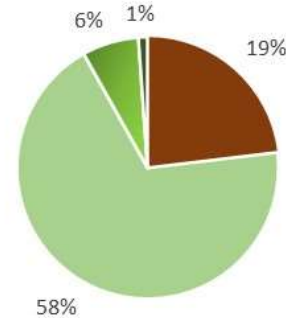
# Producing templates for climate-smart landscapes

## Landscape design template



McIntyre et al. 2000, Arroyo-Rodriguez et al. 2020

## Mackenzie

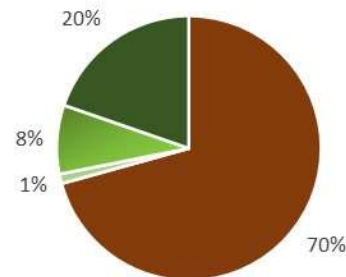


■ Intensive ■ Extensive grassland ■ Shrubland ■ Native Forest



- Extension of intensive use?
- Restore native forest

## Waikato

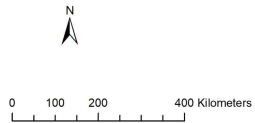


- Where / how to reduce intensive use?
- Protect native forest



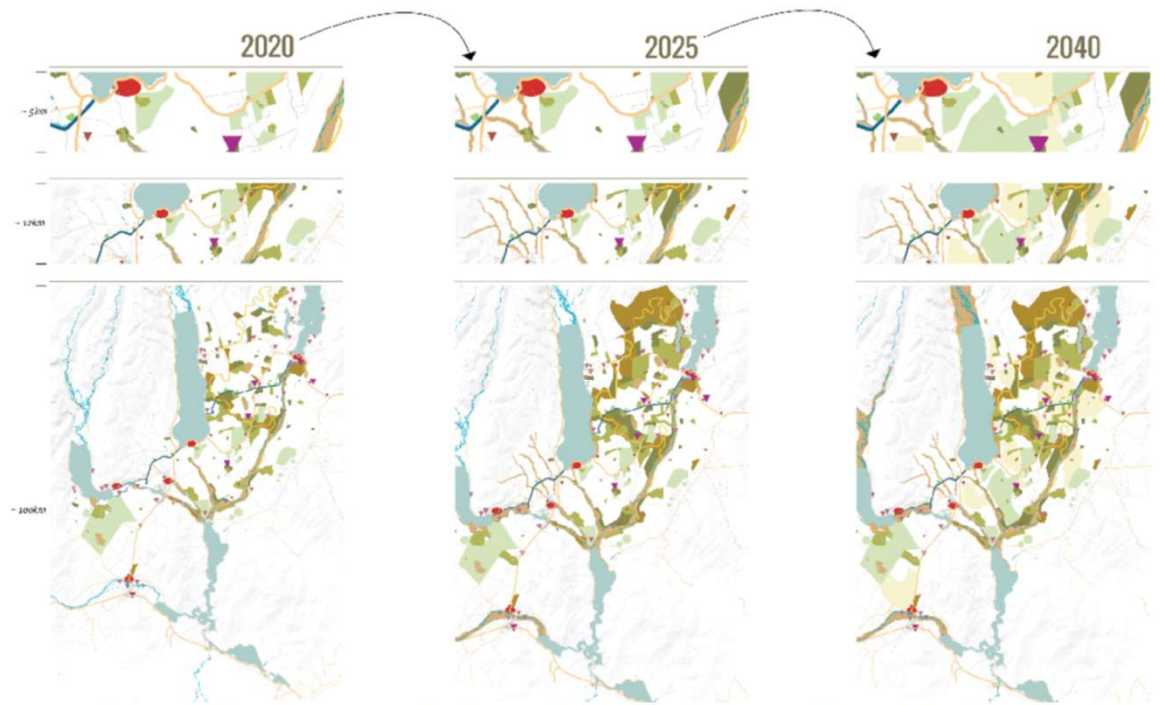
Value  
High : 1,82237  
Low : 0,127996

**Compound climate exposure**



© Karl Grigulis

## Case study: Mackenzie Basin



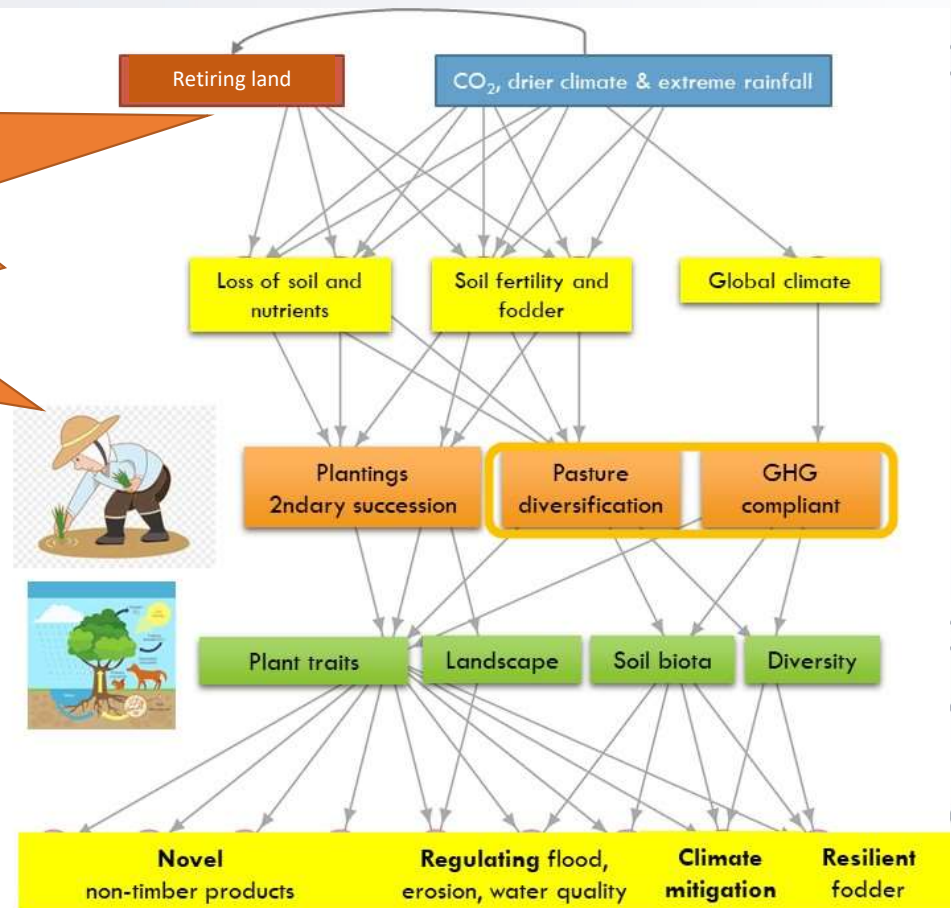
*Phasing map for possible Mackenzie Drylands Conservation Area. Copyright: Landscape DesignLab.*

# How people act for Nature's contributions to adaptation

Managers' and wider societal values  
Knowledge and know-how;  
extension services  
Regulation by environmental  
policies, access rights  
Social capital: farmers, catchment  
networks, power relations  
Infrastructure and financial capital

Ecosystem and landscape management  
by farmers, conservation managers,  
community groups

Harvesting, accessing, transforming,  
distributing, value development







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# Climate change Adaptation and Mitigation (CAM) Portfolio

# Climate Adaptation and Mitigation Portfolio



**Thank you for your attention!**



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*Nursery design for creating a conservation park through harnessing the impacts of people. Copyright: Landscape DesignLab.*