Wildlands

Biodiversity values at risk from beach drivers at Puwheke Beach

Puwheke Beach

Introduction

- Cumulative evidence indicates driving on beaches is linked with adverse effects on biodiversity.

- There is evidence that driving on beaches:
  - Damages shellfish populations
  - Crushes dune vegetation
  - Disturbs/destroys ground-nesting bird populations
  - Alters dune habitat structure

- However, quantitative NZ-based research remains very limited (La Cock 2022)[1]

Cars and dogs on Puwheke Beach

[1]La Cock, G.D. (2022). Vehicles on New Zealand beaches: an annotated bibliography of research on physical and ecological impacts. Department of Conservation, Wellington. 17 p.

Introduction

- Vast majority of work is not peer reviewed, nor quantitative.
- No NZ-based quantitative, peer reviewed evidence for specific effects of driving on beaches for:
  - Lizards
  - Terrestrial molluscs
  - Spiders (including katipō)
  - Other invertebrates
- Reflects nothing other than a lack of investment and interest in the issue.
- So, most evidence is necessarily qualitative or anecdotal.

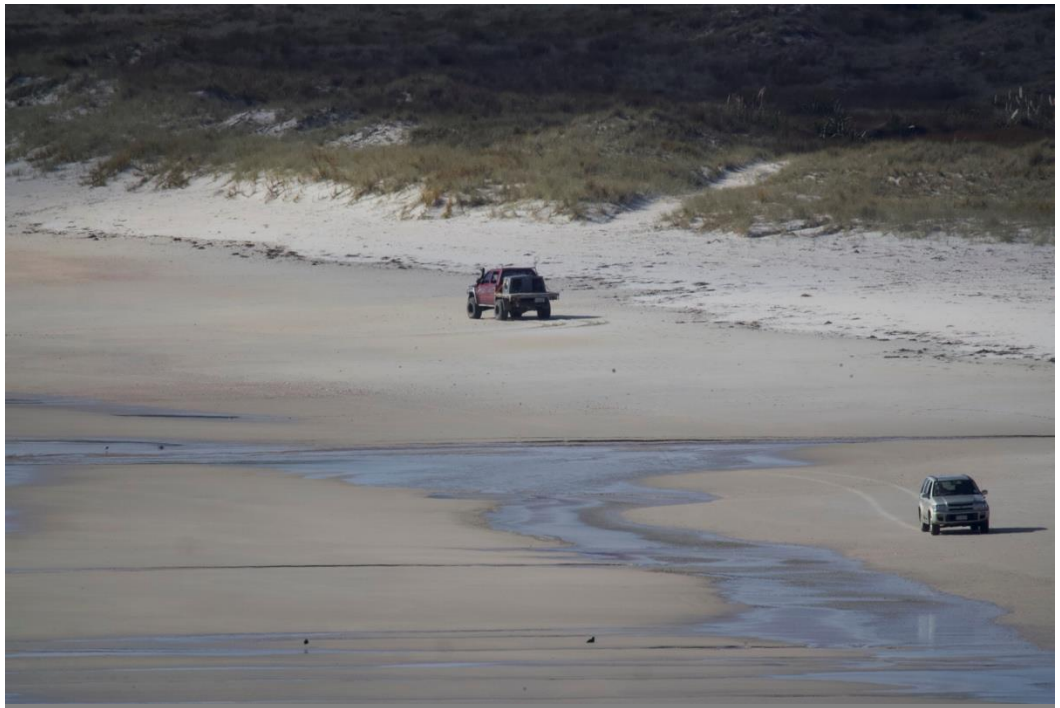
Cars on Puwheke Beach

Introduction

- This is despite the powerfully worded Policy 20 in the New Zealand Coastal Policy Statement that affords a high level of protection to beaches and dunes from the impacts of vehicles.

- Without the empirical evidence, responsible management should take the precautionary approach:

"Where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat"(United Nations 1992).



Cars on beach

[2]United Nations. (2022). Convention on Biological Diversity.

At risk biodiversity values at Puwheke Beach

Sand-binding vegetation

- Crushed or killed by tyres.
- Dune destabilization.
- Crushing of threatened dune plants (all at Puwheke Beach):
  - Sand daphne (At Risk – Declining)
  - Pīngao (At Risk – Declining)
  - Sand coprosma (At Risk – Declining)
  - *Senecio biserratus* (At Risk – Declining)

Senecio biserratus (left) and sand daphne (*Pimelea villosa*) (right)

https://en.wikipedia.org/wiki/Pimelea_villosa
https://www.nzpcn.org.nz/flora/species/senecio-biserratus/

At risk biodiversity values at Puwheke Beach

Shellfish

- Empirical evidence for adverse effects on tuatua[3]
- Mortality rose when vehicles created fresh tracks.
- Juvenile tuatua (5–25 mm) in the intertidal zone especially vulnerable to vehicle tyres.

Tuatua

[3]Marsden and Taylor 2010. Impacts of vehicles on juvenile Tuatua, *Pahies donacina* on Pegasus Bay surf beaches. Estuarine Research Report. School of Biological Sciences, University of Canterbury
https://upnorth.co.nz/tuatua-catch-and-cook/

At risk biodiversity values at Puwheke Beach

Shorebirds

- Nest abandonment.
- Crushed eggs and chicks.
- Flush-induced chick mortality.
- Constant flushing of adult birds, with adverse effects on energy budgets and territorial requirements (all at Puwheke Beach):
  - New Zealand dotterel (At Risk – Declining)
  - Variable oystercatcher (At Risk – Declining)
  - Caspian tern (Threatened – Nationally Vulnerable)
  - Red-billed gull (At Risk – Declining)

Variable oystercatchers with chicks (left) and NZ dotterels (right) at Puwheke Beach

At risk biodiversity values at Puwheke Beach

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Driving into roosting birds at Puwheke Beach

At risk biodiversity values at Puwheke Beach

Lizards

- Moko skinks confirmed at Puwheke Beach.
- At Risk – Relict
- Shore skinks also observed (At Risk – Naturally uncommon)
- Absolutely protected under the Wildlife Act (1953).
- No published peer-reviewed study documenting adverse effects of beach driving or dogs on shore skinks.
- There is little doubt that they are negatively affected; absence of evidence should not be taken as absence of impact in these cases.

Shore skink

https://www.reptiles.org.nz/herpetofauna/native/oligosoma-smithi

At risk biodiversity values at Puwheke Beach

Katipō

- Recently confirmed at Puwheke.
- At Risk – Declining and absolutely protected under the Wildlife Act (1953).
- Therefore, illegal to kill, capture, or disturb katipō without a permit from the Department of Conservation (DOC).
- Likely highly vulnerable to dune habitat modification.
- Reports of katipō declines in dunes heavily damaged by vehicles, dumping, grazing, and exotic plants[4].

Katipō at Puwheke Beach

[4]Costall & Death 2009. Population structure and habitat use by the spider Latrodectus katipo along the Manawatu–Wanganui coastline. NZ J Zoology, 36: 407-415.

At risk biodiversity values at Puwheke Beach

Succinea archeyi

- "There are no apparent threats to the population of S. archeyi at Puwheke Beach."

"Distribution and conservation status of the dune snail *Succinea archeyi* Powell (Stylommatophora: Succineidae) in northern New Zealand"

- The recent discovery of empty shells at Puwheke Beach indicates the species could still be surviving in-places.
- Threatened – Nationally Critical.
- The most serious threat status in NZ.
- Higher threat status than kakapō.

Succinea archeyi

https://en.wikipedia.org/wiki/Succinea_archeyi#/media/File:Succinea_archeyi.jpg

At risk biodiversity values at Puwheke Beach

Sand hoppers

- Important ecosystem engineer (detritivores) on beach and dune systems.
- Current observations at Puwheke Beach reveal an alarmingly depleted or near-absent population. Cause unknown.
- No published evidence of impacts on beach disturbance in NZ.
- But evidence from USA[5], Chile, SA, Australia[6] indicates that related amphipod species there can be significantly impacted by beach disturbance.

Sandhopper (*Bellorchestia quoyana*)

University Of Rhode Island. "Study Of Cape Cod Seashore Finds Off-road Vehicles Harmful To Beach Fauna." ScienceDaily. ScienceDaily, 21 May 2004.
Afghan et al. 2020. Main Anthropogenic Impacts on Benthic Macrofauna of Sandy Beaches: A Review. J. Mar. Sci. Eng. 8(6), 40. https://doi.org/10.3390/jmse8060405

https://upload.wikimedia.org/wikipedia/commons/d/d1/Sand_Hopper_%28Bellorchestia_Quoyana%29.JPG

Conclusions

- New Zealand has yet to significantly investigate the biodiversity consequences of driving on beaches.
- The current lack of research must not be interpreted as an indication that no impact exists.
- The notable but declining ecological values of Puwheke Beach indicate a clear need for increased protective management.
- There is strong evidence that vehicles and dogs on beaches like Puwheke has adverse effects on biodiversity values.
- To safeguard Puwheke's ecological integrity, it is vital that vehicle and dog access rules are strictly upheld.

Puwheke Beach

Wildlands

Thank you