Tourism effects on conservation areas

Fagan, J., & Kearns, R. (2017). Tramper perspectives on New Zealand's Great Walks in a time of transition. *New Zealand Geographer*.

- During the 2012/2013 season 86,873 people undertook one of the Great Walks (Smith 2013). Since then numbers of walkers has steadily increased.
- The patronage of well-known tracks such as the Milford and Routeburn is 'running at an all-time high' and there are concerns that this 'congestion' may damage New Zealand's tourism reputation overseas (Newport 2016).
- At the same time the proportion of 'kiwis' on the Great Walks is decreasing. For instance, only 24.7% of people who walked the Kepler track in the 2014–2015 season were New Zealanders (Nicoll & Mack 2016). This trend is not new; in 2000 Cessford noted that 'numbers of international visitors hiking the Great Walks commonly exceed those of New Zealanders' (2000, p. 71). This proportion may reflect both the costs involved and that tourists tend to book many months in advance whereas New Zealanders are inclined to make decisions more spontaneously and thus may miss out on bookings.
- Whereas traditional tramping is characterised by improvisation and route-finding, a distinguishing feature of the commodification of the Great Walks is that they involve a set of choreographed experiences that include checking into the DoC Visitor Centre to uplifting prepaid hut passes, being shuttled to the beginning of the track by a commercial operator, participating in or encountering guided walking groups, and staying in well-appointed but invariably fully occupied 'huts' that often resemble lodges. Clearly this bundled set of experiences constitutes a very particular 'wilderness' encounter.

Anderson, L. G., Rocliffe, S., Haddaway, N. R., & Dunn, A. M. (2015). The role of tourism and recreation in the spread of non-native species: a systematic review and meta-analysis. *PloS one*, *10*(10), e0140833.

- Our results provide quantitative evidence in support of the hypothesis that tourism is a pathway for the spread of non-native species across the globe [10,12,13]. The results of our meta-analysis demonstrate that the abundance and richness of non-native species are significantly higher in sites where recreational activities took place than in control sites, and that this pattern is consistent across multiple non-native taxa, in both terrestrial and aquatic habitats, and across a suite of different vectors.
- Awareness raising initiatives have already been developed to improve the biosecurity practices of recreational water users [59], hikers [84] and airline passengers [85] and have resulted in compliance by 71% of water users in New Zealand [86].

Shannon, G., Larson, C. L., Reed, S. E., Crooks, K. R., & Angeloni, L. M. (2017). Ecological consequences of ecotourism for wildlife populations and communities. In *Ecotourism's Promise and Peril* (pp. 29-46). Springer, Cham.

Only able to access abstract

- Evidence suggests that human presence does not only cause disturbance to the behavior of animals in the short term but may well have population and ecological level consequences that affect survival, reproductive success, and the structure of ecological communities. Tourists can also impact populations of wild animals as a result of direct mortality (e.g., vehicle strike), by providing food to attract charismatic species that can alter the long-term distribution and social structure of populations, by degrading crucial habitats through infrastructure development and pollution, by introducing non-native species that displace native taxa, and by transmitting infectious diseases.

Marion, J. L., Leung, Y. F., Eagleston, H., & Burroughs, K. (2016). A review and synthesis of recreation ecology research findings on visitor impacts to wilderness and protected natural areas. *Journal of Forestry*, *114*(3), 352-362.

- Visitor trampling associated with recreational activities results in a variety of impacts to vegetation, including a reduction in vegetation cover, height, and biomass, changes in species composition, and the introduction and spread of nonnative plants
- As recreational activity increases beyond initial and low levels of traffic, plant cover and biomass are reduced as plant health and vigor are degraded
- Plants that are sensitive to trampling are greatly reduced in size and cover or are removed by moderate levels of trampling, whereas more resistant species may even increase their number and cover (Cole and Monz 2003, Cole 2013). Such compositional changes in vegetation occur slowly over many years, but the cumulative long-term effects can be substantial, e.g., forest herbs are replaced by grasses, lowgrowing herbs, and sometimes mosses (Marion 1984, Mortenson 1989, Liddle 1997).
- Initial and low levels of trampling generally affect only vegetation and organic litter, such as dead plant leaves, grass, needles, and twigs. Initial trampling flattens and begins to degrade organic litter. Increased levels of trampling cause organic litter to be pulverized, which accelerates removal by wind or water or decomposition into the underlying organic soil (Figure 1). Organic soils are then exposed to traffic, but their low density and lack of structure allows rapid displacement and loss, particularly due to erosion in sloping terrain. Organic soils in flatter terrain absorb water and become mucky, particularly in low areas along trails. On recreation sites the loss of organic soil over time can expose large areas of underlying mineral soil, increasing soil temperatures and decreasing soil moisture.
- Recreation trampling quickly compacts exposed mineral soil
- Soil erosion and loss, especially water-based erosion problems, are perhaps the most significant long-term recreation impacts and have received attention from recreation ecologists (Figure 1) (Olive and Marion 2009).
- Visitor impacts to water resources primarily concern the degradation of water quality, a core issue in the context of wilderness sustainability. Water quality degradation can be direct, resulting from activities with body contact, including swimming, canoeing, and wading (Figure 5). Indirect impacts on water quality are also common, contributed by recreation

activities that take place along the shoreline or in close proximity, such as hiking, camping, and wildlife viewing (Cole and Landres 1996, Cole 2008, Hammitt et al. 2015).

- The increasing presence of human visitors and their interactions with wildlife can cause changes in physiology and behavior that compromise wildlife health (Knight and Gutzwiller 1995, Hammitt et al. 2015). Some interactions are unsafe, and the resulting changes in wildlife behavior may lead to unpopular and costly management decisions to move or kill problem animals (e.g., foodattracted bears).

Burns, B. R., Ward, J., & Downs, T. M. (2013). Trampling impacts on thermotolerant vegetation of geothermal areas in New Zealand. *Environmental management*, *52*(6), 1463-1473.

Only able to access abstract

- We evaluated historical and current trampling impacts of tourists on the thermotolerant vegetation of the Waimangu and Waiotapu geothermal areas near Rotorua, and compared the results to experimental trampling at a third site (Taheke) not used by tourists.
- Vegetation height and cover were lower on and adjacent to social tracks than further from them. Thermotolerant vegetation showed extremely low resistance to experimental trampling. This confirms and extends previous research that also shows that thallophytes and woody shrubs, life forms that dominate in thermotolerant vegetation, are vulnerable to trampling damage. Preservation of these vulnerable ecosystems must ensure that tourist traffic is confined to existing tracks or boardwalks, and active restoration of impacted sites may be warranted.

Travaille, K. L., Salinas-de-León, P., & Bell, J. J. (2015). Indication of visitor trampling impacts on intertidal seagrass beds in a New Zealand marine reserve. *Ocean & Coastal Management*, *114*, 145-150.

Only able to access abstract

- This paper examines the effects of low-impact visitor activities on *Zostera marina* seagrass beds within the Te Angiangi Marine Reserve, New Zealand.
- Seagrass cover (shoot count and blade length) was compared between an area that received high levels of visitor use and an analogous, relatively-unused area within the marine reserve. The high-use area had significantly lower seagrass cover than the control site, with a gradient of increasing impact observed closer to the beach and at the edge of a high-use swimming area. These impacts reflect estimated visitor use patterns in the area and highlight the need for additional management strategies that consider the potential impacts of seemingly 'low-impact' visitor activities on sensitive habitats within no-take MPAs.