

**Regular Paper**

# **Leave No Trace and Sustainability Education: Taking a Dialectical Approach**

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## **Abstract**

Leave No Trace (LNT) is globally the most widely accepted minimum impact program and has been linked to behavior change and the maintenance of a range of ecological measures. Critiques of LNT have emerged, including that LNT ignores wider impacts that contribute to climate change and diverse world views. Many outdoor education students carefully follow LNT practices. When students encounter these critiques, they often conclude either that LNT is effective and the detractors are misplaced or that LNT should be abandoned, thereby avoiding deep engagement. Education must prepare students for the contested project of creating a sustainable future. We argue that LNT shows considerable promise as a context for learning through dialectical approaches where students must engage with divergent articles and examples. LNT can be used to help students understand that taking informed action is important. LNT can also be used to show that there are no innocent actions.

**KEYWORDS:** *Outdoor education, ethics, Leave No Trace, sustainability, pedagogy*

## **Introduction**

We (authors) are involved in tertiary education. In our field trips, we work with our students to minimize their impacts by applying the Leave No Trace (LNT) framework. The challenges of educating our students to practice LNT are diverse and require students to understand

their potential impacts, to plan ahead, consider the places we are going and develop skills and knowledge of how, for example, to protect water quality and avoid harming fauna and flora. There is a growing body of literature that identifies the most important minimum impact practices and highlights the effectiveness of LNT (Lawhon et al., 2020; Schwartz et al., 2018a; Schwartz et al., 2018b; Settina et al., 2020).

Concurrently, critical questions are being asked about minimum impact practices and often LNT in particular. These critiques include that LNT: separates humans from nature (Loynes, 2018; Rawles, 2013); discourages youth from connecting to nature (Marris, 2014); and does not promote values that are “socially and ecologically diverse, just, and responsible” (Mullins, 2018, p. 11). These critiques question the foundational concepts and approaches of LNT from diverse epistemologies and ontologies. An example of divergent approaches can be seen in an exchange between Simon and Alagona (2009), who presented a critique of LNT (discussed further below) which resulted in a rejoinder by Marion et al. (2011), who criticized their lack of evidence, which in turn resulted in another response by Alagona and Simon (2012) in which they justified their argument and stated they were drawing on:

primary source documents, empirical analysis of texts, qualitative interpretation, and narrative argumentation—that historians, cultural geographers, philosophers, and other humanistic scholars have used for as long as their fields have existed. Readers are welcome to evaluate our work based on the sophistication of our argument or how effectively we apply these methods. (p.120–121)

In this example, the diverse paradigms of the scholars lead to contested ideas of what counts as evidence and what constitutes a valid justification for a position.

We believe it is important to invite our students into debates such as these in order to understand that there are multiple and, importantly, robustly justifiable positions in the world and that, rather than pre-emptively shutting down the discussion by picking a side, students should engage deeply and critically with the arguments. Indeed, the project of sustainability education and fostering pro-environmental behaviors requires the use of a wide variety of disciplines, theories, and methodologies, and understanding the transdisciplinarity and interconnectedness of all the factors involved (Siegel et al., 2018). We recognize that it is important to educate our students (and the public) that outdoor activities can result in unnecessary impacts and that LNT is a strategy for minimizing these impacts. Many critics of LNT argue that its emphasis on minimum impact skills misses the broader crisis of climate change (which outdoor recreation often contributes to). Instead of focusing solely on LNT’s limitations, we use the powerful messages and practices of LNT in reducing environmental impacts in outdoor settings as a platform for conversations about larger planetary issues. Our premise is that such work is critical in preparing our students for complex and contested sustainability issues which require navigation and must result in action. This article explores our pedagogical approaches to achieving this end.

We begin by linking the roots of LNT in the context of rapidly growing impacts and concerns about the sustainability of popular outdoor environments. We highlight the effectiveness of LNT in achieving a reduction in impacts through people changing their behaviors (a critical consideration for sustainability education). Next, we examine the literature at the intersection of outdoor education and sustainability education which reveals possibilities but also some tensions which are also pertinent to LNT. Having identified the contested landscape of LNT, outdoor education and sustainability, we introduce the dialectical approach as a productive way to navigate this landscape. We then provide two examples from the LNT principles for exploring through a dialectical approach. Finally, we look to the implications of this work.

## Leave No Trace

LNT was originally developed in response to increases in outdoor recreation impacts in the U.S. and has since gained significant international recognition to become the most widely accepted minimum impact program (Cole, 2018). As the Leave No Trace Center for Outdoor Ethics developed as a nonprofit organization in the 1990s (Marion & Reid, 2001), research from the field of recreation ecology—the study of outdoor recreation impacts on the landscape, informed the framework of principles and educational practices (Cole, 2018). In the past 15 years, social sciences have begun to investigate if and how LNT-related education can influence the perceptions and actions of people outdoors. The combination of social sciences with recreation ecology has deepened our understanding of peoples' interactions with our ecosystems.

A more sustainable future requires that people go beyond simply deepening understandings; it requires for people to take action, and research into LNT provides some insights here. Much of the research on LNT over the past 15 years has examined peoples' knowledge, perceptions, and self-reported behaviors associated with LNT, and applied concepts related to the Theory of Planned Behavior and/or Reasoned Action established by Ajzen and Fishbein (Vagias et al., 2012, 2014). For example, Mueller et al. (2018) examined competitors' perceptions of LNT across multiple event types, such as trail running, mountain biking, and motorcycle races. They found that attitudes toward LNT behaviors were less favorable among motorized racers compared to non-motorized event participants. Using similar approaches Schwartz et al. (2018) examined attitudes of boulderers, and Clark et al. (2020) evaluated perceptions of LNT among roped rock climbers. They found that some behaviors specific to accessing bouldering and climbing areas (e.g., Travel and Camp on Durable Surfaces) were perceived as more difficult than other general Principles (e.g., Plan Ahead and Prepare). Among climbing populations, those people identifying as females and people of color sometimes showed greater knowledge of LNT than comparison categories (Maples et al., 2022). Perceptions and self-reported behaviors related to LNT have also been explored with youth (Miller et al., 2014), generally finding that education can influence attitudes and self-reported behaviors of children.

In order to be effective, actions to reduce impacts must be undertaken in different contexts and by a wide range of people, which raises questions about whether LNT education is transferable. Research has explored LNT in diverse settings. For example, Vagias and Powell (2010) examined the attitudes of people who stayed overnight in the backcountry in Glacier and Olympic National Parks as well as Cumberland Island National Seashore, finding that attitudes aligned with LNT Principles. Taff et al. (2014) extended this research to compare the Vagias and Powell (2010) findings with people who only entered the front country in Rocky Mountain National Park, finding that the attitudes of people who went into the backcountry were slightly more congruent with LNT Principles, but largely the same between the backcountry and front country groups. Backman et al. (2018) extended this research across multiple protected areas, including U.S. state parks, national forests, and national parks finding similar results across these settings. While the majority of research on Leave No Trace has been focused on U.S. protected areas, the program has evolved internationally with programs in Ireland, Hong Kong, Australia and Aotearoa| New Zealand. Research in other locations has demonstrated that global perceptions of Leave No Trace generally align with the LNT Principles and mission (e.g., Blye and Halpenny (2020) and Wu et al. (2021)).

Measures of effectiveness of sustainability education often rely on peoples' self-reported perceptions and behaviors. Such research is less robust than examining actual behaviors and more recently research has begun to address this measure of the efficacy of Leave No Trace. Results suggest that Leave No Trace can change both attitudes, and behaviors. For example, Settina et al. (2020) found that Leave No Trace-based education reduced behaviors associated with causing tree damage, litter, and poor disposal of human waste by forest campers. Schwartz et al. (2018a)

found that Leave No Trace signage significantly reduced undesignated trail use with front country day-users in an urban open space, and Lawhon et al. (2020) discovered that Leave No Trace signage resulted in significantly increased recycling within national parks. Finally, Schwartz et al. (2018b) found that a brief Leave No Trace educational lesson was more effective at encouraging people to leave natural objects with young people than control conditions, while also facilitating more nature connectedness for treated groups than control groups.

These studies into LNT are promising as they address one of the key concerns in sustainability, the lack of action. LNT has proven effective in particular contexts with particular people using a particular focus. To expand these actions to address sustainability more globally would require a massive upscaling of this work across contexts, cultures, political systems and ecosystems. LNT was never set up to address the diversity of sustainability issues facing us today. While the above points to recreation ecology and social science efforts, less attention has been placed on the contribution Leave No Trace can make to broader educational goals such as sustainability and, importantly, how that curriculum can be enacted.

## Outdoor Education and Sustainability

As with many of the contested aspects of this article, a global consensus on sustainability is elusive. The most often cited definition of sustainability is from the Brundtland Report from the World Commission on Environment Development (1987), which articulates sustainability as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (United Nations, 1987, p. 43). The model of sustainability continues to evolve and often includes three pillars: environment; society; and the economy (Scott Cato, 2009). Each pillar is nested within the boundaries of the previous pillar (for example, for society to be sustainable it must work within the constraints of the environment, and likewise for the economy to be sustainable it must operate within both environmental and societal constraints). More recently a fourth pillar has been proposed to emphasize the importance of culture (Lazar & Chithra, 2022). This fourth pillar recognizes additional aspects of sustainability such as ways of living together, value systems, traditions and beliefs which are marginalised in the term “society” (UNESCO, 2001). Indigenous cultures are of particular importance because they often hold world views which are based on many generations of living in a location and harvesting resources sustainably (Johnson et al., 2016). While we have been working to define sustainability and extend our knowledge of the impacts of humans on the planet, global indicators continue to worsen. Sustainability education must prepare student for the complexity of working with all of the pillars and their often-divergent logics and arguments (Wals, 2010). While scholars and global organizations have been doing critical work to better define sustainability and extend our knowledge of the impacts of humans on the planet, global sustainability indicators have deteriorated. We believe it is important for the conversations about sustainability to continue, but it is now imperative for attitudes and behaviors to change (Siegel et al., 2018).

Having briefly touched on definitions of sustainability, it is important to look at the intersection of sustainability and outdoor education. Outdoor education (OE) and sustainability education can be reconciled in some ways because of aligned pedagogical approaches. For example, the “emotional engagement outdoor education can generate opens the door for teachers to address the complex issues of thinking about the future and taking action to tackle underlying sociological reasons for unsustainable practices” (Irwin & Straker, 2014, p. 162). In addition, due to its interdisciplinary nature, OE has often become a home for sustainability education (Hill, 2012; Irwin & Straker, 2014; Lugg, 2007; Martin, 2008). However, Irwin and Straker (2014) warn that it is problematic to assume there is a natural synergy between OE and education for sustainability because OE can focus too much on fast adventures, high-risk activities and social and interpersonal development. These foci detract from sustainability education to the point where the environmental aspects of sustainability become little more than a backdrop to the

activity (Baker, 2005; Brown & Beames, 2016; North, 2020). Ultimately it seems “the contribution that outdoor education makes to sustainability depends on how outdoor education is conceived and implemented” (North & Jansen, 2013, p. 4) and one of ways in which OE engages with sustainability in a tangible way is through minimum impact practices like LNT.

However, minimum impact practices are considered one of the problematic aspects of OE which Hill and Brown (2014) label as “shallow environmental approaches ... or green practices within outdoor education” (p. 217). Similarly, Simon and Alagona (2009) critique LNT because it “focuses on the immediate, local impacts of recreational use while ignoring larger issues of change over time and connections through space” (p. 25) and from this basis, Simon and Alagona argue that LNT takes a view of the environment as presentist (ignores the cultural ecological history of places) and which obscures connections between places (such as the fact that national parks, rural and urban areas are all interconnected). Simon and Alagona acknowledge that LNT has helped preserve water quality from pathogens such as giardia and reduced the denuding of forests which was caused by firewood collection at campsites. They propose a new approach “Beyond Leave No Trace” which “takes the old model of recreationists as passive consumers of information and reframes it so that recreationists become active producers of new knowledge and collaborators in the educational process. This means converting passive, consumptive, uncritical leisure into active, productive, critical recreation” (p.30).

Given these robust critiques of LNT and OE and their relationship with sustainability, is there any reconciliation possible? LNT has been shown to improve certain environmental indicators and to influence behaviors and actions which is what we need to live more sustainably. In this article we argue that no approach is innocent, and every action will have limitations. By coming to understand this, we believe that we can better prepare our students for a future filled with contested, complex and enduring challenges. Here we take this approach to LNT and working with the dialectic.

## Dualism and the Dialectic

Dualistic thinking is an important concept within structuralism (the study of the structures which underpin human thinking and action) and includes two terms, elements, concepts, or ideas that have the opposite meaning (Buchanan, 2018a). Examples of opposites include “good” and “bad,” “mind” and “body,” “culture” and “nature,” “global” and “local,” and “masculine” and “feminine.” In structuralism, this type of dualism is fundamental as it organizes human philosophy, culture, and language and these parts of the human reality can only be understood in relation to one another (Grbich, 2004). However, not only does dualistic thinking include two ideas, but each idea is defined in a reciprocal relationship with the other idea. In other words, the idea of “good” cannot exist without the “bad.” The two terms have a structural, complementary relationship (Buchanan, 2018a).

Furthermore, these opposites are hierarchical. One element of each dualism is privileged over the other, which is marginalized or suppressed. Typically, the first term in the opposition is considered as positive (e.g., good, mind, culture, global, masculine) whereas the second term represents the absence of the first (Kelemen & Rumens, 2008; Mills et al., 2010). Thus, each concept or idea is defined by what it is not. In everyday conversations when we use the term “women,” for example, we rely unconsciously on our understanding of “men” to derive our meanings (Hughes, 2002).

Dualistic thinking provides a structure that reduces the greyness of complex phenomena, because dualism offers one-dimensional views of a construct. Dualities are necessarily oversimplified and therefore unstable (Herdin, 2012; Hughes, 2002). This instability occurs because “the first term can never be stable or secure since it is dependent on that which is excluded” (Finlayson, 1999, p. 64). If the understanding of the good element in the duality changes, so does the understanding of a bad element, and vice versa. Furthermore, because the

elements in the dualism often lack clear definitions, dualism can lead to stereotyping (Herdin, 2012). For example, feminism provides strong critiques of dualistic thinking, which is focused on the power structures contained within opposites such as male and female, which exacerbate inequality (Grbich, 2004). Further, contemporary complex and interconnected cultures and systems have multiple categories that coexist in myriad relationships (Herdin, 2012). Dualistic thinking is inadequate to effectively understand complex problems and dilemmas. A dialectical approach engages with multiple viewpoints to support change and transformation (O'Leary, 2007; Thorpe & Holt, 2011).

The dialectic can be traced back to Socrates and Plato (Thorpe & Holt, 2011). The term "dialectic" originates from the Greek term *dialektikē* meaning "art, technique, skill" (*teknhē*) of discourse or conversation (Douglas, n.d.). Hegel and Marx are most associated with the dialectic. Hegel's understanding of dialectic is the constant presence of contradiction (Buchanan, 2018b). O'Leary (2007) defines dialectic as "a process of change that arises from the tension between a particular way of doing or thinking and its contradictory positioning" (p. 67). It is a triad of thesis, antithesis, and synthesis. In the dialectic cycle, each synthesis starts with a thesis. The thesis is an idea or movement that is defined in its structure through its opposite, an antithesis. A period of conflict between thesis and antithesis occurs until a synthesis emerges (Thorpe & Holt, 2011). The power of dialectic is in its ability to use contradiction and oppositions to do more than build resentment and antagonism. A dialectic is the starting point for change (O'Leary, 2007). The dialectical contraction of "a" is not the absence of "a" or "non-a" but "b," "c," and "d." The space of synthesis recognizes other alternatives; one where both thesis and antithesis can be deconstructed or exist at the same time. It is a way to work through dualism that we discussed above and hierarchical tensions to create a position—a synthesis—that represents an evolution in thinking (Carr, 2000; O'Leary, 2007; Thorpe & Holt, 2011). Examples of a dialectical approach are visible in the recent literature on technology in outdoor education (see for example Hills & Thomas, 2020; Reed, 2021; van Kraalingen, 2021). In this work the binary of "technology bad" versus "nature good" is addressed through lenses which look at affordances and limitations of technology to enhance outdoor education and connecting with nature.

Similarly, within outdoor education a dualism is often created between humans and the more-than-human parts of our world. This is eloquently captured by Cronon (1996) who argues that the Romantic concept of pristine and wild nature (which saw the creation of national parks) means that even the presence of people in nature represents its downfall. Cronon suggests that this duality (reinforced by protected areas and parks) has resulted in a significant breakdown in the relationship between people and the planet. A better way forward, according to Cronon, involves people and the planet living harmoniously together. Yet outside of legally protected lands, we find that 10% of the earth's remaining native ecosystems have disappeared in the past 25 years (Vaughan, 2016). Clearly this harmony between humans and ecosystems has yet to be achieved and humans continue to represent the downfall of many native ecosystems. A dialectical approach requires us to view problems from multiple perspectives which are often in conflict and create change through the synthesis of these ideas.

We believe that a potential pathway toward sustainability can be found by impelling students to participate in these kinds of discussions. However, in this work we find that student assignments often reveal that students abbreviate their engagement by "picking a side." To value the dialectical approach, we need students to feel the uncertainty and the ebb and flow of their own convictions as they read the diverse literature and listen to conflicting viewpoints without short-cutting the process. This is hard emotional work. Here we describe our attempts to enact this type of approach.

## The LNT Principles and the Dialectic in Practice

There are in total seven LNT principles each of which can be unpacked from a variety of perspectives. The following section provides two LNT principles as examples of how we introduce students to a dialectical approach. In each example, we begin by presenting research literature and cases which support the importance of the particular LNT principle. We then seek to expand students' understandings of the principle by providing exceptions, counter-cases and arguments from divergent paradigms. Through these dialectical encounters, we ask that students learn to listen to multiple (justifiable) positions and acknowledge the tensions that emerge.

### *Example One: Leave What You Find*

According to the LNT New Zealand pocket guide, "Leave What You Find/ Kāua koe e raweketia ngā wāhi tapu, me ngā wāhi motuhake rānei" (do not disturb sacred sites or sites of historical significance) is a principle which asks people to

Conserve the past; do not disturb archaeological and historical areas. Many culturally significant sites are now parts of reserves, and this is not always publicly known, so treat these places with respect... Leave natural objects undisturbed—load your camera, not your packs. Take photos, drawings and memories as your souvenirs. Objects in nature derive much of their beauty from their surroundings and never look quite the same back home. (Leave No Trace New Zealand, 2016)

In our teaching, we discuss the motivations of people who collect items often as souvenirs or for crafting, but our interest in that same item wanes and it collects dust on a windowsill. Students seem to understand this principle and to reinforce it we provide the following example:

In the northern part of the South Island, there is a species of giant carnivorous land snail (Powelliphanta). During an expedition with "at-risk" young men in that part of the country, there had been some positive changes and participants were beginning to show signs of trust and co-operation. The young men became fascinated with the diversity of colors of the snail shells and the facilitator became impressed with their demonstrations of gentleness and appreciation. They also began to collect empty snail shells. At the conclusion of the trip the facilitator discovered the large number of shells which the group had collected and called the Department of Conservation (DoC) (Land Management Agency) to ensure that it was not a problem. The DoC staff member indicated that the snails often lay their eggs inside empty shells. On inspection, the group discovered eggs and live young in the shells and the facilitator spent their next free weekend returning the shells to their original location. (Abridged from Leave No Trace New Zealand [2022])

This example highlights the limited knowledge of people in the context of complex inter-connected ecosystems; refraining from collecting items maintains the processes of the ecosystem. Human interference has interrupted ecological systems many times and resulted in the development of a legal framework which protects many public lands from activities including collecting items.

Despite this, many people believe that gathering and using items from the environment creates a connection with nature and practicing "leave what you find" stops these connections happening. This belief is not necessarily supported by research. For example, in a recent study with children, Schwartz et al. (2018b) found that a brief Leave No Trace educational lesson about the LNT Principle Leave What You Find facilitated more nature connectedness for treated groups than control groups that did not receive the lesson. Having argued that taking items is problematic on multiple levels, we now turn to the example of Māori, their ancestral lands, and their customary harvesting of food and other resources.

## The Harvesting of Pounamu/Greenstone

Siegel et al. (2018) argue that our use of language is central to our understandings and therefore advocate for stories as a way to promote pro-environmental behavior. The following oral narrative provides a story of the foundation for the Ngāi Tahu (tribe from the South Island) claim of tiakitanga (guardianship) over pounamu in Te Waipounamu (the South Island). Furthermore, their rights over pounamu were formally recognised by the New Zealand Government upon enactment of The Ngāi Tahu (Pounamu Vesting) Act 1997 (New Zealand Petroleum & Minerals, 2018). The Act acknowledged that upon selling the land to the crown, Ngāi Tahu had no intention of forfeiting ownership of pounamu. It also made Ngāi Tahu responsible for the ownership and management of pounamu.

As kaitiaki (guardians) of pounamu, Ngāi Tahu has developed a resource management plan that “allows for the ongoing use and protection of this resource in a way that is sustainable and responsible *mō tātou, ā mō kā uri ā muri ake nei* (for us and our children after us)” (Ngāi Tahu, n.d.). The following narrative shows how Ngāi Tahu view pounamu as more than a valuable resource from which to make high quality tools; pounamu is part of their ancestry and creates important links to their identity and culture.

Poutini a taniwha (water spirit) was the guardian of pounamu. During an excursion to Te Ika a Māui (the North Island), Poutini was captivated by the beauty of a woman named Waitaiki who was bathing in the sea. Poutini swept in and captured her, before fleeing southwards. At Tahanga on the Coromandel Peninsula, he lit a fire to keep Waitaiki warm. Realising that his wife Waitaiki was missing, Tamaahua used his power of *karakia* (prayer) to locate her and set off in pursuit.

Poutini, discovered that they were being chased and fearing capture, took Waitaiki and fled further south to Whangamatā. When Tamaahua arrived at Tahanga the embers of their fire were cold. Once again, he set off in pursuit. This was repeated many times and at each stop cold ashes were the only sign that Poutini and Waitaiki had been there.

The pursuit continued down the west coast of Te Waka o Aoraki (South Island) to Takiwai. Upon arrival at Arahura on the west coast of Te Waka o Aoraki, he noticed that the water was warmer, realised that Waitaiki was near and made his way up the river to find his wife.

Knowing that Tamaahua was about to catch them, Poutini turned Waitaiki into pounamu and laid her in the Arahura River. He then made his way stealthily down river and escaped. Tamaahua found his beautiful wife Waitaiki lying in the Arahura River, turned into pounamu and after mourning her, he began his long journey home, alone. Today Poutini continues to patrol the west coast of Te Waka o Aoraki or Te Tai Poutini, as the guardian of pounamu. (Ngāi Tahu, 2020)

Viewing their role as similar to the water spirit Poutini, Ngāi Tahu seek to protect and manage pounamu in a responsible way to ensure the resource remains available for the generations of Ngāi Tahu descendants of the future (Ngāi Tahu, n.d.).

By drawing on oral narratives and connections to ancestral lands that include customary rights (now enshrined in law), we can see that examining Leave What You Find/ *Kaua koe e raweketia ngā wāhi tapu, me ngā wāhi motuhake rānei* has led to a deepening of appreciation of the nuance involved in this principle. It reveals that pounamu is not just a resource to collect for jewelry or trinkets, but the stone supports deep cultural connections of the indigenous people of these places. The idea of not taking anything but photographs of the pounamu denies this cultural heritage and could extinguish the skills of working the stone gained through many generations. These cultural dimensions of sustainability often remain invisible to non-Indigenous peoples.



This in turn raises questions for many of our non-Indigenous students such as “Why should Indigenous peoples be treated differently to other people?” We treat this as an invitation into topics including colonization, equity, and history. A potential response to such student questions might be that our public lands and national parks are largely the domain of those with access to enough money, recreational time, and cultural inclination to spend their time doing things that don't put food on the table. For too long, outdoor recreation and education have been the preserve of the affluent elite who have a focus on adventures and overcoming challenge. This approach has led to the exclusion of working class and those of diverse cultures who see value in contributing resources to their communities from their time in the mountains and around the coasts. This highlights how sustainability takes on different forms depending on our cultural lenses.

That said, indigenous peoples such as the Māori do practice Leave No Trace/Toitu te Whenua. There are places that are sacred (wāhi tapu) and special (wāhi motuhake) where Māori do “leave what they find” and other places where Māori can harvest based on cultural protocols of stewardship.

The goal of this dialectic is to highlight the use of finite resources. There are times when taking items is legally and morally justifiable. These situations are ones where there is extensive knowledge of the cultures and ecologies of the area and where protocols are carefully followed. For our courses, we use Leave What You Find as a foundational concept. Self-restraint may not seem like an action (perhaps more like inaction), but by avoiding causing harm we may work towards a more sustainable relationship with the planet (Siegel et al., 2018).

#### ***Example Two: Respect Wildlife and Farm Animals/Me kauuanu koe ki ngā kararehe katoa***

Aotearoa New Zealand contains a large number of endemic species which evolved in isolation for around 70 million years. The introduction of the Polynesian dog and rat, and then the introduction of animals by Europeans has resulted in the extinction or near extinction of many species. The LNT principle “Respect Wildlife and Farm Animals/Me kauuanu koe ki ngā kararehe katoa” has been expanded from solely focusing on wildlife to include farm animals. This extension was made because in Aotearoa New Zealand, many people are unaware of appropriate behaviours on farms and particularly at times such as calving or lambing and also more generally when walking with dogs. This in turn has created problems for farms where there is access to public lands. The key messages of this principle pertain to avoid feeding animals, following dog regulations and avoiding sensitive times (lambing, nesting, mating and raising young). To reinforce these messages, we present the following cases which are primarily focused on wildlife:

#### ***Declining Numbers of Alpine Parrots***

Kea are a native alpine parrot with a reputation for causing mayhem by ripping tents and windshield wipers apart, stealing boots and being largely unafraid of people. Their apparent cheekiness and curiosity have also brought them into danger as they frequent car parking areas and fall victim to being run over or are poisoned by people feeding them chocolate (many people don't realise chocolate is toxic to kea). Like other native species, research shows kea numbers are in sharp decline, which is likely due to interactions with people combined with nest predation by feral cats and stoats. Yet kea are highly visible at mountain passes and ski fields leading many people to believe they are still common. A close interaction with a kea is a valued experience for many New Zealanders and international visitors alike. Offering a kea some food is a common way in which to bring the kea to within touching distance.

#### ***Feeding the Kiwibear***

At the end of a Leave No Trace course on Mt Ruapehu (a volcano on the North Island), course participants spent some time talking with tourists at a visitor centre about minimum impact practices. Some European tourists discussed how much they loved nature. They gave

an example of how they were staying in their campervan and been visited the previous evening by a 'kiwibear' which they gave some food. After a brief and confused pause, the LNT course participant (who worked in the area) was able to establish that the tourists had fed an Australian Brush-Tailed Possum—one of the worst pests in the country.

These two examples reinforce the dangers of feeding wildlife. People from varied cultures often show their hospitality by offering food to visitors. It seems natural for this caring to be extended to the more-than-human world and some species are particularly effective at exhibiting behaviours which lead to them being fed more frequently (see for example research into the feeding of chipmunks [Marion et al., 2008] or bears [Freeman et al, 2021]). This, combined with the high caloric content of human food powerfully reinforces human food-seeking behaviour in animals. The changed behaviour of the animals due to being fed, and the consequences for the ecosystems in terms of reduced seed dispersal or other ecological roles that these animals neglect in order to receive human food may well be significant. Avoiding feeding these animals either deliberately (or inadvertently by leaving food accessible overnight) is an important way to reduce our impacts. Leave No Trace-specific research with visitors in the multiple types of parks and protected areas suggests that people largely feel that “drop[ping] food on the ground to provide wildlife a food source” is “inappropriate” (Backman et al., 2018, p. 46). Further, research suggests that teaching people about Leave No Trace can effectively increase knowledge, potentially change attitudes, and subsequently has the potential to reduce negative outcomes for wildlife (Mateer et al., 2020; Schwartz et al., 2018).

To this point, students are generally comfortable with the discussion of the LNT principle. However, within this principle there are also messages for hunters and anglers such as ensuring they are familiar with the target species and a reminder to aim to make a clean kill or a clean release every time. When we discuss hunting, some students feel quite disturbed; caring for the environment does not usually involve killing animals (Gibson, 2014). Other students who participate in hunting suddenly see the relevance of this topic for their experiences.

Hunting of introduced animals is sometimes presented as one way of reducing the number of animals and allowing our ecosystems to recover. Evidence, however, indicates that hunting is insufficient to make much contribution to population control as the inaccessible areas of country hold large numbers of animals and hunting the front-country simply keeps the population in a state of rapid growth (Hansford, 2012). Furthermore, hunting focuses on larger herbivorous mammals (which reduces browsing) but not the carnivores, which are the chief predators of indigenous birds. Hunting is also problematic as it involves doing violence to an animal and, regardless of the skill of the hunter, there will be times when the animal dies painfully and slowly. The meat of the animal serves an important part of the diet of some families and communities—particularly those from Indigenous, rural and working-class backgrounds.

Because hunting is not able to control animal numbers, the Department of Conservation uses aerial drops of 1080 baits (a broad-spectrum poison) in national parks and reserves. These have proved so successful in killing possums, rats, and a variety of other introduced species, (with the consequent increase in the number of native birds), that there have calls for an increase in the use of the poison (Parliamentary Commissioner for the Environment, 2013).

For our students, the realisation that the survival of native species requires the application of huge quantities of poison in our most pristine environments is confronting. Romantic views of nature are difficult to reconcile with the practice of using poisons. Some students coming from families which hunt are staunchly opposed to the use of poisons because of the impacts on high value species. Others oppose 1080 because there is a perceived long-term effect of the poisons in foods such as watercress and in drinking water (this view is not supported by research which shows the poison breaks down very quickly in the ground, in plants and particularly in water). Some Indigenous people find the use of 1080 poison abhorrent because they view the land as a living ancestor and their spiritual values are compromised by poisons. Other Indigenous people

feel differently arguing that many tribes support the sensible use of 1080 (Waatea News, 2018). The complexity of the topic is revealed through these perspectives.

Through this particular example of a dialectical approach, we examine our relationship with animals. Beginning with the principle “respect wildlife and farm animals” we have moved from not disturbing wildlife and interrupting their ecological roles, to active killing of animals through hunting and poisoning. A stark binary does exist here; in order to sustain our endemic species, we must kill a variety of introduced species. There is a cost to sustainability. Sometimes that cost involves personal sacrifice and missing out on a close-up photo, other times that cost can feel counter to people’s desires to care for nature and protect animals. Decision-making in the midst of controversies is necessary in order to live more sustainably on the planet.

The upshot of our work with LNT in OE is that we have developed a curriculum which begins with LNT to inform our practice on field trips and which we believe is an important part of responsible outdoor education and recreation. Students are empowered to act in ways that look after the places they go so they can be preserved for future generations. We also value the broader multidisciplinary discussions that LNT opens up to engage with social, cultural and ecological justice and the relationship between people and the more-than-human elements of our planet.

## Implications

A key challenge is for educators to prepare students for the complex and contested project of creating a sustainable future. Our experiences suggest that students (like many of us) often gravitate toward a dualistic position where LNT is either right or wrong and where the critics are either misguided or correct. In other words, dualistic thinking presents these positions as irreconcilable and shuts down further reflection on the important contributions each argument might make. In our minds, impelling students into the dialectic and holding them there, offers a way to expand the possibilities for sustainability education more generally.

One method which we believe holds promise is to ask our students to read an article or case (selected because they investigate the effectiveness of LNT principles and practices), and then complete a response sheet. An example of a response sheet is the “3, 2, 1” format, which requires students to identify: 3 key ideas from the reading; 2 ideas that challenged my thinking or made me wonder; and 1 question I now have. Through these types of structured reflections, students are encouraged to interact with the text without premature foreclosure. Students are then presented with an article or example which presents a divergent case, and which is intended to expand their understandings. Students then complete another response sheet. This is a way in which we are attempting to help students to engage with the dialectic. It is crucial that students develop their critical thinking, but not by closing down opportunities for fresh insights from beyond their own experiences.

It would be deeply disturbing to have our students graduate with no understanding of the practices and principles of LNT, or with the belief that LNT was flawed to the point of irrelevance. The literature referenced here shows widespread evidence of the effectiveness of LNT in maintaining various ecological measures.

It would also be deeply disturbing for students to graduate thinking that LNT fulfilled their complete response to achieving global sustainability. No single framework or theory will be sufficient, nor will a single action (no matter how well-informed). It will take multiple actions, multiple theories and perspectives to move towards the shifting target of sustainability.

Some students are reluctant to critique established ways of being and doing. Others are quick to critique. More challenging is to build something that is better, particularly because concepts of sustainability are inevitably framed within our cultures. This in turn leads to questions such as “whose sustainability are we working towards?” Understanding and acknowledging that all our approaches will be flawed gives permission for clumsy solutions, experimentation and a sense

of humility which will be critical to building a better future (Hipkins et al., 2014). Alagona and Simon (2012) argue that LNT:

is not enough in a world of global capital circulation where the goods we produce and consume in order to enjoy the outdoors can have long-term and far-reaching social and environmental ramifications. Our original article sought to push LNT further by making it more honest and inclusive regarding the full range of impacts associated with modern outdoor recreation. We resume that effort here, and we will continue to do so in future research and writing. (p.120)

Similar to Alagona and Simon, we also believe that it is important to push ourselves and each other toward sustainability. It will take a combination of action and rhetoric to realize the potential for OE and sustainability to become better aligned. Sustainability in outdoor settings and in urban or other settings is not a zero-sum game; LNT practices do not preclude other actions in other aspects of our lives and ideally should inspire a life-long commitment to care for both local places and the planet as a whole.

The unpacking of frameworks and world views must lead to further actions. We are concerned that for some students, the act of problematizing particular frameworks (such as LNT) undermines students' confidence and can result in feelings of helplessness. Somewhere at the intersection of the binary of unreflexive action and the inertia of complexity lies a space where informed and thoughtful action lies. Whether our work with a dialectical approach actually results in students taking actions leading to a sustainable future is difficult to measure; we must ask what constitutes a pedagogical success within this work. The best achievable evidence is probably when our students can demonstrate understandings about the relationship between LNT practices in field trips and broader practices which lead toward sustainability and which they intend to action. While this cannot be taken as evidence of actions, encouraging signs of such understandings are emerging in student assignments.

In the context of fatality prevention, North and Brookes (2017) asked, "Is there even an argument for outdoor teacher preparation which does not examine the lessons from the past?" (p. 200). We adapt this question for the topic at hand which now asks, "Is there even an argument for outdoor education (or indeed education in general) which does not support students to take action towards a sustainable future?"

In conclusion, LNT provides a framework through which actions are clearly defined and which has proved effective in sustaining a variety of ecological indicators in natural environments. We have argued that LNT is a powerful starting point from which to expand our acts of care towards a more planetary scale. Drawing on the dialectical approach to enact this expansion is one such approach. We anticipate arguments and counterarguments to continue and welcome this ongoing dialectic as we attempt to enact our myriad values and support urgently needed actions leading to a sustainable future.

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