



Environment Institute  
of Australia and  
New Zealand

ANET 2023

## RESILIENCE, RECOVERY AND RESTORATION: TRANSPORT ECOLOGY IN A CHANGING WORLD

INTERNATIONAL CONFERENCE OF THE AUSTRALASIAN NETWORK  
FOR ECOLOGY AND TRANSPORTATION (ANET)

27 - 29 NOVEMBER 2023 | TE PAE, CHRISTCHURCH, NZ



## SPEAKER BIOGRAPHY



### LORENZO FRANZONI

UIC - INTERNATIONAL UNION OF RAILWAYS

Lorenzo Franzoni is a Junior Sustainability Advisor at International Union of Railways (UIC), managing the activities of the Sustainable Land Use sector. He is one of the authors of the latest sector publication "UIC Guidelines on Managing Railway Assets for Biodiversity", and he is currently managing the latest sectorial project "Ecosystem Valuation for Railways" (ECOV4R), focused on the valuation of the ecosystem services related with railway networks. Moreover, he took part as railway and biodiversity advisor in the "Biodiversity and Infrastructure Synergies and Opportunities for European Transport Networks" (BISON) EU Funded project where UIC was the consortium member representing the railway sector.

## PRESENTATION | RAILWAYS AND ECOSYSTEM SERVICES: CHALLENGES FOR INFRASTRUCTURES DEVELOPMENT

### ABSTRACT

The session will focus on railway infrastructures and the relation with ecosystem services, underlining the challenges, benefits and opportunities rising from an ecosystem based approach.



# RAILWAYS AND ECOSYSTEM SERVICES: CHALLENGES FOR INFRASTRUCTURE DEVELOPMENT

2023 Australasian Network for Ecology and  
Transportation

Carla Bates, Daya Thomson and Lorenzo Franzoni

[carla.bates@kiwirail.co.nz](mailto:carla.bates@kiwirail.co.nz)

[daya.thomson@kiwirail.co.nz](mailto:daya.thomson@kiwirail.co.nz)

[franzoni@uic.org](mailto:franzoni@uic.org)

28 November 2023

# Today's Agenda

1

**Warm up and  
introduction**



2

**Interactive session:  
Speak your mind!**



3

**Wrap up and  
conclusion**

**FINISH**



# Today's moderators



**Carla Bates**  
Head of Environment



**Daya Thomson**  
Environmental Advisor



**Lorenzo Franzoni**  
Sustainable Land Use  
Sector Advisor



INTERNATIONAL UNION  
OF RAILWAYS



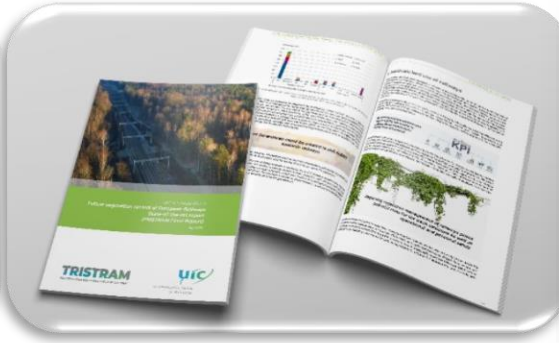


INTERNATIONAL UNION  
OF RAILWAYS

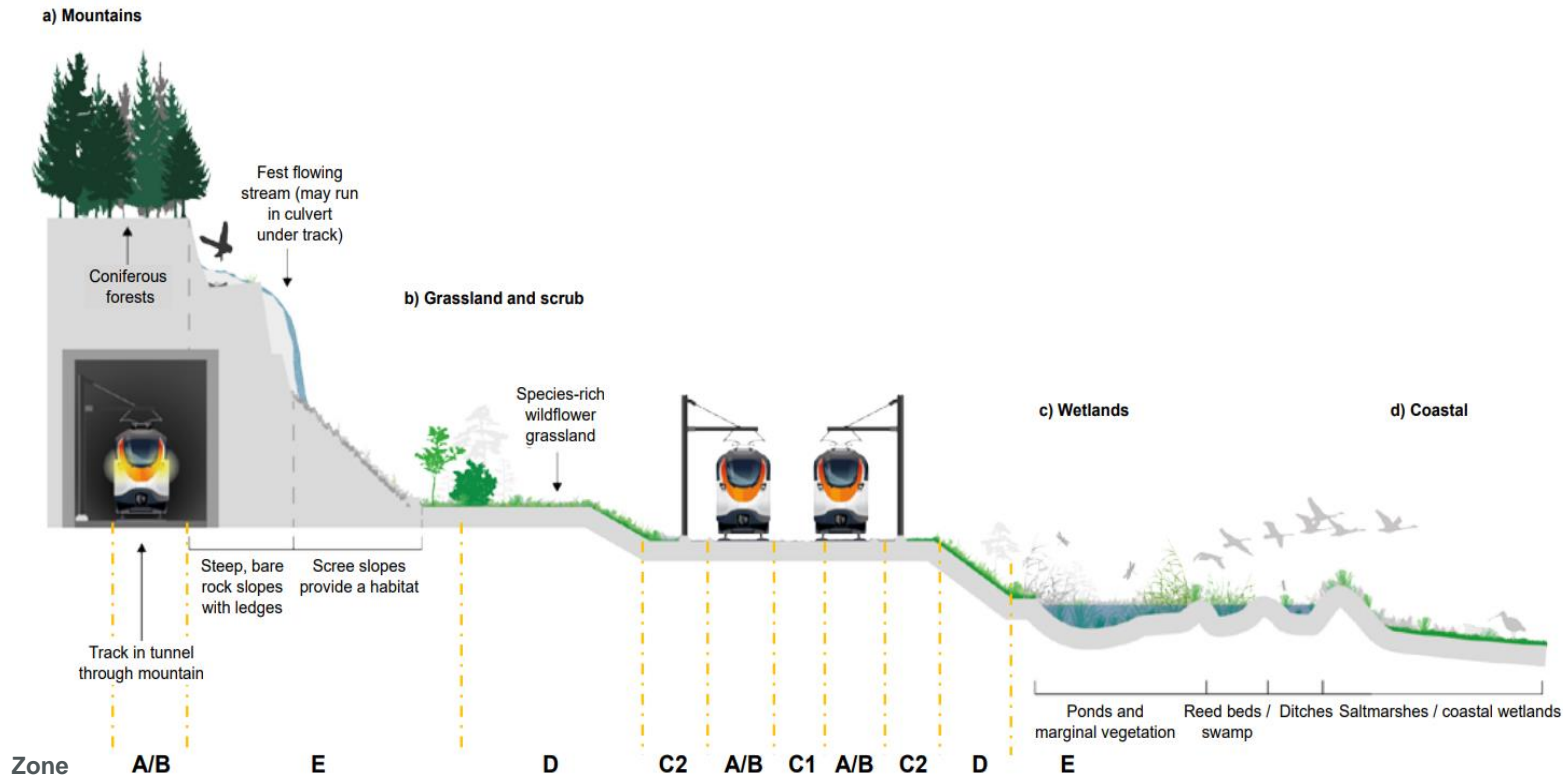
# RAILWAYS AND ECOSYSTEM SERVICES



# The UIC Sustainable Land Use Sector

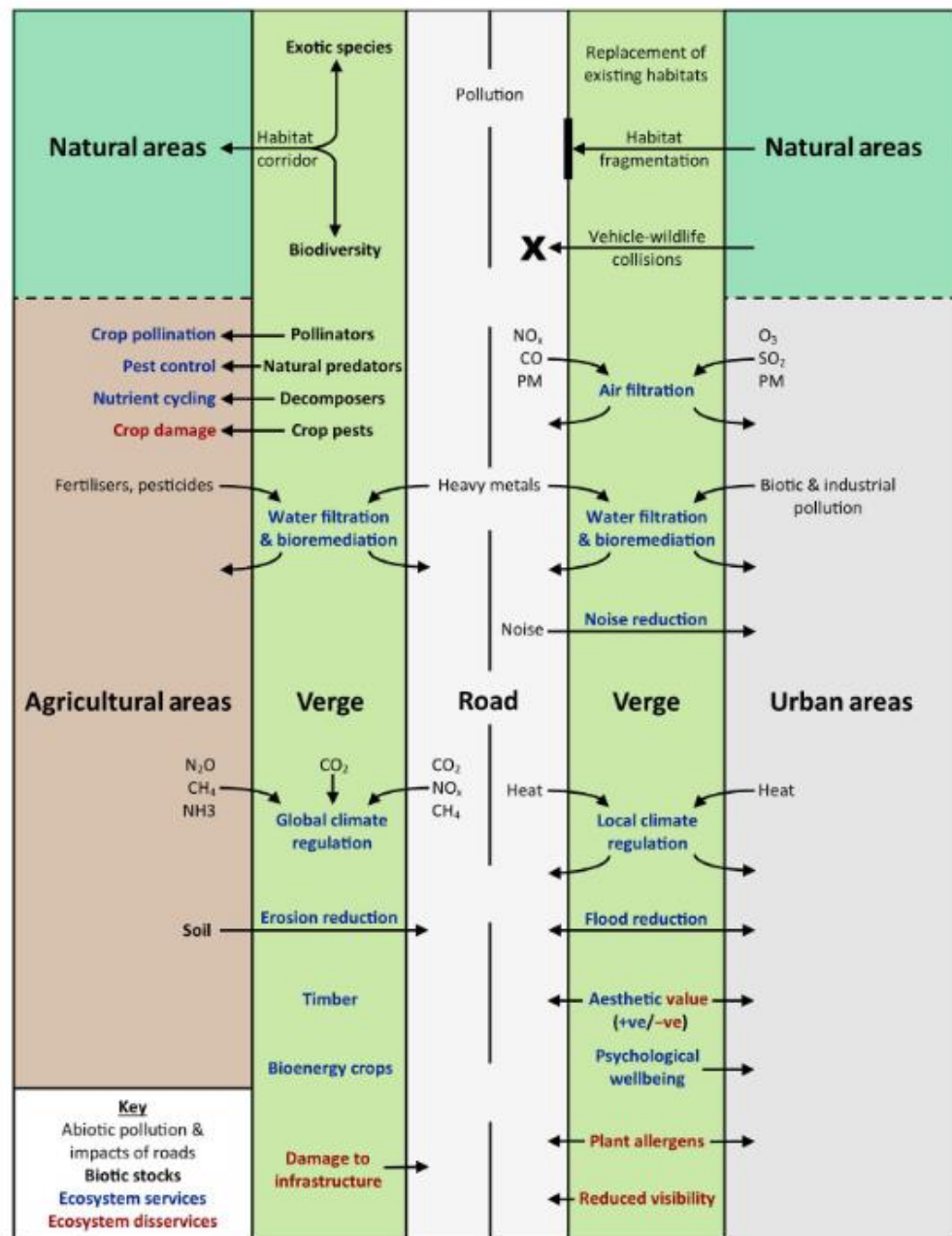


**TRISTRAM**  
TRANSITION STRATEGY ON VEGETATION MANAGEMENT



**ECOV4R**  
ECOSYSTEM VALUATION FOR RAILWAYS





**Applicable to  
Railways too!!**

Source: Benjamin B. Phillips et al., 2019.  
<https://doi.org/10.1111/1365-2664.13556>



# **NEW ZEALAND AND KIWIRAIL ENVIRONMENTAL ACTIVITIES**



# New Zealand Environment

## New Zealand – second in the world for natural disaster costs

New Zealand's a risky place. New Zealand ranked high risk for just about every natural disaster. The Global Facility for Disaster Reduction and Recovery could think of: earthquakes, tsunamis, volcanoes, floods, landslides and cyclones - though not extreme heat or water scarcity.

The Global Facility for Disaster Reduction and Recovery looks at the risks posed by natural disasters. Users can use their online tool, [ThinkHazard](#), to look at the overall risk factors for countries, regions or even cities.

New Zealand is ranked as the second riskiest country in the world when it comes to natural disasters, according to Lloyds's of London study: A World at risk: Closing the insurance gap. We sit only behind flood-prone Bangladesh.

**Development of a Trigger Action Response Plan with extreme weather!**

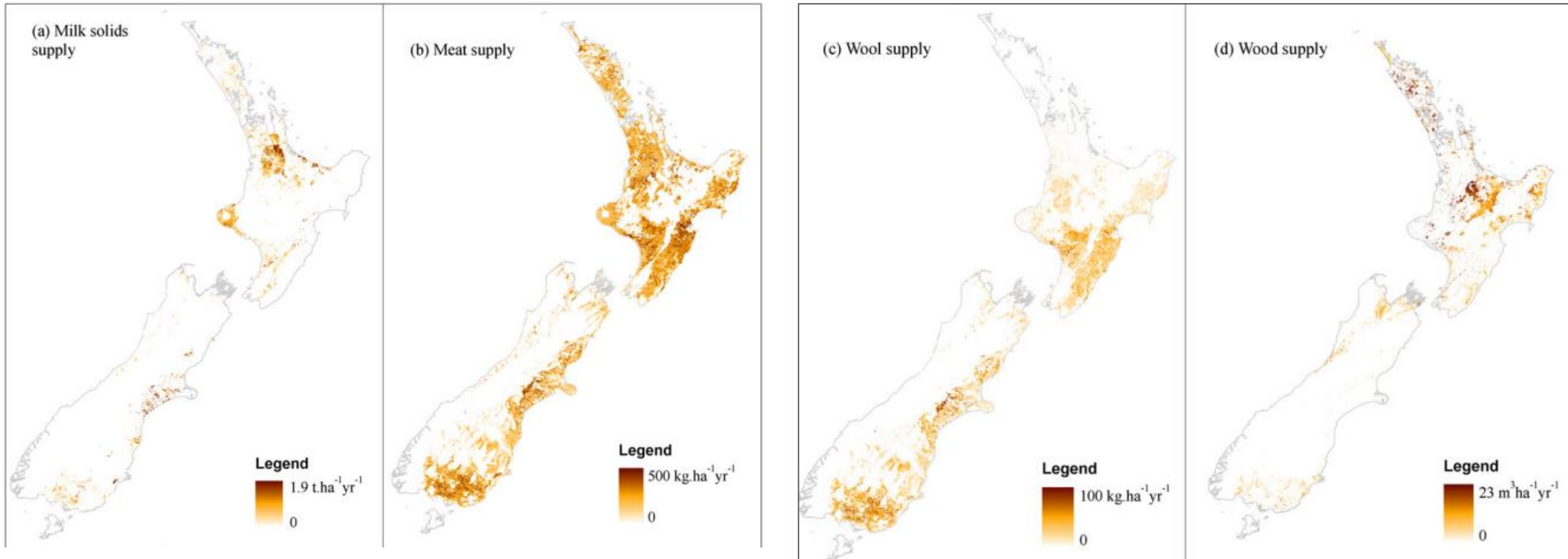


The eruption of the volcano on White Island off the coast of Whakatane, New Zealand. Source: Lillani Hopkins, via Associated Press, 2020



Cyclone Gabrielle Flooding. Source: STR/AFP, 2023

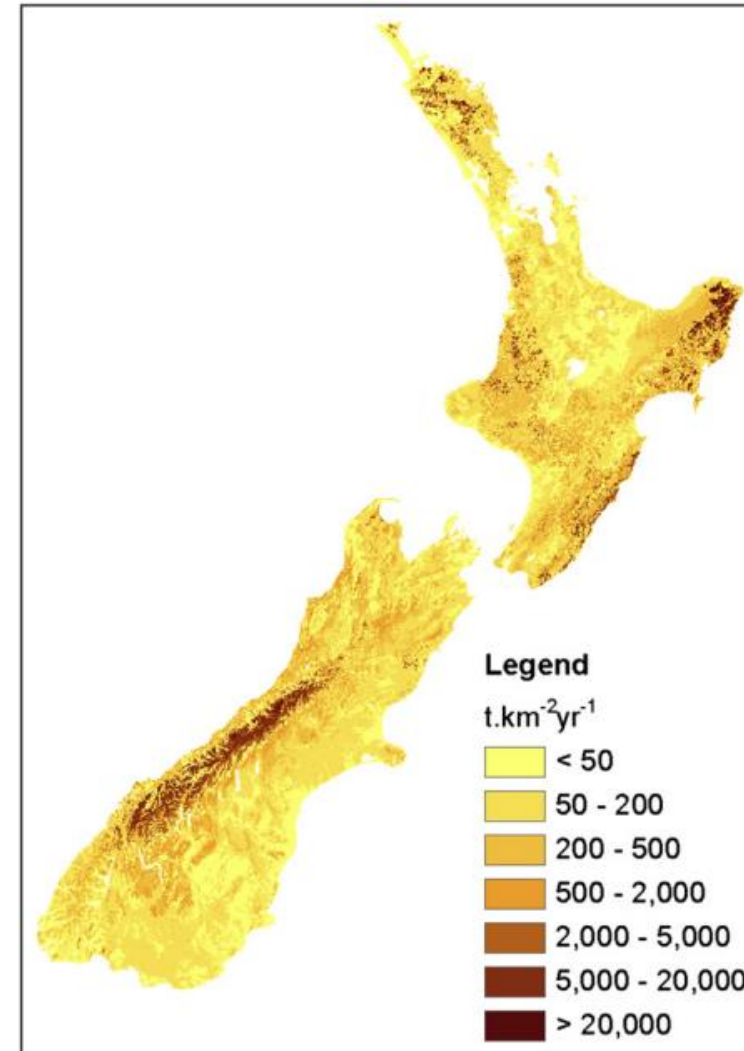
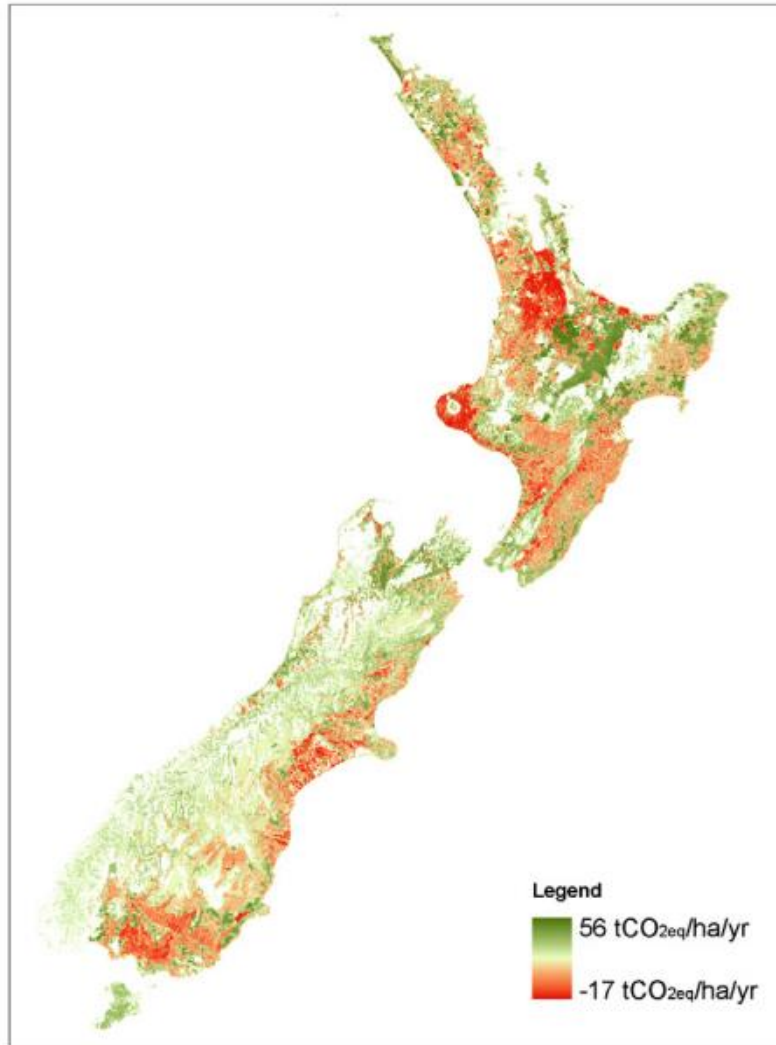
# Previous Studies Mapping Ecosystem Services



Source: Ausseil et al., 2013

<http://dx.doi.org/10.1016/j.envsoft.2013.01.006>

# Previous Studies Mapping Ecosystem Services



Source: Ausseil et al., 2013

<http://dx.doi.org/10.1016/j.envsoft.2013.01.006>

# Land Holdings and Infrastructure Statistics

## KiwiRail has significant property holdings around New Zealand:

Around 17,000 hectares (approximately 26,000 rugby fields) that KiwiRail uses either for its own purposes or leases to others

- Second Largest Landowner in NZ (Behind LINZ)
- Around 1,500 buildings and structures
  - 4,000kms of rail corridor
  - 1,700 bridges
  - 100 tunnels
  - 13,500 culverts

68%  
12,002 ha



Corridor

24%  
4,268 ha



Leasing

7%  
1,215 ha

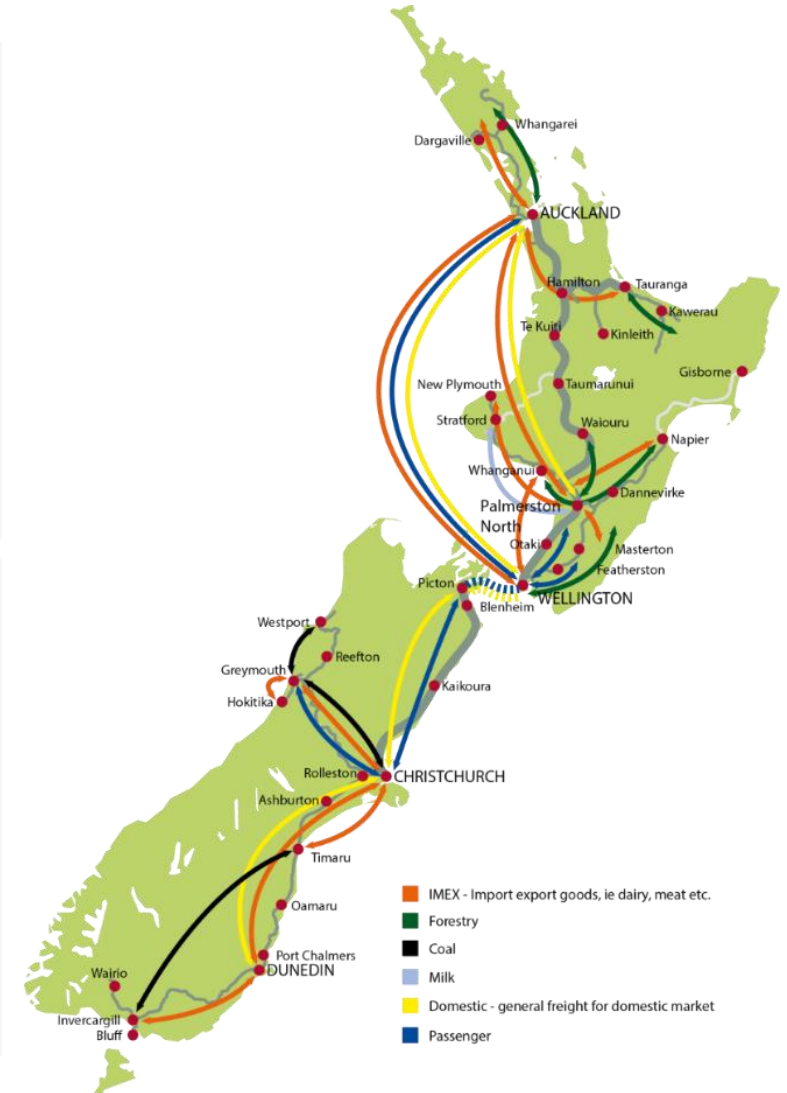


Vacant /  
Encroachments

1%  
243 ha



Operational





# Biodiversity and the Rail Network

The environment:

- Low disturbance
- Fragmented and isolated
- Transects catchments

The rail estate provides a rich mosaic of habitats for biodiversity:

- Embankments and cuttings
- Ballasted rail bed
- Structures: buildings, bridges, tunnels
- Reserves and national park passes
- Non-operational margins
- Riparian areas and drains







INTERNATIONAL UNION  
OF RAILWAYS

# INTERACTIVE SESSION ON ECOSYSTEM SERVICES



# Landslides – New Zealand



A massive slip blocking the North Auckland rail line and Tahekeroa Rd near Helensville. Source: Jason Dorday/Stuff  
<https://www.stuff.co.nz/national/300820218/in-pictures-massive-slip-wipes-out-rail-line-between-auckland-and-northland>



# Floodings – New Zealand



*Damage to the Waitangi Rail Bridge near Awatoto soon after Cyclone Gabrielle. Source: Mark Mitchell*

<https://www.newstalkzb.co.nz/news/national/cyclone-gabrielle-rail-transport-between-napier-and-hastings-a-possibility-next-month-as-temporary-fix-takes-shape/>



# Floodings – Australia



Port Augusta and Tarcoola are one of the major freight routes affected in 2022. Source: ABC News and ARTC

<https://www.abc.net.au/news/2022-02-12/renewed-interest-in-rail-linking-northern-australia-floods/100810228>

[https://www.abc.net.au/news/2022-01-24/rail-line-closed-between-sa-and-wa/100777316?utm\\_campaign=newsweb-article-new-share-null&utm\\_content=link&utm\\_medium=content\\_shared&utm\\_source=abc\\_news\\_web](https://www.abc.net.au/news/2022-01-24/rail-line-closed-between-sa-and-wa/100777316?utm_campaign=newsweb-article-new-share-null&utm_content=link&utm_medium=content_shared&utm_source=abc_news_web)



# Adjacent Landscapes and Nature Corridors



Source: KiwiRail Facebook page



Source: Kasia Nowak/Alamy

<https://www.theguardian.com/travel/2020/feb/04/5-best-uk-rail-rover-ticket-adventures-multi-trip-ticket>



# Railway Verges and Narrow Corridors



All Sources: KiwiRail Facebook page



# Hazardous Chemical Substances



Oil drums and materials on track. Source: KiwiRail Facebook page



Concrete pouring. Source: KiwiRail Facebook Page



Water Cress. Source: NZ Herald



Track Team. Source: KiwiRail Facebook page

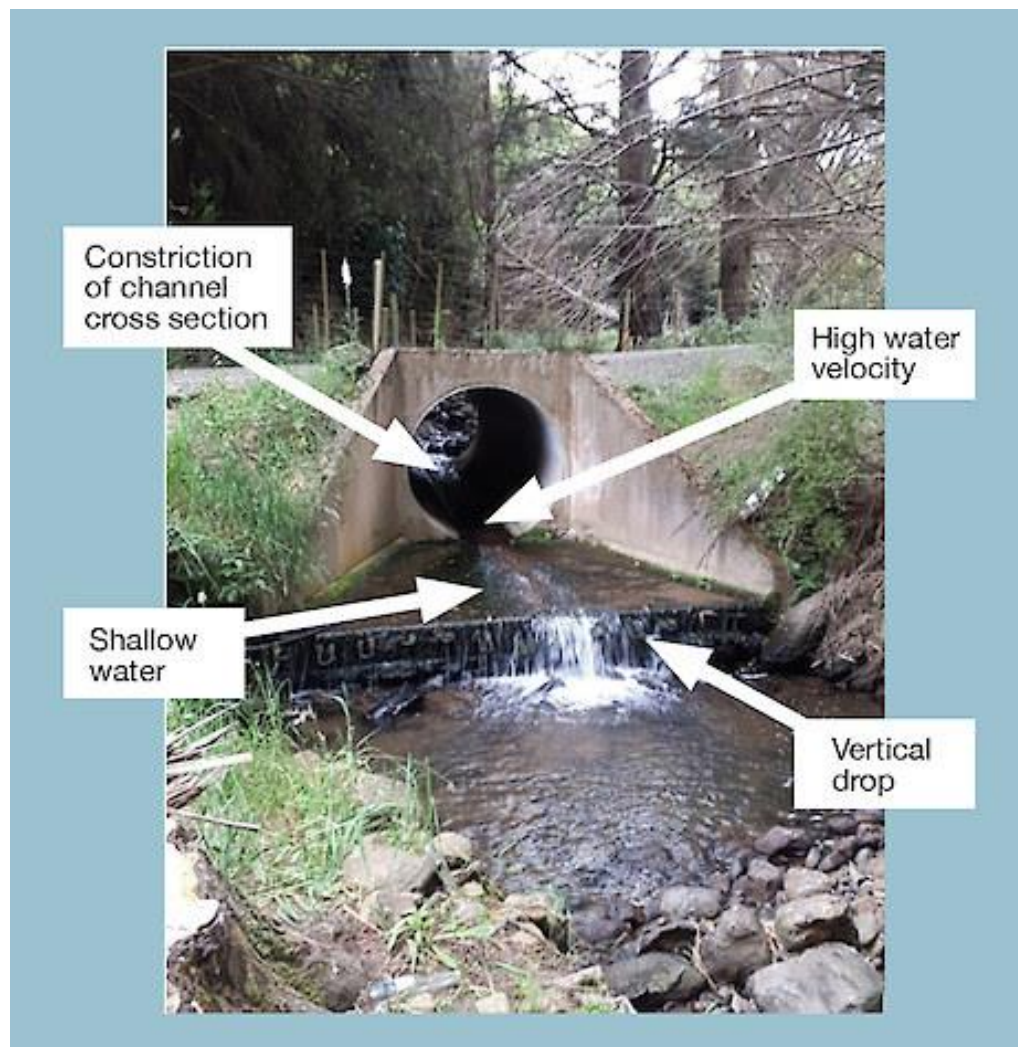


Points Lubrication





# Coastal and Marine Ecosystems & Blue Infrastructures



Source: <https://niwa.co.nz/>



Source: Hortsman et al., 2018 [https://doi.org/10.1007/978-3-319-73016-5\\_32](https://doi.org/10.1007/978-3-319-73016-5_32)



# WRAP UP AND CONCLUSIONS



# Linear Infrastructure and Ecosystem Services



**Better understand  
how to design  
according to  
engineering and  
ecological  
practices**

## **Kiwi Rail Activities**

- 1. Integrated Approach to information**
- 2. Development of Engineering Standards**
- 3. Vegetation Management Plan**
- 4. Proactive Landscaping for Resilience**
- 5. Biodiversity Credit Scheme, Legislation and Reporting**



# Stay in touch with UIC Sustainable Land Use Sector



NETWORK RAIL



FTIA/VÄYLÄ



Sydney Trains



ADIF



ÖBB



FS



Bane NOR



SNCF



[landuse@uic.org](mailto:landuse@uic.org)



## UIC Guidelines on Managing Railway Assets for Biodiversity



## European Railways: Strategy and Actions for Biodiversity



Thank you!





INTERNATIONAL UNION  
OF RAILWAYS

**Stay in touch with UIC:**

**[www.uic.org](http://www.uic.org)**



**#UICrail**

**Thank you for your attention.**