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Caged for protection

Exploring the paradoxes of protecting New Zealand's *Dactylanthus taylorii*

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ABSTRACT

Emerging from an ethnographic encounter with the conservation efforts to save an enclave of *Dactylanthus taylorii* in Tongariro National Park, the article discusses some of the paradoxes of conservation management by interdisciplinary tracing the research and conservation history of the plant. First, the article examines how our efforts to protect native species contribute to transforming the very environment of which they are part. Furthermore, by tracing the plant's history of decline and the following rise of conservation, the article addresses the role of native species in relation to notions of belonging and the creation and maintenance of a national heritage.

KEY WORDS: Dactylanthus taylorii, New Zealand, conservation, heritage, identity

INTRODUCTION

In the middle of New Zealand's North Island, halfway between the capital city, Wellington, and the largest city, Auckland, lies New Zealand's oldest national park – Tongariro National Park. The three volcanoes of Tongariro, Ngauruhoe and Ruapehu make up the nucleus of the park and are the focus of attention for most visitors and researchers.[1] In this article, however, attention is directed towards the less-visited Kakaramea region of the park and an enclave of a lesser-known New Zealand native specie: *Dactylanthus taylorii*, also known as *pua o te reinga,* or flower of the underworld, in Maori and colloquially referred to as the Wood Rose. Drawing on Heritage Studies, Science & Technology Studies, environmental anthropology and history, this case uses an interdisciplinary point of departure to discuss the reasons behind some of the paradoxes of current natural heritage conservation.

The article starts off by methodologically situating the study within the interdisciplinary field of Heritage Studies. This is followed by a presentation of the Dactylanthus taylorii before an ethnographic account of what, for me, a true outsider coming literally from the other side of the world, was a perplexing journey into New Zealand's management of native species: A day out in the Kakaramea forest protecting a recently discovered enclave of Dactylanthus taylorii - a mysterious plant whose role in the ecosystem remains largely unknown. As a means to contextualise the current efforts, an overview of the research and conservation history of the plant is presented. The overview makes it possible to draw out complex, historically situated multi-species companionships. In particular, I draw attention to Dactylanthus taylorii relations with one other native specie, the short-tailed bat, and two relative newcomers to New Zealand, the European settlers and the possum. By examining the relationships between the four, I approach the topics of 'cultural selection' and the transformative consequences of conservation practices. The final part of the article explores the role native species play in New Zealand national heritage-making and maintenance.

[1] See for example, Hancox et al. 2001; Keys 2007; Dittmer 2008; Keys and Green 2008; Leonard et al. 2008; Baird 2012; Hølleland 2014.

RESEARCHING THE PRACTICES OF NATURAL HERITAGE CONSERVATION

Heritage is negotiated through interactions with different facets of the past[2], and the practice of natural heritage conservation represents one such field of interaction. The practice of natural heritage conservation rests on the idea that one is to protect what has been left by previous generations in order for future generations to enjoy it as well.[3] As such, natural heritage conservation has one foot in the past and one in the future. Yet this duality is dependent on present-day conservation efforts. This is well illustrated in the current case study that deals with one specific aspect of natural heritage convervation: the management of native species and their counterparts, alien or introduced species, often conceptualized as pests. As historian Tom Isern has noted, the impact of pests 'in New Zealand is so dramatic, and of such a peculiar nature, that it cannot be explained in traditional terms of ecology or environmental history. Rather, it requires a reconsideration of the place of humankind in nature...'[4] Thus, in order understand the dynamics of natural heritage conservation and capture the entanglement of past, present and future at work when practicing natural heritage conservation, it is necessary to combine contemporary and historical sources from different disciplines. This requires the methodological diversity characteristic of the interdisciplinary field of Heritage Studies. Concerned with our present-day negotiations with the past, heritage scholars increasingly combine historic sources such as archival material with contemporary sources gained from ethnographic fieldwork, interviews or policy analysis to expose how heritage is and has been negotiated. The multisource approaches have been used in particular in research on international heritage bureaucracies, of which Tongariro National Park forms a part.[5] However, a multisource approach is also relevant for what at first glance may come across as a more confined, practical conservation task such as the caging of Dactylanthus. The caging needs to be approached as a contemporary practice, officially rationalized through policy documents such as strategies and plans, whereas the actual act of conservation is accessible through participant observation. Yet to fully understand the reasons for why Dactylanthus enclaves are caged, it is nonetheless essential to gain access to the cultural *and* natural history of the plant through, for example, archival data on its conservation history.

However, while Heritage Studies opens for a multisource project, at present Heritage Studies is to a large extent focused on negotiations between humans and nations. Thus Heritage Studies offers little guidance for fully exploring the *natural* in natural heritage conservation and in particular the interspecies relations which make natural heritage conservation challenging. Encouraging researchers to act as scientists and cultural critics[6], STS scholarship provides a theoretical space from which to explore how scientific knowledge is utilized when practicing *natural* heritage conservation and, more specifically, species

[2] e.g. Lowenthal 1985, 1998; Smith 2006; Harrison 2012. See also the section "Belonging – natives, nature and national heritage" for a more detailed account.

[3] This is manifested in national and international legal documents such as UNESCO 1972; National Park Act 1980, The New Zealand Biodiversty Strategy 2000 and Tongariro National Park Management Plan 2011[2006] which exempify how the future of the environment not only dependent partical conservation efforts, but also on paperwork (Asdahl 2015, 75). This underlying ethos has also informed more popular historic overviews on New Zealand's national parks system and nature conservation (e.g. Thom 1987; Young 2004).

[4] Isern 2002, 234.

[5] e.g. Fairclough et al. 2008; Søresen and Carman 2009. See e.g. e.g. Turtinen (2006), Meskell (2011); Hølleland (2013); Johansson (2015); Niklasson (2016) for in-depth studies of international heritage bureaucracies.

[6] Tsing 2012, 141. See e.g. Sismondo (2010) for a general introduction to STS.

management. Successful species management is dependent on understanding the deeper historic relations between, to paraphrase Donna Haraway, 'companion species'.[7] In contrast to the more common notion of companion animals used to describe the positive relationship between humans and their pets, 'companion species' open up the field of relations to include 'organic beings such as rice, bees, tulips, and intestinal flora, all which make life for humans what it is'.[8] The very label of 'companion species' enables us to explore natural heritage conservation as a field of co-shaping and 'interconnections binding species together over time'.[9] Thus the Dactylanthus case is approached as one where species meet, and, as time goes by, become companion species and historical, biological and ethnographic sources are used here as a means to examine how scientific knowledge is operationalized through the management of a native species. This in turn moves the natural more to fore of Heritage Studies.

INTRODUCING THE DACTYLATNUS TAYLORII

Dactylanthus taylorii, or just Dactylanthus as referred to by staff at New Zealand's Department of Conservation (DOC), is one of the tiny and, for the untrained eye, rather invisible members of New Zealand's native flora. It is indeed what one can call a surviving member of New Zealand's 'first nature'[10], a relic from a nature before humans first set foot on the islands. Belonging to the family Balanophoraceae, Dactylanthus is a remarkable parasite that grows as 'a root-like stem attached to the root of a host tree'.[11] Its colloquial name, Wood Rose, is derived from the way in which the host root moulds into a shape like a fluted wooden rose. In the past, digging of the plants for the wood roses was common practice by foresters and their families, and wood roses were often handed down as heirlooms.[12] Despite the fact that the practice of collecting is discouraged, and indeed illegal on DOC-administered land, it is still seen as a threat to the plant.[13] However, as the practice of caging Dactylanthus indicates, the threats to the plant are more complicated than its status as heirloom. Indeed, it is the complexity and severity of the threats that form the backdrop for why I joined a group of

[7] Haraway 2003, 2008.

[8] Haraway 2003, 15. Haraway's primary focus has been the relations between human beings and dogs. The concept has since been further developed within anthropology through a special issue of *Cultural Anthropology* based on the AAA's 2008 Multispecies Salon (Kirksey and Helmreich eds. 2010; Kriksey 2014 ed.) and Tsing (2012) through her work on mushrooms. Rose and van Dooren eds. (2011), Griffiths (2015), Hurn (2015), Jones (2015b), Landry (2015) has the extended the interdisciplinary scope of the concept further through case studies on the companionship between humans, parasites, baboons, dogs and horses.

[9] Jones 2015a, 135.

[10] The notion of 'first nature' refers to nature that is nature existing 'externally, independently from human activity'. The term was originally coined by Marx and Engels as described as 'the nature that preceded human history… nature which today no longer exists anywhere' and stood in opposition to 'second nature'. Second nature is thus nature with a human imprint, and is today used more broadly than Marx and Engels referring to nature that is 'humanly produced (through conceptualization as well as activity) and that therefore partakes, but without being entirely, of the human' (Biersack 2006, 14).

[11] DOC 2015a.

[12] Holzapfel 2001, 2, 17.

[13] DOC 2005.

Project Tongariro[14] volunteers to help the local DOC office in Turangi save an enclave of recently discovered Dactylanthus. Keeping in mind this is a plant whose function in the ecosystem is largely unknown, by describing the process somewhat in detail one can gain a sense of the cultural nature of the conservation effort.

ENTERING THE FIELD OF CONSERVATION

Through its Biodiversity Strategy, the New Zealand government has made clear that New Zealand's biodiversity is the nation's 'living treasure'.[15] The effort undertaken in Kakaramea falls under this umbrella of biodiversity whereby DOC has joined forces with volunteers to save some of these tiny living treasures for future generations to enjoy. At this occasion we were a nine person strong team, two DOC Biodiversity Rangers and seven volunteers, that left the office in two four-wheel drive pick-up trucks filled with wire netting – the key ingredient to protecting the treasure. Once off the State Highway, the trucks literally had to bash through green bush on a barely visible road. As the road came to an end, the wire netting was carried further into the dense forest by foot in pouring rain. Unlike the visitor-friendly structures of the national parks, there were no tracks, no people and no traps at Kakaramea. Hence one got a sense of entering a strangely unmanaged and free area of New Zealand nature. Yet it was an illusion. The pile of glossy, metallic wire netting so out of character with the dark green and brown colours of the forest was the most visible first sign of illusion. However, once the team had transformed the wire netting into cages and the cages were carried into the area where the Dactylanthus enclave was located, the managed nature of the land was further exposed. This was early autumn and the plants were no longer flowering and thus invisible for the untrained eye. However, DOC rangers had been out earlier in the year and marked out the territory; what at a distance seemed untouched was in fact covered with spikes with pink plastic flags – each flag with a number – clearly reminding us that others had been here before. The team removed the spikes, caged the clumps of Dactylanthus and then retagged them with a less temporary solution – a small metal tag fixed to the cage with metal string. As work progressed, the forest floor was gradually transformed from a green-brown carpet with occasional pink flags to something very foreign: it had become a patchwork of shiny stainless steel cages. Stood on a slight hill looking down at the patchwork of cages, one of the volunteers captured what the rest of us volunteers were thinking as she half-asked, half-described 'What the hell would you think if you came here on your own?' We may have contributed to preserving the biodiversity of the forest and saving a relic of New Zealand's first nature, but our action had also radically altered the sense of being in an untouched part of the forest.

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[14] Originally named Tongariro Natural History Society, Project Tongariro was set up in 1984 and, from the start, has worked closely with DOC offering assistance when need in Tongariro National Park and other protected areas close by (Project Tongariro 2015).

[15] The New Zealand Biodiversity Strategy 2000, 11. See Isern (2002, 244-245) for a well-argued critique of Biodiversity Strategy.

Figure 1. Caged *Dactylanthus taylorii*. Photo: Ian McNickle, Department of Conservation.

Thus as much as we had secured a future for the Dactylanthus enclave and contributed to saving an endangered native species, the caged forest floor signalled that we were standing in the middle of 'second nature' – nature 'transformed through human activity'.[16] In this case, the team had contributed to producing a conservation-scape where a remnant of the islands' first, Gondwanan, natural history had been caged in by a group of newcomers arriving in the Anthropocene.[17] However, behind these recently introduced material means of caring for an endangered native species one can identify a far longer transition from first to second nature. Put differently, by historically contextualising the conservation efforts, Kakaramea becomes an excellent location to explore how 'contact zones where lines separating nature from culture have broken down'[18] and to appreciate how history matters in the making of naturecultures.[19] Indeed inspired by Donna Haraway's notion of companion species, one could perhaps argue that these shiny cages contain several histories of slightly failed or troubled companionship between native species and alien or introduced species. In other words, by tracing Dactylanthus' history and behaviour one can secure the plant's future by unlocking the complex network of interlocked and historically situated companionships that led to its current status as endangered.

BULIDING KNOWLEDGE – UNLOCKING TROUBLE

Dactylanthus taylorii entered Western botany in 1845 when Richard Taylor discovered the plant. In the following decade, the first accounts were published, reflecting the increased interest in the new genus of Balanophoraceae among European and New Zealand botanists. However, the first truly comprehensive study of the plant's morphology, anatomy and ecology was undertaken by Lucy Moore in 1928. Following the publication of her work in 1940, Dactylanthus research was dormant for nearly five decades.[20] Only towards the end of

[16] Biersack 2006, 13-14.

[17] The concept of the Anthropocene was first coined in 2000 by Paul Crutzen and Eugene Stoermer referring to the period from the late eighteenth century onwards. In contrast to the earlier periods, humans are seen as a key agent forming the environmental processes (Solli 2011, 40). See Solli (2011) for discussions on the Anthropocene and heritage management.

[18] Kirksey and Helmreich 2010, 546.

[19] Haraway 2003, 3, 16.

[20] Holzapfel 2001, 11–12.

the 1980s, after 50 years of gradual decline in its distribution and a failure to reproduce, did the situation for Dactylanthus turn.[21]

The first breakthrough for Dactylanthus preservation came in 1989 when a clump of Dactylanthus at Mamaku Plateau, near the city of Rotorua, was covered in netting to see if it would protect it. When scientists came back two weeks later, the plant was, unlike the 'free' plants, covered in inflorescences.[22] This, in turn, became the starting point for a longer study of the plant that resulted in understanding its enigmatic pollination. In the early 1990s, a series of observation and monitoring measures were started; one of them used a video security system to film the nightlife of the plant, revealing that Dactylanthus' native pollinator is the only remaining endemic mammalian pollinator left in New Zealand, the lesser short-tailed bat (*Mystacina tuberculate*, hereafter the short-tailed bat).[23] This is a rare form of companionship; in fact, it is the only plant that flowers at ground level and is pollinated by a bat.[24] Their interaction is made possible due to the amount of time the short-tailed bat spends on the ground, their specialised locomotion and their attraction to the sweet fragrance of the Dactylanthus' nectar, characteristic of the bat's chiropterphily syndrome.[25] The companionship is fragile because the short-tailed bat is not only another native species in serious decline, but also because the short-tailed bat's current range overlaps with Dactylanthus at only a few sites.[26] Thus, the fragile state of their companionship is materialised in the Dactylanthus metal cage design; the gaps in the cages are large enough for the bat to get through in order to pollinate the plant.

The video also provided insights into more recent networks of what one could characterise as companion trouble; caught on tape were a series of introduced species. Drawn to the Dactylanthus' sweet nectar, these introduced species entered into new interspecies relations with Dactylanthus. The oldest of the newcomers was the Pacific rat or Kiore (*Rattus exulans*)[27] followed by the ship rat (*Rattus rattus*).[28] However, rather than the rodents, the most severe troublemaker was a newcomer from across the Tasman: the brush tailed possum (*Trichosurus vulpecula*). With the possum, new layers of the natureculture network emerge.

THE POSSUM – FROM INTRODUCED ALIEN TO CONTROLLED PEST

[21] Ecroyd 1996; Holzapfel 2001, 12.

[22] Ecroyd 1996, 82.

[23] Ecroyd et al. 1995, 1387; Ecoryd 1996; Cummings et al. 2014, 281.

[24] Ecroyd 1995, 1996; DOC 2006.

[25] Ecroyd et al. 1995, 1388; DOC 2006; Cummings et al. 2014, 281–282; Lee and Lee 2015, loc. 1317–1324.

[26] DOC 2005.

[27] Kiore was first introduced by the Polynesian settlers in the thirteenth century AD, an introduction which resulted in a decreasing population of native species such as reptile tuatara (Ecroyd 1996; Ferreira 2005; Krull et al. 2015, loc. 6926).

[28] The ship rat is arrived with the Europeans in the late nineteenth century, after which it gradually wiped out the Kiore population as well as caused a decline in native birds and bat population. However, while helping themselves to Dactylanthus' nectar, the ship rats, in contrast to the kiore, did not browse the plants, but left the flowers relatively intact following their nectar feast (Ecroyd 1996, 89-90; Lee and Lee 2015, loc. 1485).

In New Zealand natural heritage conservation management, the possum is in many ways the stereotypical, negatively loaded 'invasive exotic'[29]: With only two per cent of mainland New Zealand remaining possum-free and with an estimate of around 40-50 million possums (i.e. roughly ten possums per person), the possum is not only existing, but *thriving outside its historical and natural range* in Australia.[30] Consuming an estimated 21 000 tonnes of vegetation every night[31], there is no doubt the possum population is *causing damage to the local ecosystems,* and *eliminating or at least displacing native species*. In one sense, this interspecies relation between the possum and Dactylanthus is a result of the plant's strong scent and the large quantities of sweet Dactylanthus nectar, which are both highly attractive to the possum.[32] However, unlike the Dactylanthus' interspecies relation with its native pollinator, its interspecies relation with the possum is not a companionship characterised by conviviality but one of trouble: the possums browse the plant, destroying the flowers, damaging the host root, and thereby preventing the regeneration of the Dactylanthus.[33] Without any mechanisms to control this companionship, the possum can, in the worst-case, browse and nibble the plant to extinction. The possum is no longer just a human-introduced species, it has grown to become an invasive species, a pest threatening the biodiversity of New Zealand's native forests. This is reflected in the fact that almost half of New Zealand's vegetated land (13.3 million hectares) is under some form of possum control, whether it be traps or poison,[34] costing New Zealand society more than 80 million NZD annually.[35] Unsurprisingly the possum has become an 'unloved other'[36] causing severe problems not only for the native species, but the human species. However, the latter stems from another classic – yet less discussed – trait of the black and white versions of the exotic-native divisions; the possum is an alien once *actively introduced by humans*.

The brush-tailed possum was introduced to New Zealand from Australia in 1837 to establish a fur trade for the settler communities. In this sense, the possums were not introduced as an equal companion, but as an economic resource. For around a hundred years, possums were protected from all except licensed hunters, and the fur trade provided a good

[29] Johnson 2010, loc. 48. See Woods and Moriarty (2010) for a discussion on the problematic nature of identifying exotics. In their article they break down the common tendency among environmental professionals to treat exotic species as notoriously bad in need of being removed or killed showing how criteria such as human introduction criterion, the evolutionary criterion, the degradation criterion, the historic range criterion and the community membership criterion are far from clear cut and that it in many cases can be difficult to determine where species belong. For similar point and further discussions, see also Peretti (2010), Hettinger (2010) and Beattie (2011).

[30] The total population of possums is unknown, but estimates over the last 40 years have varied from 40-70 million (e.g. Young 2004, 231). Recent estimates under taken by Warburton et al. (2009) put the current population at around 48 million.

[31] Te Ara 2015b.

[32] Ecroyd et al. 1995.

[33] Ecroyd 1995, 1, 8.

[34] Young 2004, 230-234; Lee et al. 2006, 6; Warburton et al. 2009; DOC 2015b.

[35] Warburton et al. 2009, 1. However, in 2006 it was estimated that controlling this pest would cost 111 million NZD per year in the following ten-year period, see Te Ara (2015a). Part of these costs are related to controlling the possum in native ecosystems, part of it is related to managing the possums in relation to its spread of bovine tuberculosis to cattle and deer.

[36] Rose and van Dooren eds. 2011.

source of income. Some 80 years after its introduction, Harold Kirk, reporting on the impact of possums on forests and orchards, noted that while the damage to the orchards was considerable the possum's impact on the forests was 'negligible'. Thus, Kirk recommended that possums were released in all forest districts at a distance from orchards. Already by the 1920s and 1930s, discussions arose regarding the possum's effect on forests. It was becoming clear that the possum had entered into new interspecies relations, but the troubled and conflictual nature of these new relations was only acknowledged in the 1940s when the first scientific research revealed that possums had a significant negative impact on a number of the native species making up New Zealand's forests. The official policy was radically altered, with the possum officially recognised as a pest in 1947.[37] Thus, within just over a century, the possum went from an introduced economic resource to a troublesome pest in need of control.

Briefly exploring this journey from a historical perspective clearly reveals that the possum's journey from economic resource to pest was certainly dependent on a series of unfortunate decisions and actions, which ultimately were taken by the settlers; without human intervention, the possum would most likely never have made it to New Zealand in the nineteenth century. Yet once defined as a pest, the role of humans in this equation has shifted: From introducers and thereby active agents of environmental transformation, humans take on the roles of managers and thereby become active agents of environmental restoration.[38] Thus while not introduced as a companion, the possum has become part of a multi-species network of troubled companionships where the role of humans become elusive once we act as caretakers. Our role of managing caretaker creates a distance from the 'misguided souls in the distant past who introduced them [i.e. possums]' and with no immediate humans to blame, our role in the historically-situated networks that fostered Dactylanthus' troubled companionship with the possum fades.[39] Our attention can be directed towards tackling the interspecies conflict[40] taking place in the forests by restoring the damage that the present-day troublemaker, the possum, has caused: the severe decline in many species of native flora, amongst them Dactylanthus. Reflecting further on the protection of native species and the war on invasive species, the cultural nature of our conservation practice becomes increasingly visible through the ways in which we conceptually classify nature and transform nature into heritage and thereby create new environments or conservation-scapes.

CULTURAL SELECTION – CHOOSING WHEN TO LOVE AND WHEN TO FIGHT

The discourse on natives versus non-natives, introduced or exotic species is particularly strong in settler societies such as New Zealand, Australia, Canada and the US[41] and is to a great extent built on the underlying presumption that European settlers found their new world

[37] Clout 2006, 265–266; Isern 2002, 235-237; Young 2004, 130, 133.

[38] As Isern (2002, 245) has pointed out: there is no doubt that protecting 'native species requires large and continuous human intrusions into nature so as to knock back possums; when kiwi are threatened, ardent environmentalists no longer trust the balance of nature to make things right.'

[39] Isern 2002, 245, Head and Muir 2004, 203. For a similar point, see also Woods and Moriaty (2010).

[40] Hurn 2015:152. Hurn draws attention to how common interspecies conflict is when species meet, using the meeting of human and baboons in South Africa's Cape Peninsula to explore this further.

[41] e.g. Thomson 1922, Clark 1970; Isern 2002; Cosby 2004[1986]; Lien and Davison 2010; Johnson ed. 2010; Beattie 2011.

in a pristine and natural state.[42] This in turn frames the desire to preserve 'natives' and indeed recreate 'first nature'.[43] In order to achieve this, processes of 'cultural selection' are needed to move towards this state of restored, first nature. Cultural selection in this context refers to processes in which humans actively interfere with the current natural environment in order to protect certain parts, often a 'native', by species protection and 'wars' on invasive intruders.[44] The shiny, metallic cages covering the Kakaramea forest floor display the decision to protect the enclaves of a native species and whilst the cages along with metal bands protecting mistletoe and plastic containers filled with poison represent the weapons used in the war on the possum. More generally, all these introduced items are visible, material consequences of the processes of cultural selection that contribute to the physical transformation of parts of the natural landscape and thereby the sense of the naturalness of the landscape. Despite being a hopeful means to 'clean up', purify and turn back time so that the first, native landscape can remerge, conservation nonetheless includes long and costly stages where second, and in this case conservation-managed, nature is on display. The omnipresent protective gear on display in New Zealand's national parks makes conservation management visible and hints at the enormous efforts and costs put into controlling and fighting the pests and protecting native species and biodiversity.[45] Again, drawing on the battle to save the rather invisible Dacthylanthus from the 'pesky possum', one can explore the value-laden entanglements and cultural nature of conservation management further.

As noted above, now part of history rather than current practice, the human introduction of the possum to New Zealand is one step removed from today's practical conservation management. However, when trying to address why introduced exotic or alien species become problematic, this separation between nature and culture is difficult to maintain; once items of management, exotics become subjects of debate and concern because the very act of managing them pushes competing values to the fore.[46] Eating native flora and fauna as well as spreading bovine tuberculosis, the possum is both a threat to the health of the ecosystem and the biodiversity of both forests and agriculture. Yet when efforts are taken to reduce the possum population, conservation management's environmental transformation impacts the value of naturalness, the value of animal welfare and anthropocentric values of nature perception. Installation of control mechanisms such as traps and poison in, for example, national parks can both be perceived as impairing human experience of landscapes and interfering with recreation as well as be judged as morally wrong when animal sentience is taken into consideration.[47] While processes of cultural selection aimed at replacing troubled or failed companionships with new, controlled companionships are often framed as a clear-cut means to preserve biodiversity, processes of cultural selection nonetheless are also rooted in more intangible and less articulated notions of belonging.

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[42] Peretti 2010, loc. 1162-85. The implications of this notion of an untouched new world is pacifying and naturalizing the first settlers, now of commonly described as Indigenous peoples, of the areas that themselves had in many cases had transformed the landscape over the course of their, in the case of New Zealand, hundreds of years or, in other such as Australia, thousands of years of occupation.

[43] Biersack 2006, 14.

[44] See for example Isern 2002; Head and Muir 2004; Trigger et al. 2008; Larson 2008; Lien and Davison 2010.

[45] Lee et al. 2006, 6-7; Beattie 2011, 343.

[46] Woods and Moriarty 2010, loc. 651.

[47] Woods and Moriarty 2010, loc. 6887-705. See also Lien and Davison (2010) for a discussion on biodiversity.

BELONGING – NATIVES, NATURE AND NATIONAL HERITAGE

Over the last 30 years, heritage has become a key concept for conceptualizing individuals', minorities' as well as nations' relations to the past. In short, one can argue that heritage is understood to assume some form of relationship to the past and the nurturing of this relationship takes place through our interaction with the places, objects and practices of the past. Furthermore, while heritage tends to have positive connotations, heritage may also imply a sense of threat of loss, or at least a vulnerability, that sets it apart from everyday life.[48] Within Europe, notions of heritage have first and foremost been discussed in relation to cultural heritage – that is humans' material remains, such as castles and cathedrals, of the past. New Zealand, however, lacks the long monumental history European countries have built their national heritage around, even when the much longer history of Maori settlement is taken into consideration.[49] Thus, the 'authentic' remnants of New Zealand's past, from which to build a national heritage, have had to be structured around something else. As in other settler societies such as Australia, Canada and the US, the natural environment has served as a key ingredient in creating a sense of belonging and shared heritage in New Zealand.[50] Indeed, in his Zealandia lecture, New Zealand physicist Paul Callaghan gave a vivid example of how New Zealand's natural heritage parallels European cultural heritage, arguing that one can think of the endemic reptile tuatara, the last survivor of the 200 million years old *Sphenodontia* order, as something like 'our Lascaux cave paintings'.[51] New Zealand's natural history and its long history of isolation are in other words presented as what make these islands stand out.[52] This shows how species from the natural history gain similar traits to the objects and monuments often highlighted in European context. Once species or larger natural environments are framed as heritage, the remnants of ancient species and environments function as key ingredients for forming the nation's sense of self – echoed in titles such as David Young's *Our Islands, Our Selves* and Libby Robin's *How a continent created a nation*. One is no longer managing nature, but natural heritage. Furthermore, while often practically managed as something humans can control and conserve, the environment also contributes to forming our sense of belonging and gives rise to nation states' notions of self. Thus, New

[48] The definition is draws on work such as Lowenthal (1985, 1997); Hewison (1987); Smith (2006) and Harrison (2012).

[49] Needless to say this split between Europe as a continent of culture and the Pacific as one of nature is an oversimplification: New Zealand heritage and its management does of course include built heritage of which Kempt House and the Art Deco city of Napier are but some examples. Equally for states in Europe such as Norway the mountains hold an equal position to the Viking ships. However, within the New Zealand context natural heritage dominates the discourses heritage and identity to a different extent than in Europe, see Sinclair 1986, pp. 38, 54-55; Thom 1987; Molloy 1993, 59; Kirby 1997; Dulap 1999; Choay 2001; Young 2004; Ross 2008, Werry 2011, Harrison 2012.

[50] e.g. Sinclair 1986; Thom 1987; Dunlap 1999; Gibbons 2002; Star 2002a, 2002b; Head and Muir 2004; Young 2004; Trigger and Mulcock 2005; Robin 2007; Ross 2008; Peretti 2010; Lien and Davidson 2010; Beattie 2011; Pawson 2013.

[51] Callaghan 2012.

[52] This comes a across in for example New Zealand's Biodiversity Startegy (2000, 1) where it is argued that 'Isolation is a strong theme of New Zealand's biological and cultural histories'. Evolution, through a long period of isolation, has created unique flora and fauna and thereby the context from which biodiversity is farmed as the nation's living treasures 'we hold for future generations' (2000, 16).

Zealand's environment has become part not only of New Zealand's natural, but cultural heritage.[53]

However, as often highlighted in relation to cultural heritage[54], New Zealand's natural heritage is also surrounded by a certain sense of nostalgia and longing for something lost during their recent history: In their efforts to make New Zealand home, the nineteenth century settlers transformed the environment of New Zealand at a rate and scale hardly seen before. Native forests were disappearing quickly due to the establishment of agriculture and the timber industry as well as human introductions of mammals.[55] Inevitably, this desire to make New Zealand a familiar home, a Britain of the South, had an immense impact on native fauna and flora. However, within a century the wholehearted embracing of environmental transformation in the name of progress was challenged, albeit gradually. Nature preservation, in particular of native birds, was very much pushed forward at the turn of the twentieth century by the, by then, aging early settlers who grew concerned and nostalgic for the flourishing birdlife that had once met them.[56] As a consequence, the sentiment towards native flora and fauna shifted; native species became key players shaping New Zealand settlers' sense of belonging, and New Zealand heritage was no longer tied to the homelands of the 'old world'.[57] Indeed, as environmental historian Paul Star notes, the desire to preserve native species 'became an expression of nationhood' in the early 20th century.[58]

The use of native species, in particular avifauna, as symbols of the New Zealand nation grew stronger in the 20th century; following World War I, the fluffy, cute and endangered kiwi bird has been used to frame a sense of self for the relative newcomers and has given the people their post-colonial marker of identification.[59] Thus, New Zealand has become a nation of Kiwis[60] – that is, of Kiwi humans as well as kiwi birds. As Beattie has noted 'New Zealand's native nature [has] become a useful focal point' for later 20th century nationalism characterised by an increasingly diverse population with fewer ties to Great Britain.[61] This merging of nature and culture makes nature preservation a national and

[53] e.g. Sinclair 1986, 6-7, 54-55; Star 2002a and 2002b, 154-156; Young 2004; Robin 2007; Ross 2008, 9-12, 17; Star and Lochhead 2013; Lee and Lee 2015.

[54] e.g. Lowenthal 1985, 1997; Hewison 1987; Smith 2006; Harrison 2012.

[55] e.g. Thom (1987); Young (2004) in particular chapter 3; Brooking and Pawson eds. (2011) for a thorough discussion of the agricultural transformation of the environment of south island; Pawson and Brooking eds. (2013), in particular Peden and Holland (2013)'s chapter on the environmental transformation caused by the introduction of agriculture, Hearn's (2013) chapter on the impact of mining and the pollution caused by the debris of mining; Wynn's (2013) chapter on deforestation and Park's (2013) chapter on the transformation of New Zealand's wetlands. For more general accounts see Beattie (2011), for example Young's (2004) chapter two and Anderson (2013) for discussion on environmental changes prior to European settlement and Atkinson (2006) for an overview over the introduction of mammals and their environmental impact.

[56] Star 2002a, 132. See also Beattie (2011) for a nuanced description of the settlers' valuation of the early appreciation of the aesthetics of native species.

[57] See for example Ross (2008) discussions on how primary education contributed to the generational shifts in attitudes towards New Zealand nature and landscape. See also Beattie (2011).

[58] Star 2002a, 129, see also Beattie (2011) for similar arguments.

[59] e.g. Sinclair 1986, 128,188; Beattie 2011, 343.

[60] e.g. Immigration New Zealand 2015; Beattie 2011, 343.

[61] Beattie 2011, 346.

emotional matter; keeping natives alive is closely linked to maintaining the 'Kiwi nation'. Thus, simply letting the native species die out without a fierce battle is not an option if the 'Kiwi nation' is to prevail.[62] This is clearly exposed through the government's post-millennial concerns for the loss of native biodiversity and the ambitious desire to turn back time and restore it to a replica of New Zealand's 'first nature'.[63] However, the fear of loss and the desire to protect and restore native nature has become a matter of national importance reaching far beyond the conservation professionals and dedicated volunteers. As the editor of the magazine *North and South* noted last year, by investing in a rat trap everyone can 'be part of a nationwide, backyard, pest-dispatching solution – one small cog in the creaky wheel of New Zealand's conservation machine' and help reduce the number of the troublesome rodents in the hope of transforming one's garden into havens for native species.[64] In this sense, preserving native species becomes a means of actively practicing New Zealand heritage and is a low-key activity most can take part in. However, practicing heritage and caring for lesser-known native species is far from easy: Predicting the long-term effects of scientifically-sound conservation actions is bound with uncertainties as the action taken is of an experimental nature. Indeed, as the final example from Kakaramea illustrates the practice of caging Dactylanthus a striking illustration of unintended consequences of experimental conservation.

CAGING – THE UNINTEDED CONSEQUENCES OF ACTIONS OF CARE

The practice of caging Dactylanthus now has some 20 years of conservation history to draw lessons from. Nearly ten years ago, the first contours of trouble emerged: Research seemed to indicate that the galvanized metal used in the wire netting of the first caging missions had actually caused harm to the caged Dactylanthus – more clumps of Dactylanthus had died inside the galvanised cages than outside.[65] Now 'researchers with time on their hands' had confirmed this, one of the Biodiversity Ranger noted as we headed further into the forest to re-caged and rescue an unhealthy enclave of Dactylanthus covered in old, galvanized cages. The practice of re-caging certainly made it clear that the human protective intervention had not gone as predicted; the actions were taken because one feared loss, but the caretakers' efforts had further endangered natives thought to have been protected. Thus, what initially seemed like a new and thriving companionship turned out to be troubled as time went by. However, unlike the earlier histories of introduction, the human element of the trouble was clearly acknowledged and acted upon. As a means to undo the harm, the re-caging continued until the team ran out of wire netting, leaving behind several Datylanthus clumps in old, galvanised cages serving as an installation of failed control. Only time will tell whether these clumps covered in galvanised cages survive until the next load of new cages arrive sometime in the future.

Slightly perplexed by it all, I asked one of the Biodiversity Rangers if these Dactylanthus would ever be 'free'. The answer was no; once caged, always caged. That is unless the biodiversity of the forest is significantly altered – which by the looks of it, is not

[62] In addition to more symbolic side discussed here, it can also be read in a more literal manner as tourism, which is heavily dependent on New Zealand's natural heritage, is the largest export earner of the country (Beattie 2011, 343).

[63] The Biodivsersity Strategy as well as DOC's Protecting and Restoring Our Natural Heritage: A practical Guide from 2001 are examples of this. See Isern (2002) and Beattie (2011) for a more reflexive discussion on the impact of these documents.

[64] Larson 2015, 8.

[65] DOC 2005, 21.

likely to happen any time soon. For the foreseeable future DOC rangers and volunteers will be managing cages and monitoring the caged treasures from New Zealand's first nature and the transformed forest floor of Kakaramea will continue to be an alien landscape of second nature. While certainly alien to foreigner like me, the New Zealand volunteers' bewilderment over their newly produced patchwork floor also hints at the fact that this is a landscape they find it hard to relate to. It is a zone that may come more across as a modern art installation than a tranquil place to draw a sense of belonging from. As such, Kakaramea can be seen as an uneasy grey area between first and second nature, filled with histories of regret and future hope.

CONCLUSION

Using one member of New Zealand's native species as a starting point, this article has sought to address some of the paradoxes of natural heritage conservation. As a means to do so I have approached the case of Dactylanthus taylorii as a case where multiple species meet and new and troubled companionships have evolved over time, essentially triggering conservation responses. By closely examining the interspecies relationships between Dactylanthus, bats, possums and humans, along with the latter's operationalization of scientific knowledge, the *natural* in natural heritage conservation can come to the fore. Working from the interdisciplinary position of Heritage Studies, the possibility to combine contemporary and historical courses has been crucial in gaining a sense of the temporal dynamics leading to the preservation efforts. Finally, the ethnographic encounter out in Kakaramea highlights how the preservation and restoration of native species also contributes to transforming the very landscape of which they are a part. On a micro-level, the first experimental caging of the Dactylanthus shows how protective technology – the galvanised steel – can negatively impacted the micro-environment of the plant. However, while the caging altered the well-being of the plants, this means to control the possum-Dactylanthus companionship also had a more uneasy visible side that impacts our human perception of the landscape. From a pocket of seemingly untouched nature, the cages transformed the forest floor into an alien landscape of 'second nature' – a product of processes of cultural selection and companionship control. Thus, the ethnographic account leaves no doubt that conservation efforts not only save native species but also contribute to transforming environments and altering our sense of place.

By combing contemporary and historical sources one can detect at least two parallel notions of nature at work within natural heritage conservation: One practice and future-oriented notion in which nature comes across as something that can be controlled and restored through management. However, while future-oriented, it is also nonetheless not free from the past, in that its aim is to preserve and restore members and populations of New Zealand's first nature for future generations to enjoy. It is this practice and future-oriented notion of nature one first and foremost met out in Kakaramea. The DOC and volunteer team did not linger much on the historical and, more importantly, the human-historical dimension of the conservation effort. Rather, our attention was directed towards the future of the Dactylanthus enclave. However, one could nonetheless feel the presence of the competing notion of nature where nature forms an integral part of the cultural history of New Zealand. The older volunteers dipped into this when describing memories of the framed Wood Roses on display in New Zealand homes. Furthermore, by delving deeper into the research history of Dactylanthus taylorii, the human element of its history of decline emerges through the Dactylanthus-possum companionship. This companionship highlights how one plant is indeed part of a network of historically-situated companionships between multiple species, of which humans are one. Rather than detached from human history, the role of caretaker has emerged from our previous historical role as introducers and the fact we created what has become a

troubled interspecies relation. Caring for natives therefore becomes both engaging with a nation's difficult heritage whilst hoping to also secure its future. Hence, by historically situating practical conservation efforts, one can start to appreciate how native species and the efforts to preserve them are integrated into and negotiated through our own notions of belonging and sense of place.

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