



Urban Coexistence: Human-Wildlife Management in New Zealand

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Department of
Conservation
Te Papa Atawhai

Urban Coexistence: Human-Wildlife Management in New Zealand

An Interactive Qualifying Project submitted to the faculty of
Worcester Polytechnic Institute in partial fulfillment of the
requirements for the degree of Bachelor of Science

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Abstract

In Aotearoa New Zealand, human-wildlife conflict threatens both biodiversity and public safety. In partnership with the Department of Conservation Te Papa Atawhai, this project examined the root causes of human-wildlife conflict to address and diminish this issue in New Zealand. Using results from archival research, expert interviews, and public surveys, the project team identified underfunding, inadequate public education, and ineffective legislation as primary factors. The team developed three sets of recommendations to enhance educational programs, improve law enforcement, and increase funding. Implementing these recommendations can foster a better coexistence and decrease human-wildlife conflict in Aotearoa New Zealand.

Executive Summary

Background

Coexistence is a widely adopted idea in many parts of the world, yet human-wildlife conflicts claim the lives of thousands of animals annually (Mase, 2024). Total public compliance to act appropriately toward wildlife is often difficult due to differing beliefs and the ineffectiveness of outreach efforts. These issues are exacerbated by factors such as urban expansion, which often forces wildlife into urban areas in search of food and shelter. Consequently, new challenges and unexpected outcomes arise from people's actions, ineffective regulations, and inadequate law enforcement.

Aotearoa, New Zealand, hosts numerous native species susceptible to harm from humans, their pets, and introduced predators. While human-wildlife encounters can be harmless, they often have harmful effects on wildlife (Schell et al., 2020). Although many New Zealanders acknowledge their responsibility in wildlife protection, misinformation, and negligence often cause people to harm native animals (B. Vayndell, personal communication, March 26, 2025).

Driven by a commitment to their responsibility and the threats facing New Zealand's native wildlife, the Department of Conservation Te Papa Atawhai (DOC) and other organizations such as Zealandia, Greater Wellington Regional Council, and Save the Kiwi work to preserve New Zealand's native wildlife. Despite their efforts, human-wildlife conflict persists, and wildlife continues to suffer across New Zealand. One such example is Figure 0.1, showing the results of baby fur seals that were brutally and illegally clubbed to death.



Figure 0.1. A DOC ranger with some of the 23 fur seals clubbed to death at Ohau Point near Kaikōura (Scoop, 2010)

The goal of this project was to partner with the Department of Conservation Te Papa Atawhai to identify, address, and diminish human-wildlife conflict. To achieve this goal, the project team developed three objectives:

1. Identify critical issues around people interacting with wild animals in New Zealand.
2. Discover the public's actions or preconceived notions that influence harmful behavior.
3. Research effective strategies that improve human-wildlife interactions worldwide.

By addressing these objectives, the team uncovered significant issues and solutions regarding human-wildlife conflict that DOC can

use to better reach the public. The team developed evidence-based recommendations to address these issues and create a coexistent environment for people and wildlife in New Zealand.

Methods

The team used archival research, interviews, and surveys to investigate how human-wildlife conflicts affect wildlife in New Zealand and to propose actions for DOC to address these issues.

Objective One: Archival Research

The project team used archival research to address objectives one and three. Research for objective one consisted of the team collecting and analyzing 14 DOC reports that covered harmful interactions between people and wild animals in New Zealand to identify common factors and possibly root causes behind this problematic behavior. Research for objective three consisted of reviewing seven international articles from bibliographic databases to analyze the success and failures of previous initiatives implemented by governments and non-government organizations (NGOs). Reviewing historical research was essential, as analyzing past documentation could identify the most effective strategies and which ones DOC should avoid. This research aimed to determine the effectiveness of multiple techniques, such as improving public awareness and fostering new educational initiatives.

Objective Two: Expert interviews

The project team interviewed one DOC employee, two wildlife experts, and one academic professional in relevant fields to address all objectives (see Table 0.1).

Table 0.1. Interviews Experts

Participant Name	Job Title/Role	Interview Date
Kelly Eaton	Supervisor, DOC	April 9, 2025
Bruce Robertson	Professor of Conservation, Genomics and Wildlife Management, University of Otago	April 15, 2025
Brenda Lee	President & Founder, Colorado Bear Coalition	April 16, 2025
Dr. Ox Lennon	Conservation Manager, Wellington Zoo Trust	April 17, 2025

These expert interviews produced reliable, firsthand information on human-wildlife issues. While the team created interview questions to address specific objectives, some questions addressed multiple objectives. Interviews began with a project introduction, confidentiality rights and participation terms, and the team obtained a signed consent form with optional audio recording permission. The interviews consisted of asking unique questions for each stakeholder group to maximize the value of the information gained.

Objective Three: Surveys

To address objective two, the project team distributed surveys on Qualtrics XM to New Zealand locals, tourists, and those on DOC-affiliated social media groups. The team conducted surveys in person at Victoria University, online through social media groups, and on DOC social media pages with support from Brian Vayndell and the DOC social media team. Distributing surveys online aimed to reach social or cultural groups that in-person surveys may have overlooked.

The team implemented surveys to understand public perceptions regarding human-wildlife conflict in New Zealand, including actions made by DOC, DOC areas for improvement, and people's behavior.

Results

The team conducted archival research, interviews, and surveys to identify, address, and diminish issues regarding human-wildlife conflict.

Archival Research

Archival research yielded themes of deliberate harm, conservation sabotage, and gross negligence. Documented incidents included the illegal clubbing of 23 fur seals near Kaikoura (see Figure 0.2), the theft of over 25 predator traps from Okura Bush Scenic Reserve, and teens recklessly camping near a Tara Iti nesting site in Mt. Aspiring National Park.



Figure 0.2. A DOC ranger with two of the 23 fur seals clubbed to death at Ohau Point near Kaikōura (Scoop, 2010)

Further research reviewed previous global attempts to remedy similar issues, which discussed themes of insufficient public education and inefficient regulation enforcement. Trewhella et al (2005) described educational initiatives in the western Indian Ocean that effectively reduced threats to the fruit bat population by improving community awareness and engagement. Other studies showed promising results when using strict enforcement measures and issuing meaningful fines to deter wildlife-related crimes (Keane, 2008; Ringo, 2014). The team believes these methods apply to Aotearoa New Zealand when trying to diminish human-wildlife conflict.

Interviews

Through the thematic coding of the four expert interviews, the team identified several common themes (see Figure 0.3). The y-axis shows the number of times each interviewee mentioned each theme. Additionally, the team assigned each interviewee a color to separate their responses. Across the four experts the team interviewed, education emerged as the top priority.

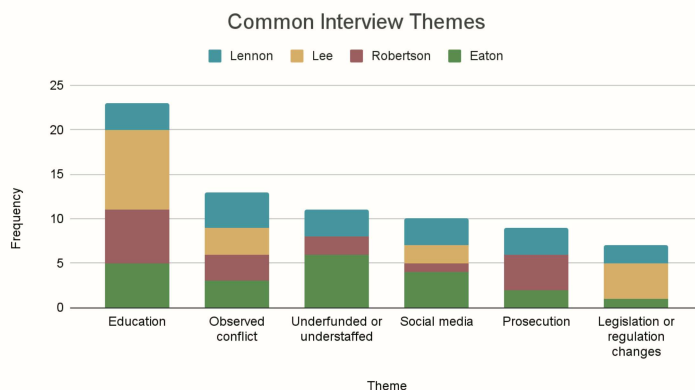


Figure 0.3. Common Interview Theme

Surveys

The team collected and analyzed 2,417 survey responses. Of the survey respondents, 70.8% agreed that human-wildlife conflict is an issue, with 27.1% strongly agreeing (see Figure 0.5). This result suggests that the public is motivated to develop a solution.

Figure 0.4 displays the most common themes from the open-ended survey responses suggesting improvements: increased DOC funding, expanded educational efforts, and stronger law enforcement. The y-axis shows the percentage of respondents who mentioned each subject.

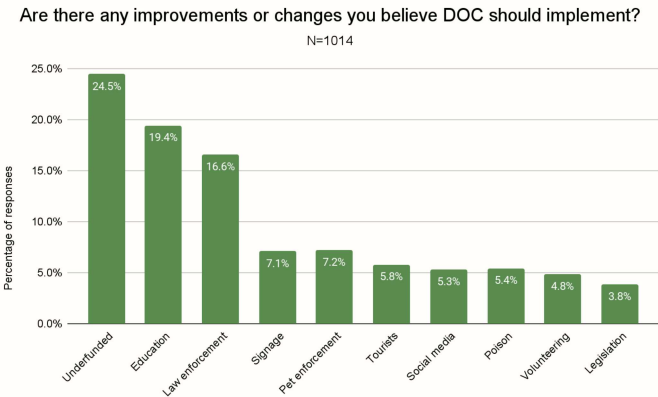


Figure 0.4. Are there any improvements or changes you believe DOC should implement?

Figure 0.5 details how survey respondents rated statements on a Likert scale—a measure of agreement from strongly disagree to strongly agree. The black lines represent the mean value of responses for each question. These questions revealed that survey respondents often viewed their behavior as responsible but viewed others’ as negligent. They also collectively agree that human-wildlife conflict is an issue in New Zealand and that the current efforts are insufficient to protect wildlife.

Responses to Likert Scale Statements

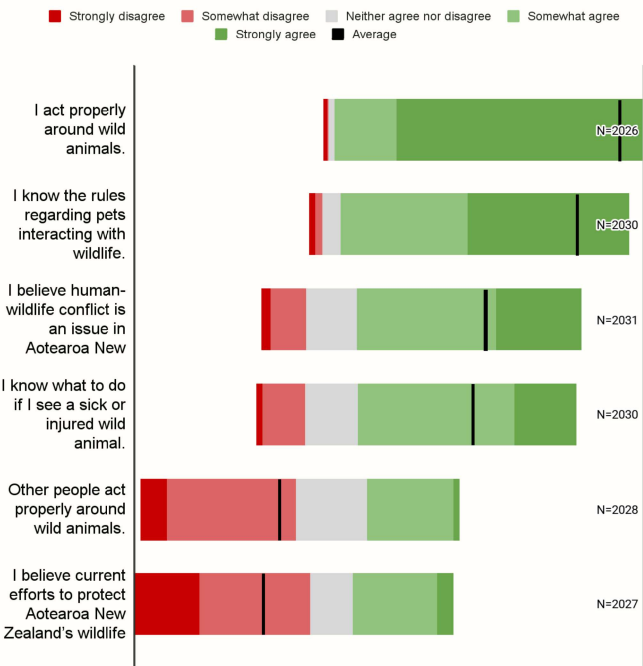


Figure 0.5. Responses to Likert Scale Statements

Recommendations

By obtaining and analyzing method results from the completion of each method, the team presented the following three evidence-based recommendations to reduce human-wildlife conflict and presented them to Brian Vayndell and the Department of Conservation Te Papa Atawhai:

Recommendation One: Enhance Educational Programs

1. Increase educational efforts in primary and secondary schools to teach children about appropriate wildlife interactions, including offering new volunteer opportunities.
2. Design and deploy new signage in multiple languages at common hotspots that includes information on how to identify a sick or

injured animal and provides a QR code to DOC's recommended response to that scenario.

3. Offer the public a volunteer training program that teaches them the benefits of backyard trapping and provides them with humane predator traps to use on their property.

All three of the team's methods strongly indicated education as one of the highest priorities to reduce gross negligence. These education programs will increase public awareness and empower volunteers to take action to protect wildlife.

Recommendation Two: Improve Law Enforcement

1. Promote legislation that is both enforceable and avoids jurisdictional issues.
2. Increase the number of rangers and warranted officers patrolling. Even without issuing more punishments, their increased presence can deter negligent behavior and educate the public.
3. Train a selective specialized ranger position with cross-jurisdictional authority and the ability to more easily acquire warrants, distribute fines as they see fit, and pursue legal actions with less "red tape".

All of the team's methods reflected the importance of increased enforcement. These reforms would allow law enforcement to more easily obtain warrants to enter private property and give more weight to verbal testimonies and video evidence in the conviction process.

Recommendation Three: Increase Funding

1. Advocate for increased government funding by recognizing demand for stronger conservation efforts and proposing benefits of expanded educational efforts, stronger regulation enforcement, and new protection initiatives.
2. Lobby for an increased International Visitor Conservation and Tourism Levy (IVL) by \$5-10 as a "Conservation Contribution" to gain an additional estimated \$18-36 million per year, based on New Zealand's pre-covid overseas arrivals (Stats NZ, n.d.).
3. Develop new corporate partnership opportunities to sponsor different protection initiatives in exchange for positive public exposure and a better brand image to secure substantial annual private funding.

Interviews and surveys frequently commented on this hindrance, noting it as one of the driving factors behind DOC's shortcomings. A combination of government funding, tourism-based contributions, and corporate partnerships will enable DOC to sustainably implement proper long-term conservation efforts.

Conclusion

By completing the goal to identify, address, and diminish human-wildlife conflict, the project team gave DOC three sets of recommendations. If DOC implements our recommendations, we believe there will be an increase in the number of prosecutions for wildlife related crimes, an expansion of DOC's conservation capacity, and a decrease in the occurrences of human-wildlife conflict and wildlife predation in Aotearoa New Zealand.

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Method Three: Surveys	Hunter	Connor, Gavin, Luke
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Objective Three	Luke	Connor
4.2 Method Two: Interviews		

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Objective Two	Connor, Hunter	Luke
Objective Three	Connor, Hunter	Luke
4.3 Method Three: Surveys		
Objective Two	Gavin, Hunter	Connor, Luke
4.4 Summary	Gavin	Luke
Chapter Five: Recommendations		
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Recommendation Two	Connor, Gavin	Luke, Hunter
Recommendation Three	Connor, Gavin	Luke
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References	Gavin	Luke
Appendices	All	All



Chapter One: Introduction

Around the world, people and wildlife must coexist, yet human-wildlife conflicts continue to claim the lives of thousands of animals annually (Mase, 2024). Obtaining public compliance to interact responsibly with wildlife is often a struggle. Urban expansion worsens this issue by pushing wild animals closer to humans in search of food and shelter, increasing both unintentional encounters and intentional interactions such as approaching, feeding, or even handling.

New Zealand is home to many vulnerable species, including the flightless kiwi, little blue penguins, and New Zealand fur seals. Human interaction with wildlife can lead to changes in foraging behavior and facilitate disease spread. Additionally, they increase the risk of injury or death from humans, domesticated pets, or vehicle collisions (Schell et al., 2020). Although the public plays a crucial role in taking care of wildlife and preventing human-wildlife conflict, many harmful interactions stem from well-intentioned ignorance. For instance, some people try to pet penguins or drag beached whales back into the ocean, while others act recklessly by allowing their dogs to chase and attack flightless kiwi (B. Vayndell, personal communication, March 26, 2025).

Conservation organizations in New Zealand have used numerous strategies to address these issues. The Department of Conservation Te Papa Atawhai (DOC) has launched multiple educational initiatives, including posting country-wide signage, providing educational kits for schools, and hosting public education programs. Other organizations, such as Zealandia, have taken a more hands-on approach to solving this problem. Zealandia is the world's first entirely fenced-in ecosanctuary, engineering a unique fencing system to keep predators out of the enclosure (Zealandia,

2025). Regardless of many organization's efforts, achieving widespread public compliance to protect wildlife and follow guidelines remains difficult.

Despite their attempts to educate the public, DOC struggles to convey newer conservation efforts and policies to people who are not attentive to signage or do not actively seek out information. Exploring people's understanding of wildlife interactions could uncover where the disconnect arises between DOC and the public. However, DOC has faced challenges in collecting information from the public due to common public perception issues, as their exact role in wildlife and environmental matters can often be unclear. This can result in receiving unwarranted criticism from the public due to issues that fall outside their jurisdiction (B. Vayndell, personal communication, March 26, 2025).

The project's goal was to partner with the Department of Conservation Te Papa Atawhai to identify, address, and diminish human-wildlife conflict in Aotearoa New Zealand. To achieve this goal, the project team outlined three objectives:

1. Identify critical issues around people interacting with wild animals in New Zealand.
2. Discover the public's actions or preconceived notions that influence harmful behavior.
3. Research effective strategies that improve human-wildlife interactions worldwide.

Based on the team's analysis of the results from data collected from archival research, interviews, and surveys, the team identified underfunding, inadequate public education, and ineffective legislation as primary factors. The project team then developed three evidence-based recommendations for DOC to diminish issues related to human-wildlife conflict. The subjects of these recommendations included enhancing educational programs, improving law enforcement, and increasing DOC funding. If DOC implements these recommendations, the team anticipates a significant reduction in human-wildlife conflict.



Chapter Two: Background

This chapter reviews six topics relevant to human-wildlife conflict in New Zealand: the effects of urbanization, insufficient public education on wildlife interactions, public disrespect for wild animals, past actions of the Department of Conservation Te Papa Atawhai (DOC) in New Zealand, territorial authorities, and the Greater Wellington Regional Council (GWRC).

2.1 Urban Expansion

Urbanization drives habitat loss, pollution, and wildlife displacement. Figure 2.1 illustrates the ecological consequences of urban development. In New Zealand, urban areas cover 0.85% (228,000 hectares) of the land, which is generally low compared to the 3% of land (27,000,000 hectares) in the United States (Ministry for the Environment, 2019). However, even this smaller footprint has a substantial impact on wildlife (University of Michigan, 2024). The Shared Socioeconomic Pathways narratives estimate that urban expansion will yield an additional 11 to 33 million hectares of natural habitat loss worldwide by the year 2100, driven in part by a lack of information about urbanization's impacts on habitat fragmentation and species loss (Li, 2022).

Land development has been detrimental to New Zealand's environmental quality. Environment Aotearoa (2019) reports that loggers and land developers have removed 65% of New Zealand's natural forests and drained 90% of wetlands. Due to the loss of vegetation, Environment Aotearoa (2019) classifies 40% of New Zealand's land area as erosion-prone. This trend degrades local wildlife habitats.

Urban land development has been particularly destructive because cities often form at ecosystem junctions, areas with fertile land, access to fresh water, and ideal building conditions. Additionally, unlike other types of land such as farmland, local governments rarely reforest urban areas, but instead expand them (Rastandeh, 2018). Wellington, located in one of the world's most important biodiversity hotspots, mitigates the impacts of urbanization by incorporating vegetation patches and green spaces into its spatial planning (Rastandeh, 2018).

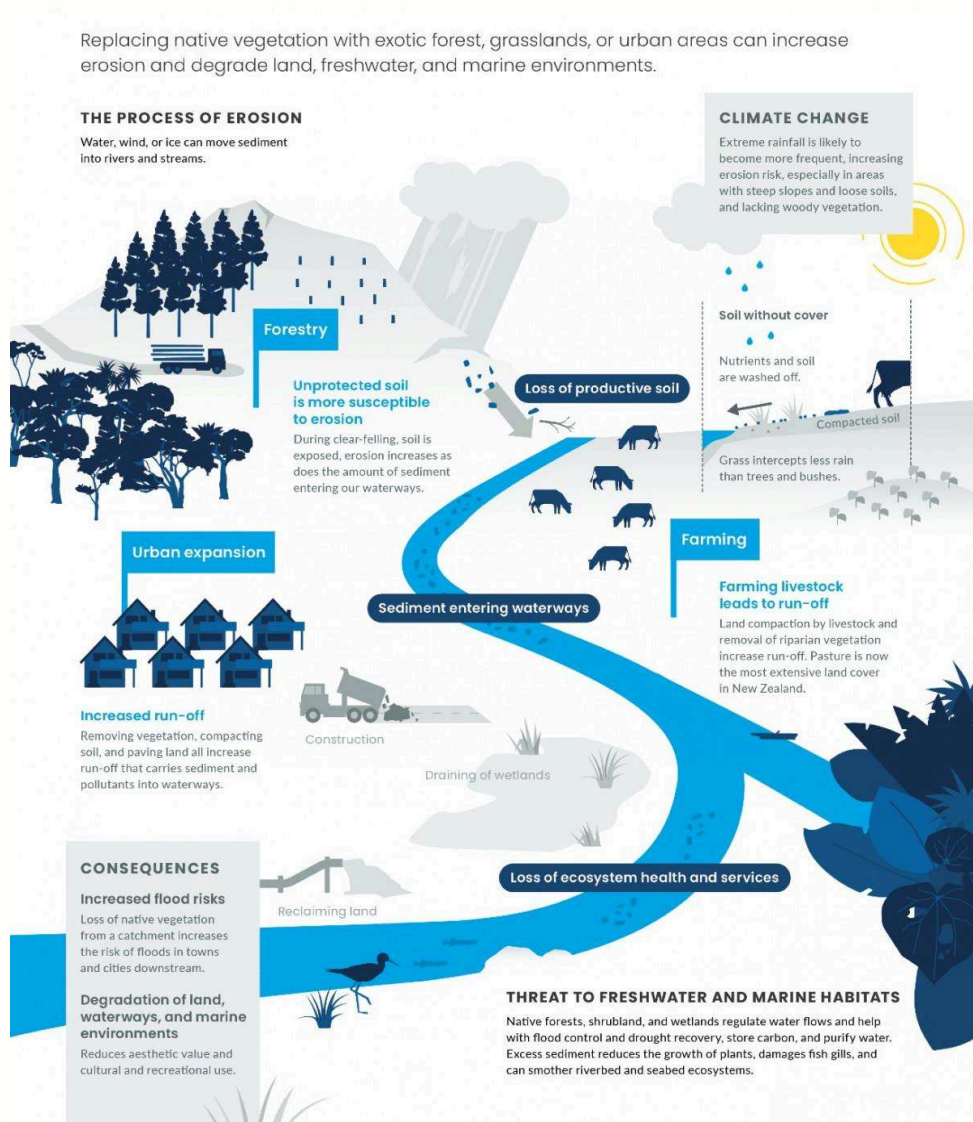


Figure 2.1. Impacts of urbanization and land development (Ministry for the Environment, 2019)

Beyond physical expansion, people and their actions significantly impact wild animals in urban areas. A poor understanding of proper human-wildlife interaction further endangers wild animals in or near urban areas.

2.2 Lack of Education

Insufficient education of appropriate behavior is a critical barrier to proper human-wildlife coexistence in New Zealand. Many residents and tourists mistakenly assume wildlife are harmless, often influenced by pop culture and media descriptions of nature as “mysterious and benevolent” (Siegrist & Berthold, 2024, p. 1). This romanticized view fails to acknowledge the unpredictable behavior of wildlife, which can lead to serious consequences when people try to approach, feed, or handle wild animals.

Flint, Hawley, and Alexander (2016) documented the negative impacts of human interactions on wildlife. They observed mongoose behavior in Botswana and found that the “banded mongooses exhibited significantly higher rates of within-troop aggression while foraging in garbage.” This demonstrates how animal behavior changes and increased health risks can occur when animals are in human-generated environments. These results highlight how necessary public education is to promote proper wildlife management practices.

Wildlife regulatory organizations in New Zealand have lobbied for targeted educational initiatives to improve the public's behavior. One such article describes significant improvements in human-wildlife conflicts through social marketing campaigns, clear regulatory information, proper signage, and consistent rule enforcement. Their findings suggest that the public more readily adopts safe practices when provided with engaging, accurate, and motivating information (Abrams, Molder, Nankey, & Leong, 2023).

Human-animal conflict includes interactions between domesticated and wild animals. Most notably, poorly managed dogs remain a significant threat to New Zealand’s native wildlife. To combat this behavior, DOC has launched multiple social awareness programs, like Lead the Way (see Figure 2.2), which “focuses on public engagement to minimize the impact of dogs on coastal wildlife. [They] want dog owners to feel empowered and know how to act to protect wildlife.” (Department of Conservation, n.d). This style of targeted outreach encourages local dog owners to protect wild animals and reinforces the owners’ expectations of their pets when interacting with wildlife.



Figure 2.2. Lead The Way Partnership (Department of Conservation, n.d.)

2.3 Lack of Caring

Gaps in education can explain some of the problematic human-wildlife interactions, but a more challenging issue emerges when people deliberately act carelessly around wildlife. Since the English government passed the first laws against cruelty towards horses, sheep, and cattle in 1822, there has been significant growth in animal safety legislation. New Zealand followed shortly after, establishing similar laws in 1840 and enacting the Cruelty to Animals Act 1878, the Police Offences Act 1884, the Animals Protection Act 1960, and the Animal Welfare Act 1999 (Swarbrick, 2017). Despite these advances, laws have limited impact on human behavior in New Zealand due to inadequate enforcement and incomplete cultural cooperation.

Dog owners who allow their pets to roam free are a significant manifestation of this problem. Their off-leash pets often result in physical or psychological harm to wild animals (Kaipara, 2024). Figure 2.3 is an example of this occurrence. Conservationists in Chile found that most dog owners show little concern about the consequences of free-roaming dogs, regularly letting their pets off leashes (Khadka 2019). Enforcement limitations on New Zealand's law enforcement worsens this issue, allowing negligent dog owners to avoid accountability for their actions.



Figure 2.3. Dogs can terrify (and even kill) wildlife (Daly, 2024)

People's deliberate careless actions have significantly disrupted wildlife and the environment. This is particularly evident in New Zealand, where both direct factors like human actions and indirect factors such as climate change threaten the country's fragile ecosystem (DGB Group, 2021). Organized conservation efforts in New Zealand's delicate regions are critical to protecting native wildlife and their ecosystems.

2.4 Department of Conservation Te Papa Atawhai

The Department of Conservation Te Papa Atawhai (DOC) is responsible for New Zealand's wildlife and environment. New Zealand's cabinet initially created the department as part of the Conservation Act 1987 and it has implemented conservation efforts ever since, including predator eradication, bird banding, and maintaining historical landmarks. To connect with the public, DOC hosts opportunities for education about wildlife, the environment, and human-wildlife interactions.

DOC has implemented several programs to increase public awareness or to provide training regarding human-wildlife interactions. In 1996, DOC and Save the Kiwi started a kiwi avoidance training program which focuses on training farming and hunting dogs to avoid these birds. Their training technique includes administering an electric shock when the dog approaches a mock kiwi (Kiwi Avoidance Training, 2025). Complementing this program, DOC distributed educational kits to

primary schools in hopes that they would act as ambassadors for the program and pass on the information to the rest of their family (James, 2000). DOC has used many methods to increase public awareness, including posted signage (see Figure 2.4), media campaigns, and, on occasion, provocative “shock tactics” such as bringing deceased kiwi into a territorial authority hearing (James, 2000).



Figure 2.4. DOC signage warns beachgoers about nesting penguins (Forest & Bird - Places for Penguins, 2023)

There are many people DOC still struggles to reach, such as those who do not regularly visit parks, seek out information online, or are intolerant to change. In particular, Brían Vayndell, senior media and communications advisor at DOC, has observed that older generations often maintain an outdated mindset, making them less receptive to the current heightened standards of wildlife conservation. Surprisingly, Vayndell also finds that locals are more challenging to reach than tourists. Many tourists visit New Zealand for its unique ecosystems and encounter extensive conservation information, through signs and videos, even before they arrive. Their appreciation of New Zealand’s natural

wildlife and unique environments, combined with the freshness of conservation information in their minds, generally makes tourists more compliant with wildlife protection expectations (B. Vayndell, personal communication, March 26, 2025).

Although the Conservation Act 1987 made DOC responsible for large portions of land, many wild animals inhabit areas in and around private property. Since conservation and wildlife protection efforts require the participation of property owners, DOC must maintain positive relationships and work closely with landowners. If DOC used more drastic measures to educate the public, there could be backlash against DOC, reducing the public's willingness to support conservation efforts (James, 2000).

While DOC primarily focuses on education and preventative measures, they also enforce laws that protect conservation resources by issuing warnings, and fines. These include legislation that provides them with enforcement powers such as the Dog Control Act 1996. DOC enforces these regulations through specially trained rangers and investigation officers, known as warranted officers. The Conservation Act 1987 authorized warranted officers to issue warnings and fines for violations (Wallwork, 2020).

DOC's funding consists of 83% from the Crown, 7% from the International Visitor Levy, 3% from concessions fees, and 7% from other sources. For the 2024/25 fiscal year, DOC had a total department appropriation of \$718.52 million, down from \$762.97 million in 2023/24. The current government has given DOC a Baseline Savings Target (BST) of \$31.341 million per year (Department of Conservation, 2024g). This has put pressure on them to reduce the number of jobs and conservation programs; specifically, DOC reduced the Kermadec Ocean Sanctuary and Contaminated Sites programs. Figure 2.5 shows how DOC uses the \$675.43 million of operating output appropriations for 2024/25. They dedicate a majority of their budget to natural heritage, which includes protecting New Zealand's wildlife, and recreational opportunities, such as maintaining facilities and services (Department of Conservation, 2024g).

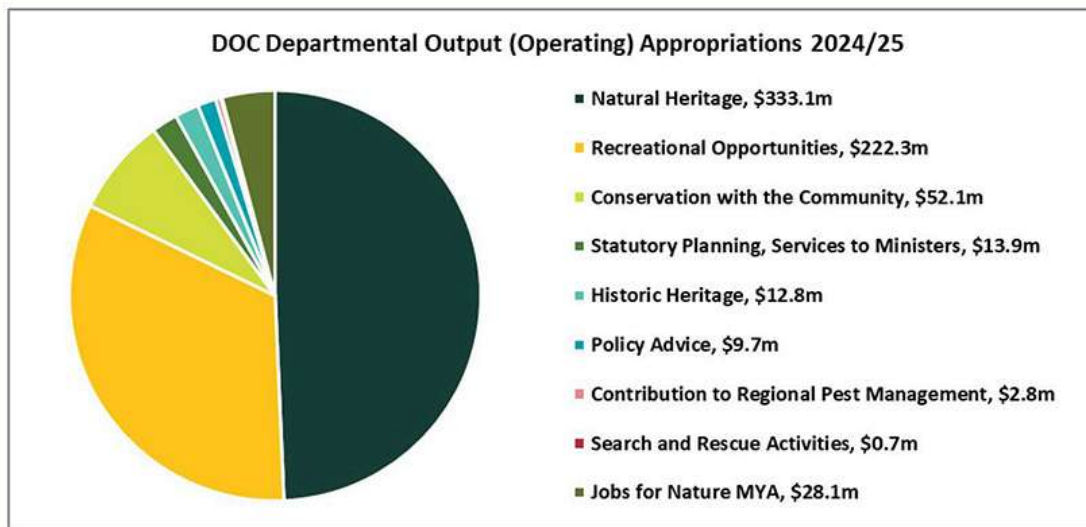


Figure 2.5. DOC Departmental Output (Operating) Appropriations 2024/25 (Department of Conservation, 2024g)

DOC has developed many programs aimed at educating the public, with varying levels of success in effecting change regarding human-wildlife conflict. However, budget, public relations, and other external factors limit DOC's efforts (B. Vayndell, personal communication, March 26, 2025).

2.5 Territorial Authority

In New Zealand territorial authorities are generally smaller than regional councils. They work alongside the regional councils and are responsible for local roads, reserves, water supply, and sanitation. Additionally, under the Dog Control Act 1996, territorial authorities are responsible for enforcing dog ownership laws. The territorial authorities must classify dogs as dangerous or menacing and maintain a dog registry. Furthermore, the territorial authority must assign dog control officers who can enter private property and seize dogs when they have reasonable suspicion of an offense against the Dog Control Act (Dog Control Act 1996).

2.6 Greater Wellington Regional Council

The Greater Wellington Regional Council (GWRC) provides services ranging from public transportation and drinking-water management to natural disasters preparedness and environmental protection (GWRC, 2025). While the GWRC focuses its efforts on the Greater Wellington region,

DOC is more extensive and oversees all of New Zealand. Because both organizations share environmental responsibilities, their respective jurisdictions can sometimes overlap. These issues revolve around which land DOC or the GWRC owns. Moreover, the public is often unaware of the land's ownership. DOC can only act in GWRC jurisdiction in limited circumstances, and a lack of shared information results in different policies and decreased effectiveness (B. Vayndell, personal communication, March 26, 2025). Due to this separation, the project team focused on land owned and actions made by DOC. While the team aimed to make suggestions that would be applicable to both departments, this project's focus was on DOC activities.

2.7 Project Stakeholders

The stakeholders for this project include DOC employees, wildlife experts, academic professionals, and the general public. Each stakeholder played an important role in forming the team's understanding of human-wildlife conflict and informing the development of practical solutions. Engaging with these stakeholder groups allowed the project team to design methods such as interviews, surveys, and archival research. This approach helped the team ground their recommendations in both expert knowledge and public experience, supporting the goal of sustainable coexistence. The following chapter outlines the methods used to gather this input.



Chapter Three: Methodology

This chapter explains the three project objectives and the methods the team used to address them. The goal of this project was to work with the Department of Conservation Te Papa Atawhai (DOC) to identify, address, and diminish human-wildlife conflict in New Zealand. The following were the three objectives for the project:

1. Identify critical issues around people interacting with wild animals in New Zealand.
2. Discover the public's actions or preconceived notions that influence harmful behavior.
3. Research effective strategies that improve human-wildlife interactions worldwide.

Figure 3.1 illustrates the project flow and identifies the methods the team implemented to address each objective. The team used archival research, interviews, and surveys to investigate how human-wildlife conflicts affect wildlife in New Zealand and considered actions DOC can implement to diminish these issues. Note the team organized both this chapter and the results chapter by methods given that the methods address more than one objective.

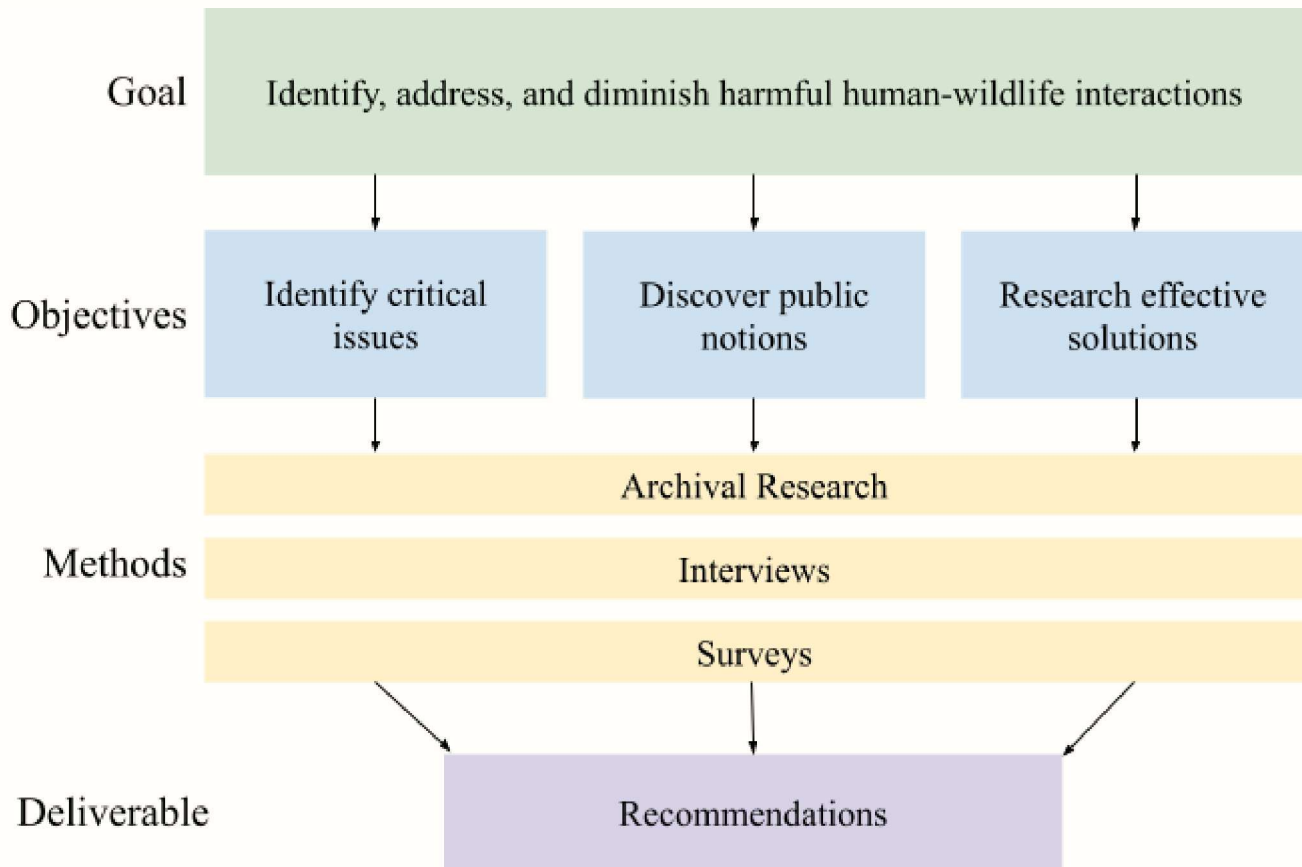


Figure 3.1. Project Outline

3.1 Archival Research

To work towards the completion of objectives one and three, the project team conducted archival research to identify critical issues around people interacting with wild animals in New Zealand and to research effective strategies that improved human-wildlife interactions worldwide. This research consisted of the team reviewing publications from the Department of Conservation Te Papa Atawhai for objective one and articles from other bibliographic databases regarding conservation issues worldwide for objective three.

Objective One: Identify critical issues around people interacting with wild animals in New Zealand

The project team reviewed historical data to identify critical issues around people interacting with wild animals in New Zealand. The team collected and analyzed 14 prior DOC reports (see Table 3.1)

of human-wildlife conflicts that covered harmful interactions between people and animals to identify common factors and possibly root causes behind this problematic behavior. By examining these incidents, the team wanted to identify patterns and themes, which then guided their interview questions for expert interviews.

Table 3.1. Reviewed Department of Conservation (DOC) Reports

Report Title	Year	New Zealand Location	Wildlife Involved
Complaints from public rise as boats, jet skis get too close to ocean animals	2024	Coastal/marine areas	Marine mammals like dolphins, whales, and seals/sea lions
Conservationists shocked at theft of predator traps at Okura Bush	2024	Okura Bush Scenic Reserve, Auckland's North Shore	Various New Zealand prey species
DOC frustrated by “completely avoidable” dog attacks on penguins	2024	Wellington region	New Zealand Penguins
DOC urges dog owners to act after nine kiwi killed	2025	Wharengaere area of Purerua, Eastern Northland	Kiwi
DOC urges public support following incident near Tara Iti nesting site	2025	Mangawhai Heads	Tara Iti (fairy tern)
Dog attack believed to have killed 19 gulls in Kaikōura	2024	South Bay, Kaikōura	Red-billed gull/tarāpunga
Five kea killed by vehicles on Milford Road	2024	Milford Road	Kea

“Frustrating and distressing”: DOC appeals for information after seabirds killed	2025	Near Slipper Island/Whakahau, Coromandel	Sea Birds
Man fined over shark decapitation	2024	Mahia Peninsula, near Mahia Boat Ramp	Great White Shark
Man sentenced for skippering vessel into flock of protected seabirds	2024	Near Simpson’s Rock in the Hauraki Gulf/Tīkapa Moana	Fairy Prion/tītī
Native species compromised by trap vandals	2025	Mount Aspiring National Park	Birds, lizards, invertebrates
Orca ‘body slam’ shocks DOC, leads to infringement fine	2024	Devonport, Auckland	Orcas
Shot sea lion a blow to recovering population	2024	The Catlins	New Zealand sea lion/pakake

Objective Three: Research effective strategies that improve human-wildlife interactions worldwide

The project team reviewed seven published articles (see Table 3.2) to analyze the success and failures of previous initiatives implemented by government and private organizations other than DOC. Reviewing historical research was essential to identify which past strategies were effective and which ones DOC should avoid. This research focused on public awareness efforts and the success rates of various techniques.

Table 3.2. Reviewed Published Articles

Article Title	Year	Location	Wildlife Involved
Effectiveness of a General Management Plan in Mitigating Human-Wildlife Conflicts and Enhancing Conservation	2014	Tansania	Elephants, Hippo, Buffalo, Crocodiles, and other large carnivores
Compilation and prioritizing human-wildlife conflict management strategies using the WASPAS method in Iran	2022	Iran	Iran's wildlife (not specific)
Spatio-temporal patterns of human-wildlife conflicts and effectiveness of mitigation in Shuklaphanta National Park, Nepal	2023	Shuklaphanta National Park, Nepal	Various wildlife in the park
Effective enforcement in a conservation Area	2006	Tansania	Elephants and Rhino (primarily)
The sleeping policeman: understanding issues of enforcement and compliance in conservation	2008	None	None
Environmental Education as a Component of Multidisciplinary Conservation Programs	2005	Western Indian Ocean	Fruit Bats
The Role Of Education And Advocacy In Wildlife Conservation	2023	None	None

3.2 Stakeholder Interviews

The project team conducted four semi-structured interviews with DOC employees, wildlife experts, and academic professionals in relevant fields. The team required the participant to sign the consent form and optionally grant permission for audio recording before the start of the interview (see Appendix A). The team used these interviews to gather first-hand, reliable information regarding human-wildlife conflict. While the team designed all interview questions to address specific objectives, some questions addressed objectives (see Appendix B). The team began interviews by introducing the project and informing each interviewee of their rights regarding confidentiality, voluntary participation, and the team's usage of their responses. Two team members conducted each interview, taking turns asking questions and recording the interviewee's responses (See Appendix B). The team conducted each interview over Microsoft Teams other than the interview with Dr. Ox Lennon, which was in person, with a duration of about 30 minutes. Table 3.3 gives information on each interview.

Table 3.3. Interview Participants

Participant ID	Participant Name	Organization	Job Title/Role	Years Experience	Date of Interview
1	Kelly Eaton	Department of Conservation	Supervisor	15	April 9, 2025
2	Bruce Robertson	University of Otago	Professor of Conservation, Genomics and Wildlife Management	17	April 15, 2025
3	Brenda Lee	Colorado Bear Coalition	President & Founder	12	April 16, 2025
4	Dr. Ox Lennon	Wellington Zoo Trust	Conservation Manager	4.5	April 17, 2025

Objective One: Identify critical issues around people interacting with wild animals in New Zealand

In pursuit of objective one, the project team developed interview questions B6 through B8 and B10 through B13 (see Appendix B) to identify issues regarding human-wildlife conflicts. The team asked questions B6 through B8 to all interviewees to identify problems experienced by the public. The team asked Questions B10 through B13 to explore challenges related to law enforcement and other issues identified by the experts.

Objective Two: Discover the public's actions or preconceived notions that influence harmful behavior

To fulfill objective two, the project team created interview questions that identified public perceptions. The team asked these questions, B6 through B8 (see Appendix B), as mentioned before, to all interviewees. These questions explored people's intentions when interacting with wildlife, specifically whether harmful human actions were intentional or stemmed from misunderstandings about appropriate behavior.

Objective Three: Research effective strategies that improve human-wildlife interactions worldwide

The project team created questions B9 through B15 (see Appendix B) to address objective three. The team asked these questions to all stakeholder groups. Using these questions, the team aimed to gather expert opinions on the current state of any unsolved conservation challenges they face (B9, B10), current issues with laws and regulations (B11 to B13), and gaps in education (B14 to B15).

3.3 Surveys

As part of addressing objective two, the project team created a survey using Qualtrics XM, a web-based survey platform, and distributed it in person and over social media.

To understand the cultural norms and the division of intentional and unintentional actions during human-wildlife interactions, the team conducted surveys to reach a diverse range of participants in New Zealand, including residents, tourists, and other visitors interested in wildlife. To conduct surveys, the team approached people in public and posted surveys on social media platforms. By the end of the project, the team collected 2,417 surveys. They collected 12 in-person surveys, 61 from

New Zealand Wildlife subreddit, 39 from New Zealand subreddit, and 2305 from the survey posted by DOC. Of the 2,417 respondents, 2043 continued beyond the demographic section (Q1.1.1, Q2.1, Q2.2, Q2.3) to complete the additional parts of the survey. The survey contained a disclaimer (see Appendix C) at the beginning to inform participants of their rights and confidentiality expectations regarding this study. The survey used multiple questions to gather demographic information (Q1.1.1, Q2.1, Q2.2, Q2.3). To address objective two, the team incorporated Likert-scale questions (Q4.2) into the survey to measure participants' perceived knowledge of behavior around wildlife. The team also asked questions about whether the respondents would intervene if someone acted disrespectfully to wild animals and how often they interact with wild animals (Q4.1, Q4.3, Q4.4). Additional conditional questions gathered data about residency status and cultural opinions regarding Māori values (Q3.1, Q3.2). At the end of the survey, the team invited participants to leave comments about DOC and the group (Q5.1, Q5.2).

Appendix D contains all the survey questions in block order, decided by Q2.2. Answering with “Aotearoa New Zealand” takes the respondent to Q3.1 and Q3.2, then returns to Q4.1. Answering with “Other” or “Australia” takes the respondent to Q4.1. For Q1.1, if the survey taker selects “Under 18”, the survey will notify the respondent at point Q1.1.2 that the survey will terminate due to age restrictions. Respondents who selected any other option for Q1.1 continued to Q2.1. to complete the rest of the survey. Q1.1 was the only mandatory question, all other questions were optional.

3.4 Data Analysis

The project team collected both quantitative and qualitative data in this study. They gathered and analyzed survey data within Qualtrics to view statistics and identify insights and trends among different stakeholder groups. Three of the team members manually coded qualitative data from open-ended survey questions and expert interviews.

The team captured interview questions by audio, transcribed them verbatim, and utilized thematic coding for analysis. Using trends discovered in archival research, the team curated the following list of themes: prosecution, legislation or regulation changes, underfunded or understaffed, observed conflict, education, and social media. The team recorded how many times each interviewee

mentioned each topic. By thematically coding the interview, the team identified frequently discussed topics and used these to develop questions for the survey that came after the interviews.

For open-ended survey questions, the team implemented thematic coding to assign codes to key ideas, and group them into themes and sub-themes. The team separated and excluded responses that were irrelevant, incoherent, or otherwise unusable. Using the Text iQ tool built into Qualtrics XM, the team assigned common themes to each text response to yield quantitative data from the qualitative results.



Chapter Four: Results

This chapter presents the results obtained from each of the three methods the project team completed: archival research, interviews, and surveys. The results in this chapter provide a basis for the set of recommendations the team presented to the Department of Conservation Te Papa Atawhai (DOC) to diminish issues regarding human-wildlife conflicts in Aotearoa, New Zealand.

4.1 Archival Research

To address objectives one and three, the project team conducted archival research. This research involved reviewing publications from DOC for objective one (see Table E.1 in Appendix E) and articles from databases regarding conservation efforts around the world for objective three (see Table E.2 in Appendix E). Tables E1 and E2 contain the notes that the team took during research.

Objective One: Identify critical issues around people interacting with wild animals in New Zealand

One report by DOC highlighted the illegal shooting of a juvenile sea lion in the Catlins Estuary. As a result of the attack, the animal suffered a slow and painful death. New Zealand sea lions (Pakake) maintain a “nationally vulnerable” status, with only about 10,000 remaining (Department of Conservation, 2024j). Although this incident involved just one animal, it represents a significant loss to an at-risk species. The team found this was not the only occurrence of humans killing seals. In an article the team reviewed, Trehwella et al (2005) identified the potential for increased educational efforts to diminish similar occurrences.

In another report, DOC described an intentional action near Mt. Aspiring National Park where an individual attempted to harm wildlife in New Zealand. The publication “Native Species Compromised by Trap Vandals” (see Table E.1 in Appendix E) documents how individuals deliberately tampered with predator traps. “This means someone has made the effort to disarm more than 150 remote traps in total across two locations,” stated DOC Operations manager Wakatipu David Butt (Department of conservation, 2025a). This report revealed a surprising fact: a calculated effort to oppose DOC’s conservation efforts. A similar case in Okura Bush involved thieves who stole more than 25 predator traps. DOC’s media team explained that, due to the attack, staff did not have additional predator traps to place in the area. These traps play a vital role in managing predators and protecting native species. (Department of Conservation, 2025b). Vandals hindered DOC’s protection efforts and elevated the risk for native species by effectively stopping their efforts to control predator populations.

While some cases covered in the articles reviewed by the team may be isolated incidents, at least half of these articles display gross negligence. The team followed the definition of gross negligence from the Legal Intelligence Institute as "a lack of care that demonstrates reckless disregard for the safety or lives of others, which is so great it appears to be a conscious violation of other people's rights to safety." In this project, the team also extended this definition to animals' rights to safety. One report (Department of Conservation, 2025c) describes how a group of nearby camping teens disrupted a Tara Iti nesting site, interfering with the breeding process and leaving the chicks visibly agitated. This case displays the negligence of people despite continued conservation efforts that DOC and other organizations in New Zealand implemented. A similar report displayed deplorable negligence by dog owners. The report describes the brutal injuries sustained by nine kiwi on private land in Purerua. Uncontrolled dogs were responsible for the massacre as researchers identified canine DNA in several injuries and observed bite patterns consistent with previous dog attacks (Department of Conservation, 2025d). The frequency of these occurrences emphasizes the need for enhanced conservation efforts, particularly with expanded education outreach and stronger law enforcement capabilities.

Objective Three: Research effective strategies that improve human-wildlife interactions worldwide

To address objective three, the project team reviewed seven articles from bibliographic databases that examined the successes and failures of conservation efforts in various countries worldwide. Table E.2

in Appendix E shows the results from analyzing and noting the importance from each document. This review enabled the team to identify approaches organizations have used to mitigate issues that negatively impact conservation efforts, including harm to humans and animals, property damage, and crop raiding. These articles demonstrated the complex, multivariable nature of wildlife conservation and the need for well-defined, applicable strategies that address all factors negatively affecting wildlife.

A significant theme identified in three articles was the necessity of a comprehensive management plan that clearly defines how to guide the development and allocation of resources while reducing human-wildlife conflict. In “Environmental Education as a Component of Multidisciplinary Conservation Programs”, Trewhella et al describes the Environmental Education Program (EEP) plan to decrease hunting, deforestation, and other threats to fruit bats in the western Indian Ocean. This plan included raising awareness about the species and its threats, fostering national pride in the bats’ unique existence, and developing educational resources highlighting the connection between local human needs and the ecosystem services provided by the bats. In the end, the plan addressed most of the identified issues and improved bat survivability (Trewhella et al, 2005). This strategy is directly transferable to protecting wildlife in New Zealand, as its wildlife is also unique and critical to ecosystems across the country.

Proper education was identified as a particularly effective strategy in four articles. Education plays a pivotal role in helping people understand biodiversity’s intrinsic value and the appropriate actions to protect it (Greenfield, 2023). As seen in the western Indian Ocean islands, insufficient education can cause significant habitat loss and population decline, potentially resulting in endangerment (Trewhalla et al, 2005). This is especially concerning in places like these islands and Aotearoa, New Zealand, where wildlife has substantial ecological and tourism value. Successful educational efforts included raising awareness through posters, local education programs, and similar efforts from other organizations. After implementing the educational efforts outlined in the management plan, the program successfully reduced most factors affecting fruit bats in the area.

Beyond education, proper enforcement and appropriate fines are necessary to deter wildlife harm. Since poaching animals often provides specific incentives—usually the valuable tusks, horns, and animal skins—economic repercussions must exceed the value of the potential profit from such

activities (Keane, 2008). Keane argues that the optimal approach is to reduce the amount of costly monitoring from enforcement officers while increasing penalties, thereby managing the occurrence of these actions. This presents an issue in New Zealand, where insufficient funding for proper enforcement can lead to unmanaged wildlife threats.

By reviewing these articles, the project team identified several effective strategies to improve human-wildlife interactions. A combination of education, proper legislation, and adequate enforcement within a clearly defined management plan can greatly impact conservation efforts.

4.2 Stakeholder Interviews

The project team conducted four semi-structured interviews with DOC employees and experts in related fields in and outside New Zealand.

After conducting the interviews, the team thematically coded them to identify recurring themes. Figure 4.1 displays how often each interviewee mentioned a theme, using different colors to represent responses from each interviewee (see Table 3.3). Education of the public was the most frequently mentioned topic. This section covers the interview results by objective, as the interview questions covered all three objectives.

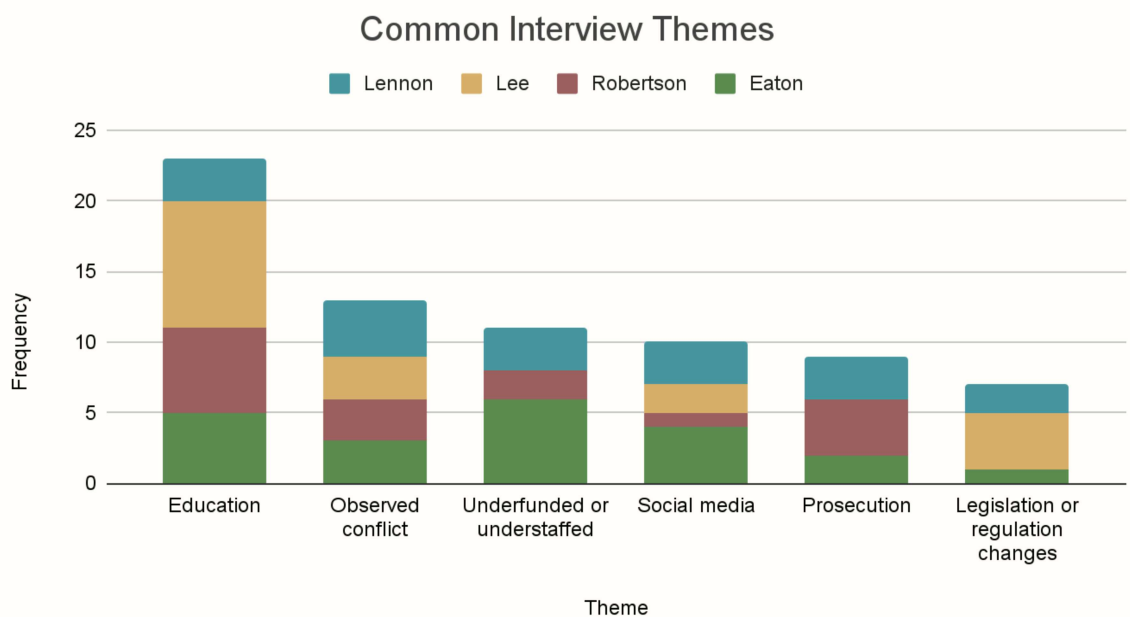


Figure 4.1. Frequency of Themes during Expert Interviews

Objective One: Identify critical issues around people interacting with wild animals in New Zealand

Answers from interview questions B6 to B8 (see Appendix B) addressed this objective in addition to objective two. The team analyzed these answers to identify issues around human-wildlife conflict that the public may not see.

During the interview with Kelly Eaton (see interview transcript in Appendix G), a supervisor for the Department of Conservation near Napier and Hawks Bay, social media emerged as a key contributor to wildlife-related issues. When the team asked if she noticed an increase or decrease in human-wildlife conflicts in New Zealand, she opined that there may not be a significant difference in these actions, however social media has given them a much larger audience, making them seem much more prevalent.

The interview with Professor Bruce Robertson from the University of Otago highlighted issues regarding sea lions in New Zealand (B. Robertson, personal communication, April 15, 2025). The growing number of this species inhabiting New Zealand has increased interactions, often escalating to conflicts. According to Robertson, some people harass and sometimes even intentionally kill sea lions. Additionally, these animals sometimes sleep on train tracks and public roads, which results in vehicle collisions that can harm or kill sea lions.

Objective Two: Discover the public's action or preconceived notions that influence harmful behavior

Interview questions B6 to B8 (see interview transcript in Appendix B) addressed this objective in addition to objective one. This section reviews answers regarding public misconceptions.

A significant theme that emerged throughout the interviews was the misunderstanding among the public regarding appropriate behavior around wildlife. Interviewees mentioned how people often try to interact with or feed wild animals, such as seals and penguins, for their enjoyment without concern for the negative repercussions of their actions. Professor Bruce Robertson from the University of Otago said, "People have this perspective that the beach is for them... and the animals are somehow there for our enjoyment". This mindset is common and has harmful effects on wildlife worldwide. Doctor Ox Lennon (see interview transcript in Appendix J) mentioned that people often feed Kākā improper food, which results in them lacking necessary nutrients. Lennon found that "feeding them

inappropriate food causes cross-beak.” Both interviewees identified the adverse effects of public actions that they considered harmless. This suggests the need for enhanced educational efforts to inform the public of the consequences of their harmful actions.

Another central point the interviewees made was that signage alone is insufficient to deter negative behavior. During the interview with Kelly Eaton, she commented “We can have all the signs in the world, and everyone just walks past them.” This implies the limitation of signage in informing the public of rules, regulations, and guidelines. This limitation further intensifies the need for more proactive methods to better inform the public of various topics regarding how to act in natural environments when encountering wild animals.

Objective Three: Research effective strategies that improve human-wildlife interactions worldwide

A central takeaway from the interviews with Ms. Eaton and Dr. Robertson was that the enforcement of wildlife protection laws is particularly limited due to DOC's staff shortages and reduced capacity to enforce regulations. DOC staff is responsible for around 8.7 million hectares of land, nearly a third of New Zealand's land area (Department of Conservation, 2023), making it almost impossible to maintain full coverage. Ms. Eaton emphasized the predicament of DOC's personnel when she indicated they were not able to "sit around all day guarding them... [they] 've got a lot of things [they] 're expected to do." Dr. Robertson noted that authorities cannot enforce even strong laws when they only capture an apparent violation on camera or witness it firsthand. He explained, "You can have that big stick of legislation, but unless somebody breaks the law and the evidence beyond doubt, it is probably not going to be prosecuted." The team found that the issues Ms. Eaton and Dr. Robertson identified were more prominent because of DOC's underfunding, leading to understaffing of rangers, insufficient infrastructure to discourage harmful actions, and a shortage of other instruments necessary for practical conservation efforts. As a result, even though legal protections exist, it often fails to serve as a deterrent in practice due to DOC's economic and logistical challenges.

Aside from enforcement efforts, the team gleaned from the interviews that education is the most effective long-term solution to human-wildlife conflicts, as all four experts interviewed stressed the importance of changing public values through outreach. Ms. Eaton and Dr. Robertson noted that while legislation is essential, it is not enough to change people's behavior. Instead, they advocated for public outreach efforts to help people develop a sense of responsibility and emotional connection

toward wildlife. Instead of relying on laws and regulations, they suggested active engagement education strategies. Some examples of this include storytelling, direct communication, and a more substantial presence of DOC staff in parks.

4.3 Surveys

The project team conducted surveys of the public to obtain their perceptions of various topics regarding wildlife interaction (see Appendix D for survey questions). A total of 2,371 people participated in the survey; however, only 1,958 people fully completed all the questions. The team analyzed survey responses to target objective two and identify public perceptions of human-wildlife conflicts and how they relate to or differ from those of the experts and DOC employees the project team interviewed.

The team recorded demographic groups that took the survey to identify possible bias in the survey participants and to see if the sampled population is representative of the New Zealand population. To analyze cultural differences in the data, the team split responses by ethnicity. Of the 2,225 survey respondents who provided their ethnicity, 184 identified at least partially as Māori. Figure 4.2 illustrates the four Likert statements with the most significant difference in the mean level of agreement between Māori respondents and Pākehā respondents, the two major ethnic groups in New Zealand (see Figure F.6 in Appendix F for the complete set of statements). The team calculated the mean level of agreement as the average value with “strongly disagree” given a value of 1 and “strongly agree” given a value of 5. Māori respondents reported feeling marginally less informed about laws and proper practices, indicating various cultures have similar opinions.

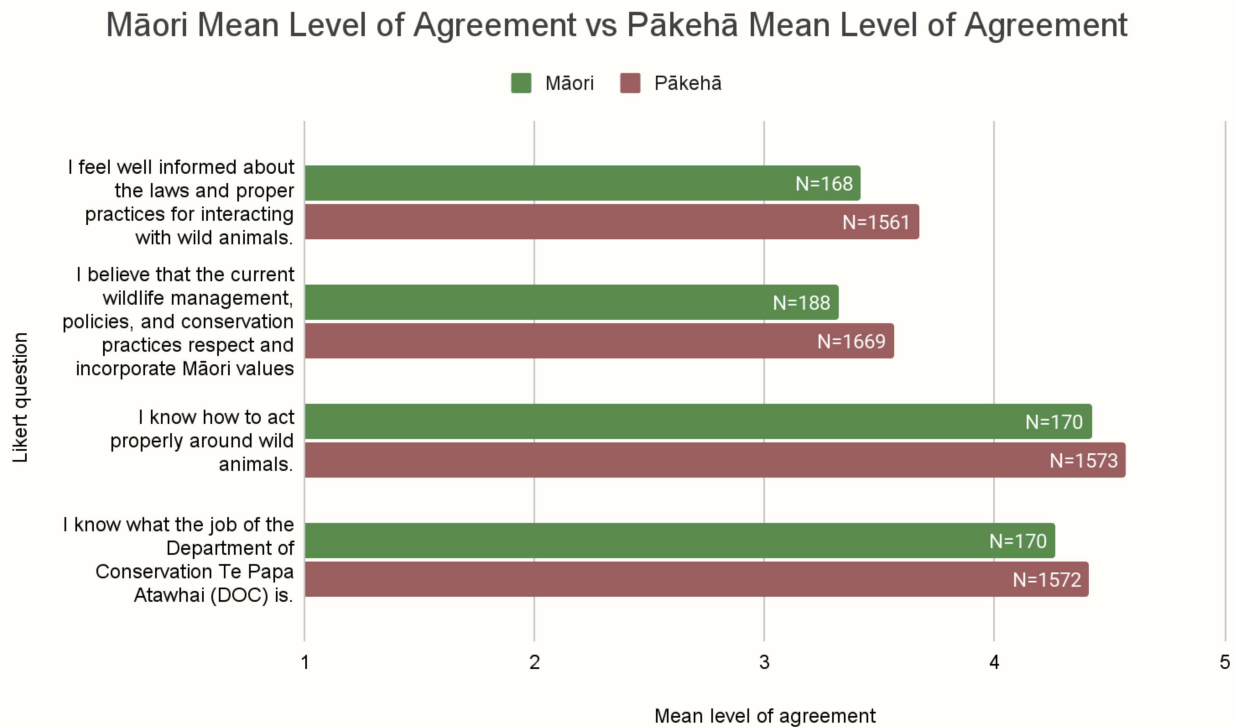


Figure 4.2. Comparison between Māori and Pākehā mean level of agreement

The survey respondents who participated from DOC social media consisted of primarily women, which led to a significant gender disparity of 74% women to 23.7% men (see Figure F.1 in Appendix F). However, when splitting responses by gender, the data collected did not display any major differences that would bias or otherwise diminish our results (see Figure F.7 in Appendix F).

The survey responses indicate that the majority of respondents interact with at-risk or threatened wild animals several times yearly (see Figure 4.3). Shockingly, over 10% of respondents interact with at-risk or threatened wild animals daily or weekly.

How often do you encounter at-risk or threatened wild animals?

N=1963

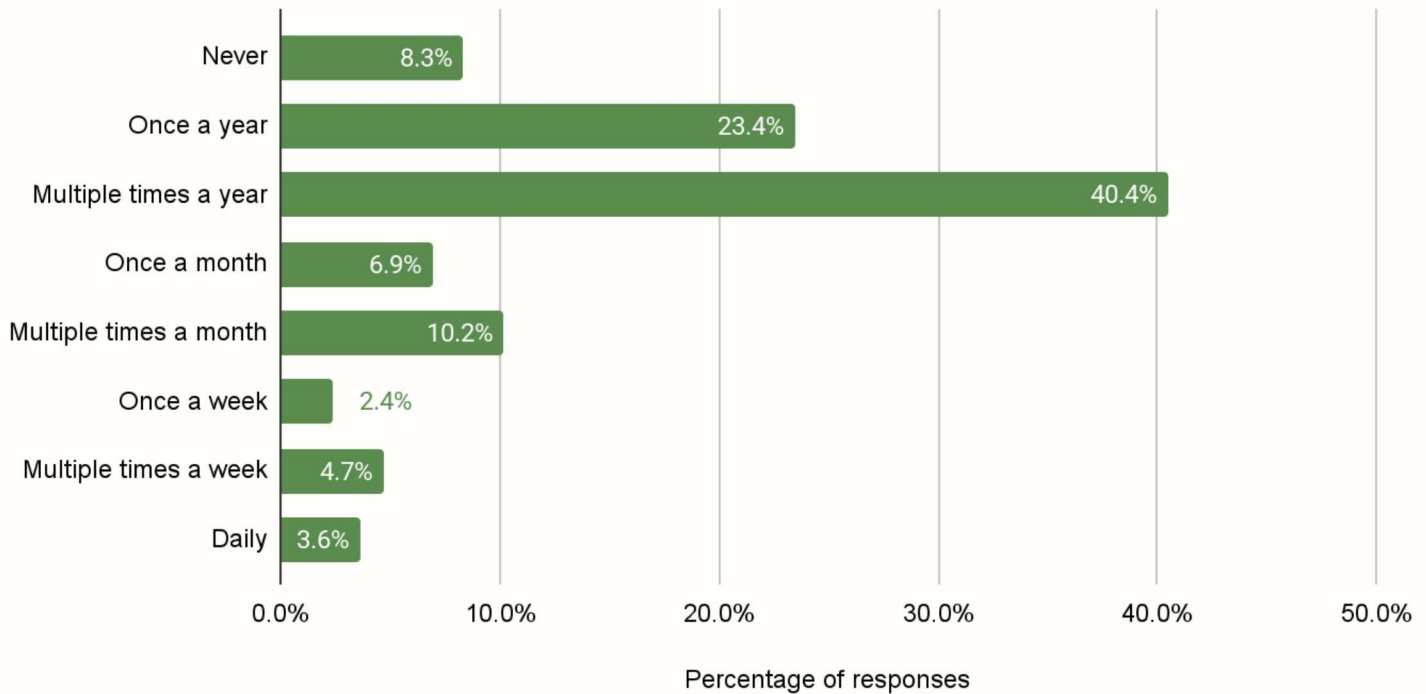


Figure 4.3. How often do you encounter at-risk or threatened wild animals?

The project team asked survey participants if they would intervene when someone or their pet was disrespectful towards wildlife. Figure 4.4 indicates that 93.5% of the survey respondents said they would, with 31.7% of the respondents also stating they have intervened in the past. When asked to elaborate, the main reason for not intervening was personal safety concerns, which was reflected by 21.3% of respondents (see Figure 4.5), and many respondents described previous interventions that ended in rebuttal, backlash, and threats. One respondent even shared that they “had a friend have a knife pulled on her for approaching someone who was too close to a sea lion”. Despite this, many people still said they would intervene for the safety of the animal (61.4%) or because it’s morally correct to do so (39.7%) (see Figure 4.5).

Would you intervene if you saw someone or their pet behaving disrespectfully to wild animals?

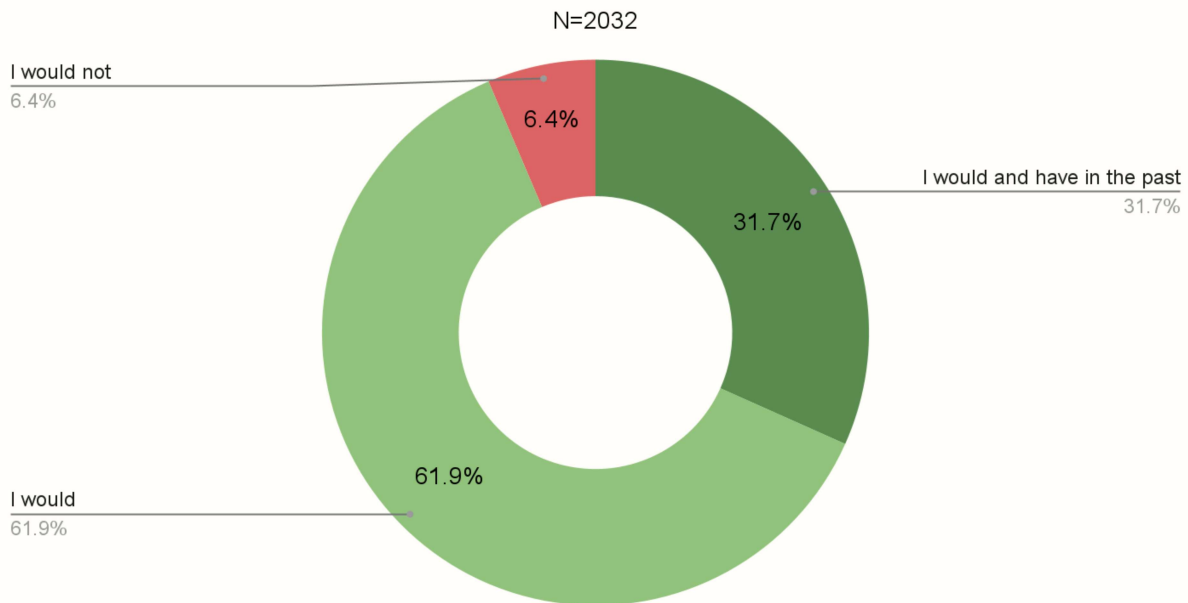


Figure 4.4. Would you intervene if you saw someone or their pet behaving disrespectfully to wild animals?

Please explain why you would or would not intervene.

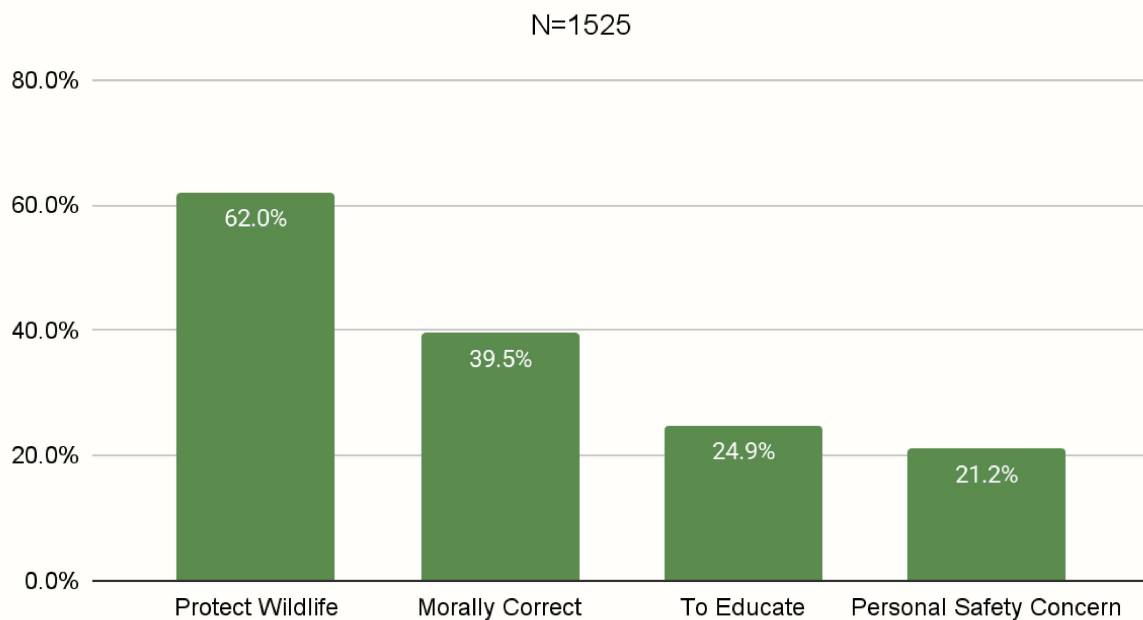


Figure 4.5. Please explain why you would or would not intervene.

Figure 4.6 shows information sources and the percentage of respondents who selected that as one of their sources of information about interacting with wildlife. The top three sources of information, all with almost 50% respondent usage, include DOC’s website, park signs, and social media. DOC newsletter falls on the lower end of information sources, which could suggest that DOC is not promoting the newsletter enough to reach a wider audience. After coding the “other” responses, the most cited sources were personal experience at 25.5% of useful text responses and education at 20.2% (see Figure F.4 in Appendix F). There is a potential for bias in these results as the team conducted the survey primarily through social media and a majority of respondents found the survey through DOC social media pages. Therefore, the team likely overrepresented DOC’s website and social media results relative to New Zealand's population.

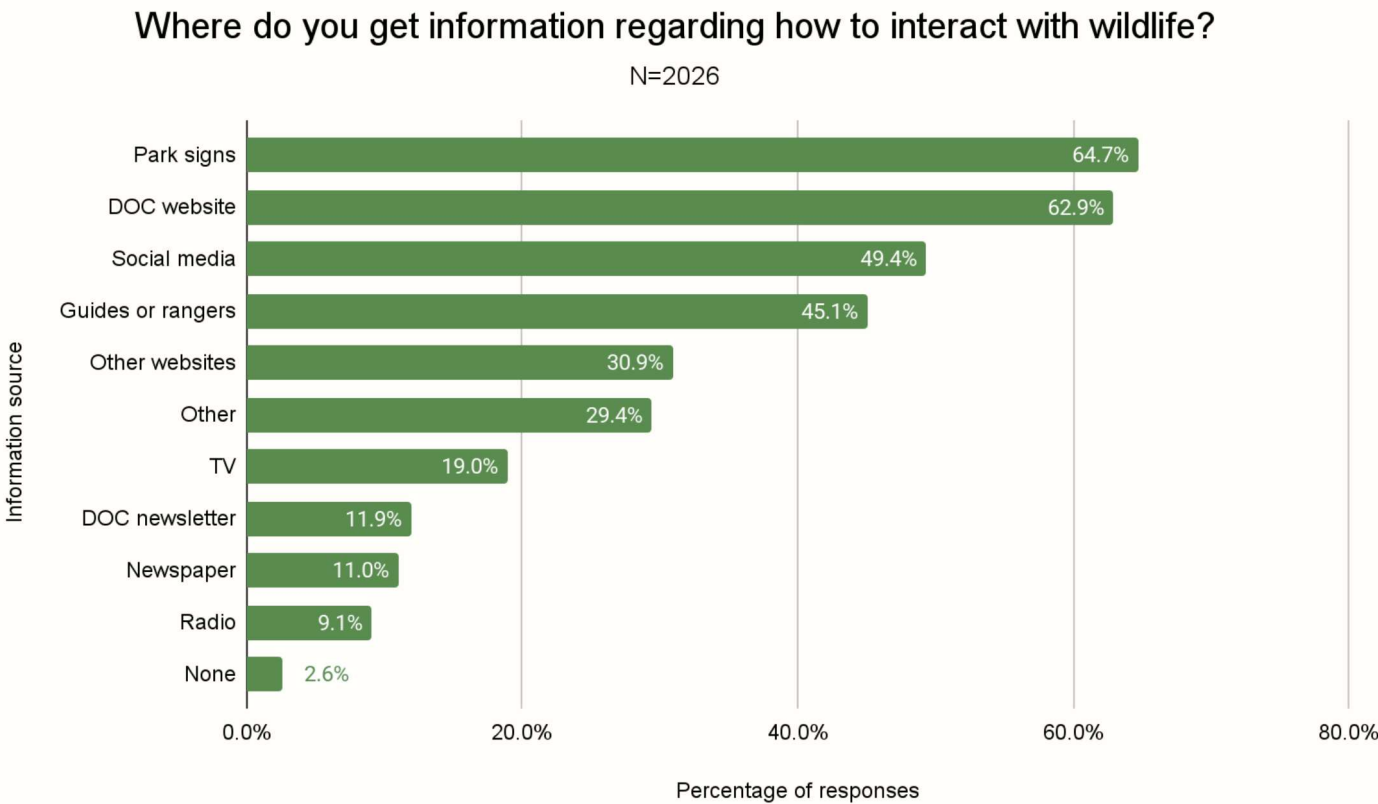


Figure 4.6. Where do you get information regarding how to interact with wildlife?

Figure 4.7 shows the responses from the ten Likert scale statements on the survey. The respondents strongly agreed that they act correctly around wildlife; however, most disagreed that others act appropriately. Additionally, respondents strongly disagree that the current efforts are sufficient to

protect New Zealand’s wildlife and agree that human-wildlife conflict is an issue. This suggests that the public believes that the issue of human-wildlife conflict is essential, reinforcing the need to implement solutions to mitigate these issues. The agreement on these issues could also suggest that the public is motivated to fix them.

Responses to Likert Scale Statements

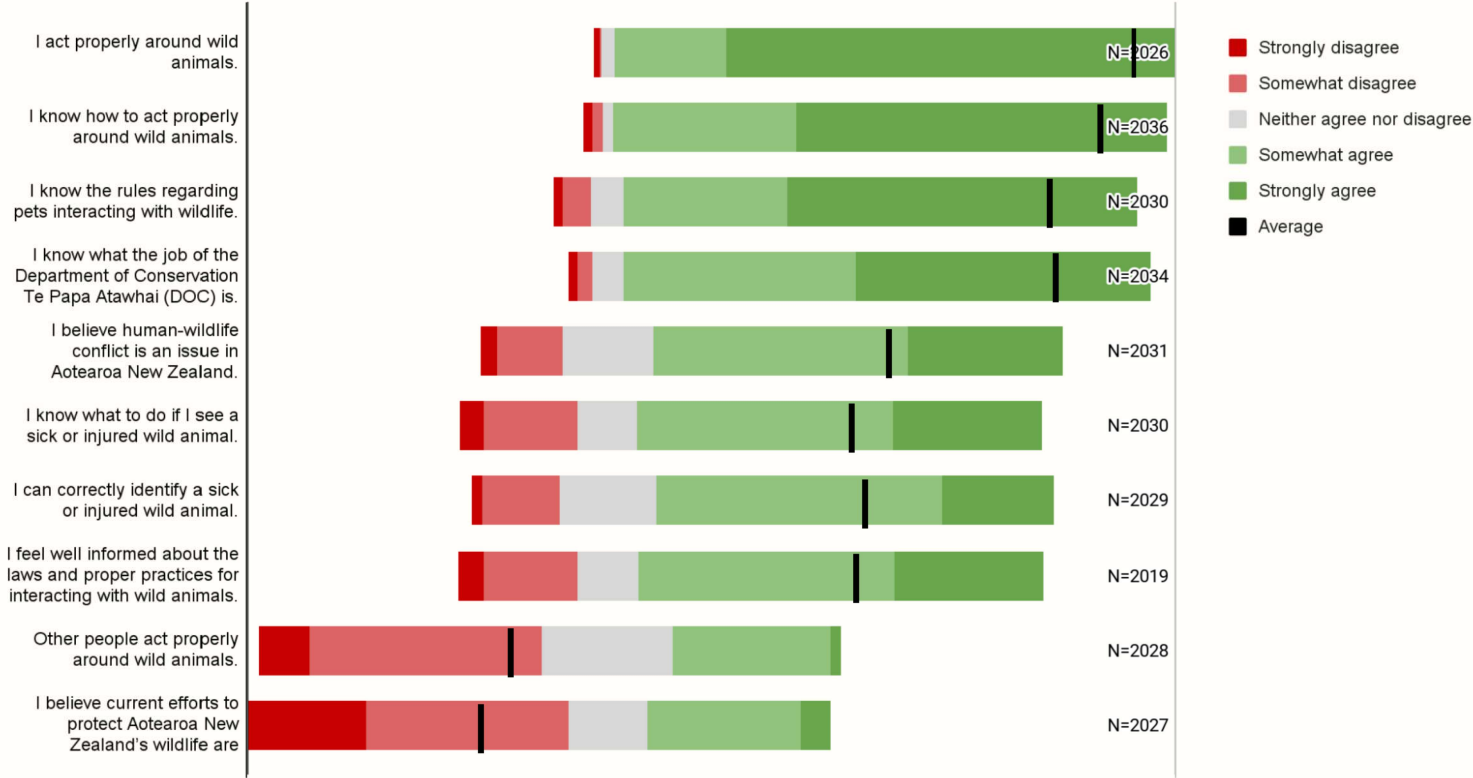


Figure 4.7. Responses to Likert Scale Statements

The project team analyzed the effect size of popular information sources (see Figure 4.6) on participants' perceived knowledge, determined by mean level of agreement with Likert scale statements measuring a kind of knowledge (see Figure 4.7). The team calculated the effect size of each information source using Cohen’s d value. Cohen’s d represents the number of standard deviations between the mean level of agreement of the two groups. In this case, the groups are the respondents who selected a source and those that did not. Table 4.1 shows the Cohen's d value for each pair, indicating whether a source of information (the column headers) has a positive or negative effect on the respondents' knowledge compared with those who did not select that source. A

magnitude less than 0.2 indicates a trivial effect, more significant than 0.2 indicates a small effect, greater than 0.5 indicates a medium effect, and greater than 0.8 indicates a significant effect.

Table 4.1. Effect size of information sources on Likert statement agreement

Effect Size of information sources. N=2008	Social media	DOC newsletter	DOC website	Other websites	Guides or rangers	Park signs	TV	News paper	None
I know how to act properly around wild animals.	-0.10	0.13	0.14	0.05	0.12	0.06	-0.06	-0.09	-0.43
I can correctly identify a sick or injured wild animal.	-0.03	0.26	0.10	0.18	0.01	-0.12	0.03	0.04	-0.24
I know what to do if I see a sick or injured wild animal.	-0.10	0.36	0.29	0.20	0.21	-0.04	0.01	0.03	-0.29
I know the rules regarding pets interacting with wildlife.	-0.08	0.24	0.16	0.12	0.13	0.02	0.00	0.00	-0.54
I know what the job of the DOC is.	0.06	0.28	0.43	0.09	0.29	0.14	0.06	0.11	-0.83
I feel well informed about the laws and proper practices for interacting with wild animals.	-0.08	0.38	0.27	0.12	0.23	0.03	0.05	0.16	-0.57

From the effect size analysis, several key findings emerge. First, participants who selected “none” as their source of information yielded statistically lower responses on all of the Likert questions, which is the expected result. Additionally, people who used either TV or social media responded lower or average. This indicates that these two sources do not adequately educate the participants compared to the other sources. DOC’s website does well at educating people on what to do with a sick or injured animal; however, it is less effective at helping people identify these animals, suggesting that information is hard to find or absent. Park signs and guides/rangers provide decent information on pet rules; however, they are less effective at educating people to identify or respond to sick or injured animals. This indicates that parks could improve in this area. Although DOC’s newsletter scores decently in many categories, it has a much lower readership than other sources (see Figure 4.6). Table 4.1 indicates many areas where various sources of information excel or fall short. The team will address these topics in the recommendations chapter.

Throughout the three open-ended response questions of the surveys, the team identified various themes. People have many opinions on improvements for DOC. When coding the responses for

improvements DOC could make, the team found the following topics to be common (see Figure 4.8): increased funding to DOC, more education about conservation in schools, and harsher enforcement of people and pets. Additionally, 40 participants mentioned the desire for more volunteer opportunities put on by DOC. Figure 4.8 displays the portion of responses which contained information that mentioned each topic. Of the initial 1032 responses in the text field, the team filtered out 119 entries that provided no information and coded the remaining 913 responses.

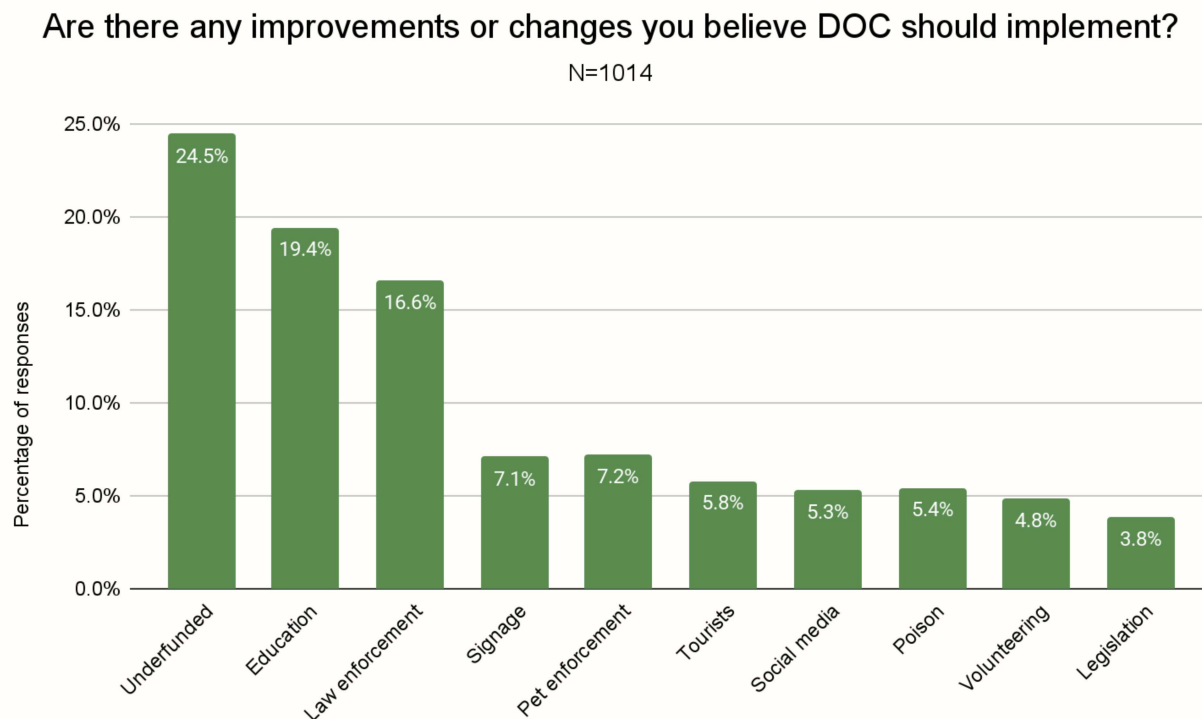


Figure 4.8. Are there any improvements or changes you believe DOC should implement?

4.4 Summary

The team addressed all three project objectives by reviewing past publications, interviewing experts, and conducting surveys. Archival research informed the team of prevalent issues and potentially effective strategies to mitigate harmful interactions. The team gained direct insight into issues rangers face and current efforts to address human-wildlife conflict by interviewing wildlife experts. Finally, the survey results revealed public perceptions on this issue and potential shortcomings in current educational efforts. After analyzing the results of the method, the team presented the recommendations outlined in Chapter Five to the Department of Conservation Te Papa Atawhai.



Chapter Five: Recommendations

Based on the team’s analysis of the results from data collected from archival research, interviews, and surveys, the project team developed three evidence-based recommendations for the Department of Conservation Te Papa Atawhai (DOC). These recommendations target the key issues that the results identified to reduce human-wildlife conflict across New Zealand. This chapter presents the recommendations and their justification.

Recommendation One: Enhance Educational Programs

Action: To maximize educational benefits, the project team recommends that DOC:

1. Increase educational efforts in primary and secondary schools to teach children about appropriate wildlife interactions, including offering new volunteer opportunities.
2. Design and deploy new signage at common hotspots that includes information on how to identify a sick or injured animal and provides a QR code to DOC’s recommended response to that scenario.
3. Offer the public a volunteer training program that teaches them the benefits of backyard trapping and provides them with humane predator traps to use on their property, keeping them and their animals safe and contributing to the overall New Zealand predator control.

Justification: Education emerged as one of the most popular themes throughout the completion of each method in this study. Currently, a significant portion of DOC’s educational effort depends on signage.

As Kelly Eaton described, signage has limited effectiveness, as many people simply ignore it. For this reason, DOC must diversify its educational methods to reach a larger audience, provide them with a better understanding of how to interact with wild animals, and to appreciate their ecological importance to New Zealand. Based on the results from the survey, respondents identified that park signage could be more effective if it was displayed in multiple languages and provided information on actions to take when encountering sick or injured animals. Through effect size analysis, the team found signage did not have a meaningful benefit on identifying or taking action to help a sick or injured animal (see Table 4.1). In the open-form questions, multiple respondents shared a common sentiment, as illustrated by the following comment from a survey participant: "I would happily participate in volunteer days to help set traps along walks in NZ." Another participant suggested making the idea of setting up traps in personal yards more commonplace, as they wish more people had traps in their yards and believe it's easier than most people think.

Recommendation Two: Improve Law Enforcement

Action: To improve the effectiveness of law enforcement, the project team suggests that DOC:

1. Promote legislation that is both enforceable and avoids jurisdictional issues to enable authorities to charge individuals with crimes more efficiently. These reforms would allow law enforcement to more easily obtain warrants to enter private property and give more weight to verbal testimonies and video evidence in the conviction process, rather than solely relying on gaining an impractical amount of physical evidence.
2. Increase the number of rangers and warranted officers patrolling. Even without issuing more punishments, their increased presence can deter negligent behavior and educate the public.
3. Train a selective specialized ranger position with cross-jurisdictional authority and the ability to more easily, acquire warrants, distribute fines as they see fit, and pursue legal actions with less "red tape".

Justification: Law enforcement plays a significant role in deterring individuals from intentionally harming animals. This statement was consistently made clear from the team's interviews and surveys. As Dr. Bruce Robertson explained in our interview, conservation law enforcement is extremely limited

in its abilities due to a lack of funding, jurisdiction issues, and an inability to give fines or pursue legal action unless evidence is abundant. Brian Vayndell corroborated this issue during our conversations, where he identified multiple cases that, despite video evidence and witness accounts, did not end in prosecution due to a lack of evidence. Figure 4.8 reinforces this point as 16.6% of survey respondents suggested the need for changes in law enforcement

Recommendation Three: Increase Funding

Action: To increase the available funding, the project team suggests that DOC:

1. Advocate for increased government funding by presenting society's demand for stronger conservation efforts and proposing the benefits of expanded educational efforts, stronger regulation enforcement, and new protection initiatives.
2. Lobby for an increased International Visitor Conservation and Tourism Levy (IVL) by \$5-10 as a "Conservation Contribution" to gain an additional estimated \$18-36 million per year, based on New Zealand's pre-covid overseas arrivals (Stats NZ, n.d.).
3. Develop new corporate partnership opportunities to sponsor different protection initiatives in exchange for positive public exposure and a better brand image, with the goal of securing substantial annual private funding.

Justification: Inadequate funding is one of the key restrictions DOC is battling. The team's research consistently brought up this topic, coming up in personal conversations, expert interviews, and public surveys. This constraint has resulted in a decrease in DOC educational efforts, law enforcement abilities, and the effectiveness of efforts to directly protect animals, such as medical treatment and predator control. While our research supported the first recommendation, recommendations two and three are ideas based on the educated opinions of the project team. Given that securing additional government funding often comes with a lot of challenges, the team believes it would be beneficial to implement alternative methods of funding to support their critical programs.



Chapter Six: Conclusion

Aotearoa, New Zealand, is home to a vast array of wildlife, much of which is vulnerable to human interaction and influence. Urbanization, a lack of education, and a lack of caring exaggerate this vulnerability, often leading to unintentional physical or psychological harm. While the Department of Conservation Te Papa Atawhai (DOC) strives to create a coexistent environment where humans and wild animals can live together in peace, there are currently various factors that inhibit this tenet.

By completing the goal of identifying, addressing, and diminishing human-wildlife conflicts, the project team created a list of suggestions for DOC. We hope that they will implement our recommendations, resulting in fewer harmful interactions, greater public understanding of native species, and a more sustainable balance between humans and wildlife in Aotearoa, New Zealand.

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Appendices

Appendix A: Consent Form for Stakeholder Interviews

Informed Consent Agreement for Participation in a Research Study

Principal Investigator: Professor Robert Kinicki

Student Investigators: Gavin Ford, Connor Jason, Hunter Maher, and Luke McQuillan

Contact Information: gr-wildlife-d25@wpi.edu

Title of Research Study: The Conundrum of Human-Wildlife Coexistence

Sponsor: The Department of Conservation Te Papa Atawhai

Introduction: We are students from Worcester Polytechnic Institute (WPI) working with the Department of Conservation Te Papa Atawhai (DOC), and we are asking you to participate in a research study. Before you agree, you must be fully informed about the purpose of the study, our procedures, and any benefits, risks, or discomfort that you may experience as a result of your participation. The purpose of this study is to assess both the direct and indirect interactions that citizens of New Zealand have had with wildlife. This form presents information about the study so that you may make a fully informed decision regarding your participation.

Interview Procedures: The interviewee will be asked to give consent to the audio recording of the interview. Then the interview will involve the interviewer asking the interviewee a set of questions, and the scribe will take notes, capturing the interviewee's responses.

Risks to study participants: There are no risks associated with taking this interview. You can skip any questions that you do not wish to answer.

Benefits to research participants and others: Participating in this interview is solely for the benefit of DOC and the Wildlife research group from WPI, who aim to gain valuable information from these surveys.

Record keeping and confidentiality: If you do not request to remain confidential, your name may be included in final publications or presentations of this data along with summarizations of your ideas or direct quotes from the duration of this interview. You can request confidentiality at any point before, during, or after this interview, either verbally or via the email address above. Upon request, we will only share the name of the interviewee with the other members of the group, DOC, and WPI. In any public viewing of this data, we will replace your name with "Interviewee #[participant

number]”. We will keep records of your participation in this study confidential so far as the law permits. However, the study investigators, the sponsor, or its designee, and under certain circumstances, the Worcester Polytechnic Institute Institutional Review Board (WPI IRB) will be able to inspect and have access to confidential data that identifies you by name.

Compensation or treatment in the event of injury: There are no identifiable ways that taking this interview could result in any injury that requires medical attention. For this reason, we will not give compensation to the interviewee or anyone participating in the interview if such an event occurs. You do not give up any of your legal rights by signing this statement.

Cost/Payment: Being a part of this interview does not give any form of compensation or cost.

For more information about this research or about the rights of research participants, or in case of research-related injury, contact: The group that conducted the research at gr-wildlife-d25@wpi.edu. Or the WPI IRB manager, Ruth McKeogh, Tel. 508 8316699, Email: irb@wpi.edu, and the Human Protection Administrator, Gabriel Johnson, Tel. 508-831-4989, Email: gjohnson@wpi.edu.

Your participation in this research is voluntary. Your refusal to participate will not result in any penalty to you or any loss of benefits to which you may otherwise be entitled. You may decide to stop participating in the research at any time without penalty or loss of other benefits. You may also skip any individual question asked in the interview. The project investigators retain the right to cancel or postpone the experimental procedures at any time they see fit.

By signing below, you acknowledge that we, the interviewers, have informed you of and consent to be a participant in the study described above. Please ensure that all of your questions are answered to your satisfaction before signing. You are entitled to retain a copy of this consent agreement.

Study Participant Signature

Date: _____

Study Participant Name (Please print)

Signature of Person who explained this study

Date: _____

Appendix B: Stakeholder Interview Questions

Demographics

B1: What is your preferred name?

B2: Have you lived in Aotearoa New Zealand your whole life?

B3: What is your ethnicity?

General Questions

B4: What is your work title, and who is your employer?

B5: How long have you worked with this organization, and how long have you held your current title?

B6: Have you seen an increase or a decrease in certain types of negative human-wildlife interactions (e.g., approaching, feeding, or handling animals) in recent years?

B7: What do you think is causing this trend?

B8: Could you describe specific instances of human-wildlife conflict that you have observed or heard about?

B9: What additional resources, support, or policy changes do you think would help reduce human-wildlife conflicts in New Zealand?

Expert Specific Questions

B10: What are the challenges you face when influencing human behavior to reduce conflict with wildlife?

B11: Do you believe that current animal protection laws are being effectively enforced?

B12: Which laws, if any, do you believe are well enforced and which are not well enforced?

B13: Do you believe there are any gaps in animal protection legislation that need to be filled?

B14: Are you aware of any current educational efforts by your organization to help inform the public?

B15: If yes: How do you think these efforts could be improved upon?

If no: Do you think your organization should put more effort into conservation?

B16: Are there any additional questions or comments you have for us?

Appendix C: Consent Form for Online and in-Person Surveys

Introduction: We are students from Worcester Polytechnic Institute (WPI) researching how people interact with wildlife in New Zealand. Our goal is to create an action plan to diminish issues regarding human-wildlife conflict. Your participation in this 5-minute survey will help protect vulnerable native species like kiwi, little blue penguins, and seals.

Record keeping and confidentiality: Your public IP address will be recorded by Qualtrics XM and will remain confidential. Only the project team, WPI, and the WPI Institutional Review Board will have the authority to view your public IP address.

Your participation in this research is voluntary. You may skip any questions or stop participating at any time. The project team may cancel or postpone this research at their discretion.

By continuing to fill out this survey, you acknowledge and consent to these terms.

The WPI Wildlife D25 project team thanks you for your participation in this survey.

Appendix D: Online and In-Person Survey Questions

Survey Link: https://wpi.qualtrics.com/jfe/form/SV_2rdC6uLWP0L4MOa

Q1.1.1

What is your age?

☐ Under 18

☐ 18 - 24

☐ 25 - 34

☐ 35 - 44

☐ 45 - 54

☐ 55 - 64

☐ 65 - 74

☐ 75 or older

Q1.1.2 (For Under 18 responses only)

Sorry, we are not taking responses from people under 18.

The survey has been terminated and your response has **not** been recorded.

Q2.1

What is your gender?

☐ Male

☐ Female

☐ Non-binary / third gender

☐ Prefer not to say

Q2.2

Where do you live?

☐ Aotearoa New Zealand

☐ Australia

☐ Other

Q2.3

What is your ethnicity?	
<input type="checkbox"/>	Aotearoa New Zealand European / Pākehā
<input type="checkbox"/>	Other European / White
<input type="checkbox"/>	Māori
<input type="checkbox"/>	Pacific Peoples
<input type="checkbox"/>	Asian
<input type="checkbox"/>	Middle Eastern, Latin American, African
<input type="checkbox"/>	Other

Q3.1 (For Aotearoa New Zealand residents only)

How long have you lived in Aotearoa New Zealand?	
<input type="radio"/>	Less than 1 year
<input type="radio"/>	1 - 5 years
<input type="radio"/>	5 - 10 years
<input type="radio"/>	10+ years

Q3.2 (For Aotearoa New Zealand residents only)

I believe that the current wildlife management, policies, and conservation practices respect and incorporate Māori values and traditions.

Strongly
disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Strongly
agree

☐

Q4.1

How often do you encounter at-risk or threatened wild animals?

☐ Never

☐ Once a year

☐ Multiple times a year

☐ Once a month

☐ Multiple times a month

☐ Once a week

☐ Multiple times a week

☐ Daily

Q4.2

Please answer how much you agree with the following statements:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I know how to act properly around wild animals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I act properly around wild animals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The public acts properly around wild animals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can correctly identify a sick or injured wild animal.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know what to do if I see a sick or injured wild animal.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know the rules regarding pets interacting with wildlife.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know what the job of the Department of Conservation Te Papa Atawhai (DOC) is.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe current efforts to protect Aotearoa New Zealand's wildlife are sufficient.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe human-wildlife conflict is an issue in Aotearoa New Zealand.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel well informed about the laws and proper practices for interacting with wild animals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4.3

Would you intervene if you saw someone or their pet behaving disrespectfully to wild animals?

☐ I would and have in the past

☐ I would

☐ I would not

Q4.4

Please explain why you would or would not intervene.



Q4.5

Where do you get information regarding how to interact with wildlife? (select all that apply)

☐ Social media

☐ DOC newsletter

☐ DOC website

☐ Other websites

☐ Guides or rangers

☐ Park informational signs

☐ TV

☐ Radio

☐ Newspaper

☐ Other

☐ None

Q5.1

Are there any improvements you believe the DOC should implement?



Q5.2

Do you have any additional comments, thoughts, or experiences you'd like to share with us about human-wildlife interactions in Aotearoa New Zealand?



Q6.1

We thank you for your time spent taking this survey.
Your response has been recorded.

Appendix E: Archival Research Tables

Table E.1. Reviewed DOC Reports Results

Report Title	Year	Location	Wildlife Involved	Notes
DOC urges public support following incident near Tara Iti nesting site	2025	Mangawhai Heads, New Zealand	Tara Iti (fairy tern)	<p>Overview:</p> <ul style="list-style-type: none"> - During breeding season, a group of teens were camping within the fenced in nesting site <p>Impact:</p> <ul style="list-style-type: none"> - The teens disrupted the nesting/breeding process - Some chicks showed signs of agitation - “The hide had been damaged, and there was evidence of a bonfire nearby. Materials used for chick recovery and site management had been removed, and footprints showed individuals had walked through sensitive areas, further increasing risks to the chicks,”
Native species compromise	2025	Mt Aspiring National Park	Birds, lizards, invertebrates	<p>Overview:</p> <ul style="list-style-type: none"> - Over 150 predator traps were deliberately tampered with

d by trap vandals				<p>Impact:</p> <ul style="list-style-type: none"> - The culprits blocked the entrances to the traps with rocks, making the traps unable to catch anything - This likely increased the amount of predators, putting New Zealand's taonga at higher risk
“Frustrating and distressing”: DOC appeals for information after seabirds killed	2025	Near Slipper Island/Whakahau, Coromandel	Seabirds	<p>Overview:</p> <ul style="list-style-type: none"> - Seabirds were caught and drowned in fishing nets by a nearby boat <p>Impact:</p> <ul style="list-style-type: none"> - The case suggests there was “wilful mistreatment of wildlife” - These events contribute to the death of protected species, such as these seabirds
DOC urges dog owners to act after nine kiwi killed	2025	Wharengare area of Purerua, eastern Northland	Kiwi	<p>Overview:</p> <ul style="list-style-type: none"> - Nine Kiwi were found dead on private land between January and March 2025 <p>Impact:</p>

				<ul style="list-style-type: none"> - The wounds are consistent with dog attacks and fresh carcasses were tested for canine DNA - Nearby uncontrolled dogs that roam near kiwi nests are current blamed for these deaths - “Dogs are the leading cause of kiwi deaths”
Shot sea lion a blow to recovering population	2024	Catlins Estuary, The Catlins, New Zealand	New Zealand sea lion/pakake	<p>Overview:</p> <ul style="list-style-type: none"> - A juvenile female sea lion was illegally shot in the Catlins area <p>Impact:</p> <ul style="list-style-type: none"> - The sea lion suffered a slow, painful death - Sea lions are “Nationally Vulnerable” at only about 10,000 alive - This act is punishable by up to 2 years in prison or a \$250,000 fine
Five kea killed by vehicles on Milford Road	2024	Milford Road, New Zealand	Kea	<p>Overview:</p> <ul style="list-style-type: none"> - Five Kea were killed by vehicles on Milford Road between April and June 2024

				<p>Impact:</p> <ul style="list-style-type: none"> - Humans feeding the Kea have drawn them to the roads in search of more food - Human food is harmful to Kea - People now need to drive more carefully near Kea habitats and stop feeding them
DOC frustrated by “completely avoidable” dog attacks on penguins	2024	Wellington region	New Zealand Penguins	<p>Overview:</p> <ul style="list-style-type: none"> - 8 little blue penguins were killed by dogs in Wellington between December 2023 and July 2024 <p>Impact:</p> <ul style="list-style-type: none"> - Penguins were injured or killed by uncontrolled dogs - The Wellington City Council erected fencing and a sign warning of fines for unleashed dogs - “The saddest part is these penguins’ deaths were completely avoidable if people simply followed the rules.”
Orca ‘body slam’ shocks	2024	Devonport, Auckland, New	Orcas	Overview:

DOC, leads to infringement fine		Zealand		<ul style="list-style-type: none"> - A man jumped off a boat to touch an Orca in the water <p>Impact:</p> <ul style="list-style-type: none"> - Actions like these can cause the marine animals to stress and change their natural feeding and resting behaviors - “This is stupid behaviour and demonstrates a shocking disregard for the welfare of the orca. It is extremely irresponsible.” - The man received a \$600 fine under the Marine Mammals Protection Act
Man fined over shark decapitation	2024	Mahia Peninsula, near Mahia Boat Ramp	Great white shark	<p>Overview:</p> <ul style="list-style-type: none"> - A great white shark was caught, killed, and decapitated <p>Impact:</p> <ul style="list-style-type: none"> - The fisher was fined \$600, but penalties could reach up to \$250,000 or 2 years in prison - Great white sharks are illegal to catch or kill, as they are protected under the Wildlife Act 1953

				<ul style="list-style-type: none"> - DOC is gifting the shark's head and jaw back to the iwi to respect cultural expectations
Dog attack believed to have killed 19 gulls in Kaikōura	2024	South Bay, Kaikōura, New Zealand	Red-billed gull/tarāpunga	<p>Overview:</p> <ul style="list-style-type: none"> - An uncontrolled dog killed 19 red-billed gulls <p>Impact:</p> <ul style="list-style-type: none"> - 17 adult gulls and 2 juvenile gulls were killed by the dog - The owner could face up to 3 years imprisonment or a \$20,000 and the dog could possibly be destroyed under the Dog Control Act 1996 - Red-billed gulls are “at-risk: declining”
Conservationists shocked at theft of predator traps at Okura Bush	2024	Okura Bush Scenic Reserve, Auckland's North Shore, New Zealand	Various New Zealand prey species	<p>Overview:</p> <ul style="list-style-type: none"> - Over 25 predator traps were stolen from Okura Bush Scenic Reserve <p>Impact:</p> <ul style="list-style-type: none"> - Traps are essential to controlling predator populations and protecting the native species - “It's coming up to peak trapping season and now we have no predator

				traps left in this area to protect our precious native species. I'm devastated. This is the second time now on this section of track that traps have been stolen – the last time was December 2022,”
Complaints from public rise as boats, jet skis get too close to ocean animals	2024	Coastal/marine areas of New Zealand	Marine mammals like dolphins, whales, and seals/sea lions	<p>Overview:</p> <ul style="list-style-type: none"> - DOC was receiving an increased number of complaints about boats and jetskis getting too close to marine animals <p>Impact:</p> <ul style="list-style-type: none"> - Noises and physical disturbances from boats and jetskis can affect feeding, resting, and breeding behaviors of marine animals like dolphins, whales, seals, and sea lions - The noise, especially with many vehicles, can confuse and disorient the animals and make it unable for them to communicate - Vessel strikes can injure or kill marine life - Fines up to \$250,000 or 2 years in prison for harassing, disturbing, injuring, or killing marine life

Man sentenced for skippering vessel into flock of protected seabirds	2024	Near Simpson's Rock in the Hauraki Gulf/Tīkapā Moana	fairy prion/tītī	<p>Overview:</p> <ul style="list-style-type: none"> - A man was fined \$2500 for driving a speedboat right through a flock of fairy prions <p>Impact:</p> <ul style="list-style-type: none"> - It's probable that many of the birds were injured or killed by the incident - Fairy prions are a "keystone species" (very important to other species and the ecosystems) - Offenders can face up to a \$250,000 fine or 2 years in prison - "The boat ploughed right through the middle of a large flock at high speed. Based on the video evidence, it's highly likely birds were hit by the boat – either killing them instantly or breaking bones, leaving them unable to swim or fly, and therefore they would starve to death."
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Table E.2. Reviewed Published Article Results

Article Title	Year	Location	Wildlife Involved	Notes
Effectiveness of a General Management Plan in Mitigating Human-Wildlife Conflicts and Enhancing Conservation	2014	Tanzania	Elephants, Hippo, Buffalo, Crocodiles, and other large carnivores	<p>Overview:</p> <ul style="list-style-type: none"> - In Tanzania, A holistic approach toward coexistence and its effectiveness is explained <p>Strategies:</p> <ul style="list-style-type: none"> - Tanzania implemented a General Management plan to guide the management and development of resources and to diminish human-wildlife conflict - This plan balances conservation efforts with tourism, hunting, etc <p>Impact:</p> <ul style="list-style-type: none"> - 73.3% of the respondents said that human-wildlife conflicts have decreased - Populations of wildlife increased - Poaching occurrences decreased
Compilation and	2022	Iran	Iran's wildlife (not	Overview:

prioritizing human-wildlife conflict management strategies using the WASPAS method in Iran			specific)	<ul style="list-style-type: none"> - This article explains the successes of Iran in using the WASAP method for managing human-wildlife conflict - The human-wildlife conflict generally happens due to a lack of land use policy, lack of operational strategies, changing socio-economic population, and increasing human population <p>Strategies:</p> <ul style="list-style-type: none"> - Formatting and categorizing management strategies to decrease conflict <p>Impact:</p> <ul style="list-style-type: none"> - The importance of strategies for wildlife conflict management were clearly laid out
Spatio-temporal patterns of human-wildlife conflicts and effectiveness of mitigation in Shuklaphanta National Park, Nepal	2023	Shuklaphanta National Park, Nepal	Various wildlife in the park	<p>Overview:</p> <ul style="list-style-type: none"> - Human-wildlife conflict around Shuklaphanta National Park, Nepal is a major issue with many individuals being injured, killed, or having their property destroyed <p>Strategies:</p>

				<ul style="list-style-type: none"> - Questionnaire surveys with local residents about frequency, timing and nature of conflicts <p>Impacts:</p> <ul style="list-style-type: none"> - Mitigation techniques were found to have mixed results. It was recommended to invest in efficacious deterrents instead
Effective enforcement in a conservation Area	2006	Tansania	Elephants and Rhino (primarily)	<p>Overview:</p> <ul style="list-style-type: none"> - Poaching in Tanzania is a major problem which has caused a significant decrease in abundance of specific species such as elephants and rhinos with valuable Ivory <p>Strategies:</p> <ul style="list-style-type: none"> - Increasing patrols and other anti poaching efforts <p>Impact:</p> <ul style="list-style-type: none"> - An increase in patrolls and other anti poaching efforts was directly proportional to the number of poachings that have occurred
The sleeping policeman: understanding	2008	None	None	<p>Overview:</p>

issues of enforcement and compliance in conservation				<ul style="list-style-type: none"> - This article illustrates the need for rules, the influence of social managers, and enforcement to allow conservation to succeed <p>Strategies:</p> <ul style="list-style-type: none"> - Increasing penalty costs while decreasing enforcement costs (issues arise from corruption, people avoiding authority, and other factors that decrease the effectiveness of fees) - Normative factors have also been analyzed as a lack of enforcement can result in compliance, however, this argument is weak as if there is a lack of penalty to outweigh the gain of false action <p>Impacts:</p> <ul style="list-style-type: none"> - Rules governing human behavior are fundamental to natural resource management - Modes inform the design of more effective enforcement strategies
Environmental Education as a Component of Multidisciplinary	2005	Western Indian Ocean	Fruit Bats	<p>Overview:</p> <ul style="list-style-type: none"> - The article addresses the need for multidisciplinary conservation programs including environmental

Conservation Programs				<p>education, ecological research, management, legislation, and enforcement</p> <ul style="list-style-type: none"> - The article focuses on issues that fruit bats face on three islands in the Indian ocean from hunting to deforestation and other issues <p>Strategies:</p> <ul style="list-style-type: none"> - Raising awareness about the existence and threats to the species - Fostering national pride with the unique existence species - Developing educational resources highlighting the connection between local human needs and the ecosystem services provided by the bats <p>Impacts:</p> <ul style="list-style-type: none"> - Most of the goals of the organization were met with an increased awareness and understanding and a decrease in hunting
The Role Of Education And Advocacy In	2023	None	None	<p>Overview:</p> <ul style="list-style-type: none"> - This article outlines the importance of education for wildlife conservation. Educating the public about

Wildlife Conservation				<p>biodiversity intrinsic value fosters awareness</p> <p>Strategies:</p> <ul style="list-style-type: none"> - Implement educational program in schools and communities to raise awareness about biodiversity - Work with policymakers to develop and enforce registration that protects wildlife habitats <p>Impact:</p> <ul style="list-style-type: none"> - Fosters long term cultural change that makes wildlife conservation a shared effort instead of just scientists and activists
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Appendix F: Additional Graphs

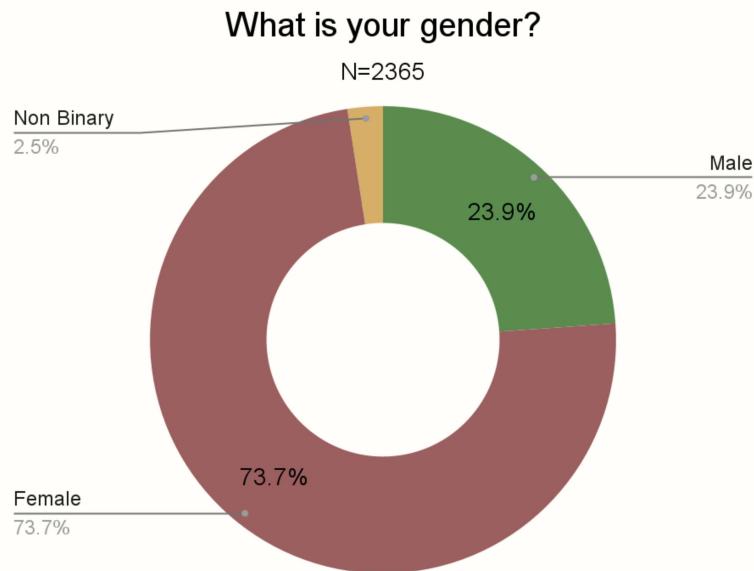


Figure F.1. What is your gender? vs New Zealand Demographics

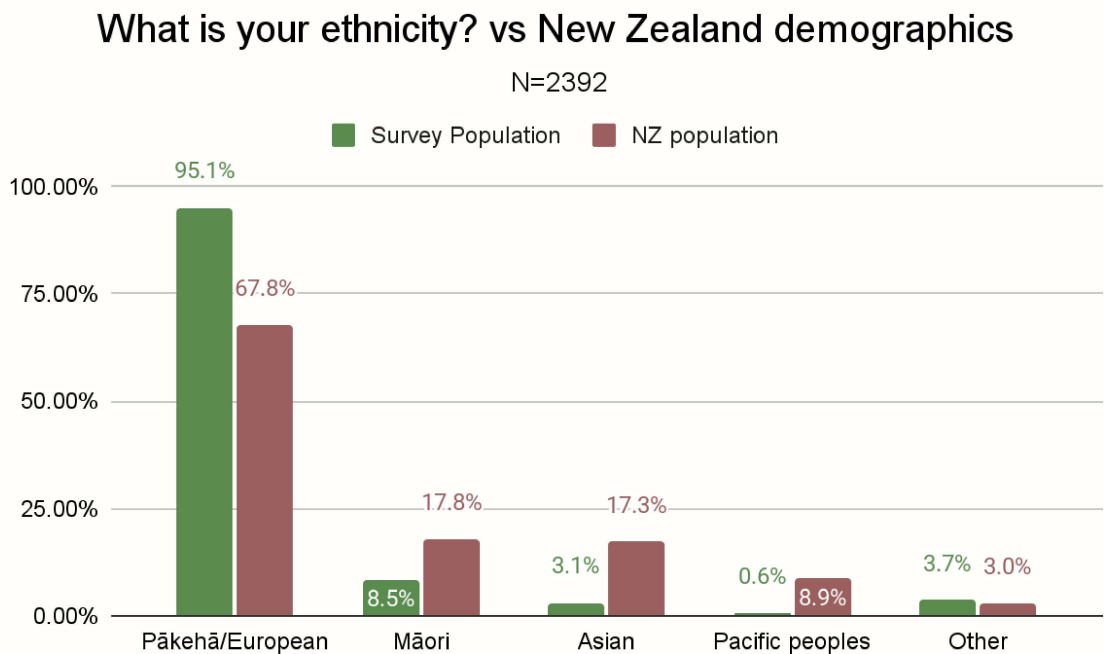


Figure F.2. What is your ethnicity? vs New Zealand Demographics

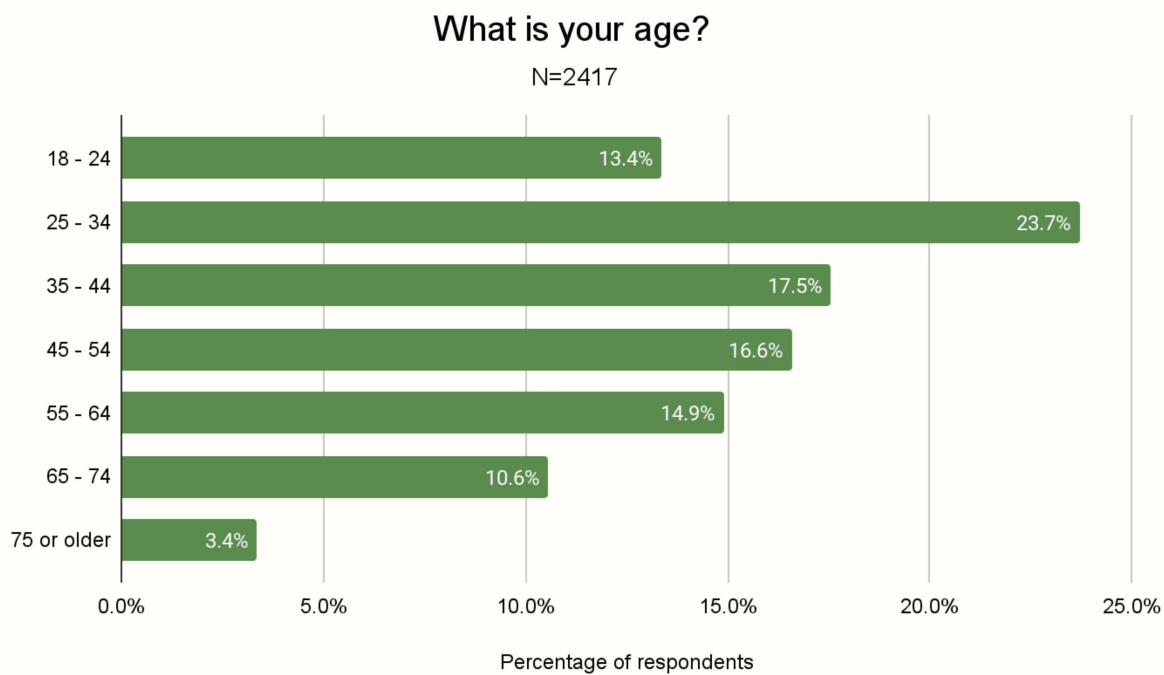


Figure F.3. What is your age?

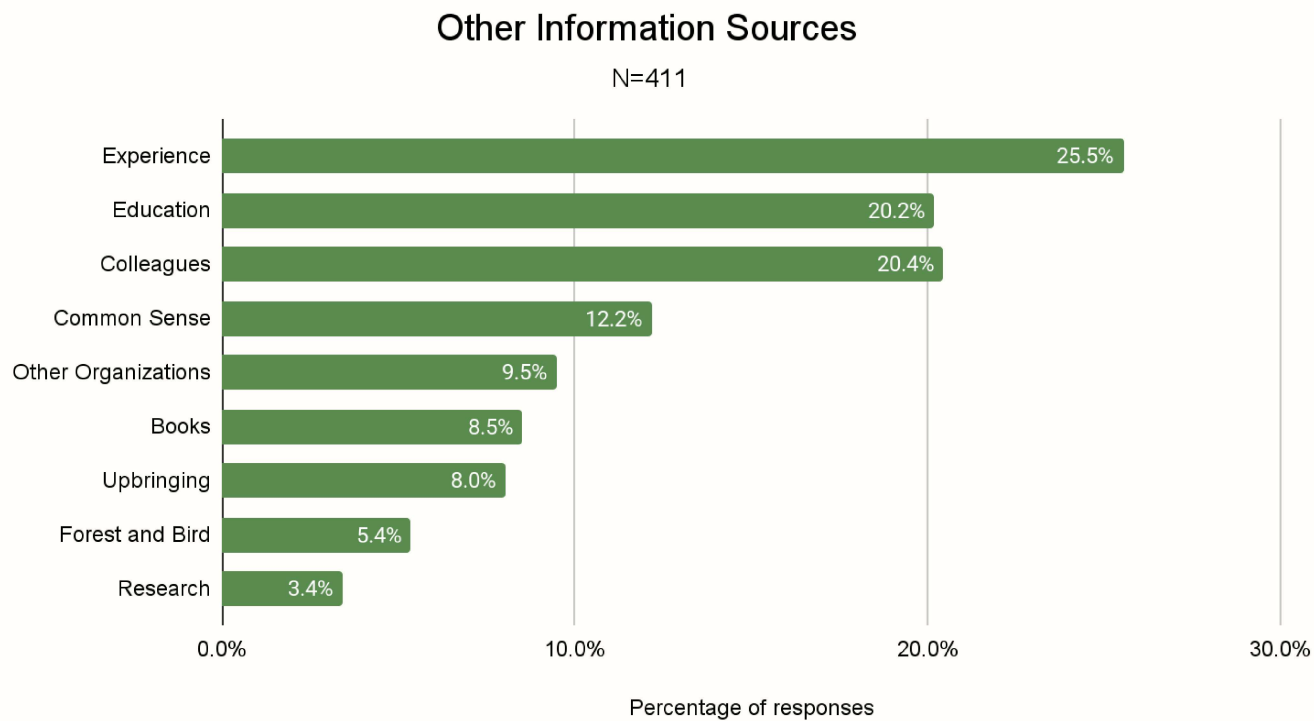


Figure F.4. Other Information Sources

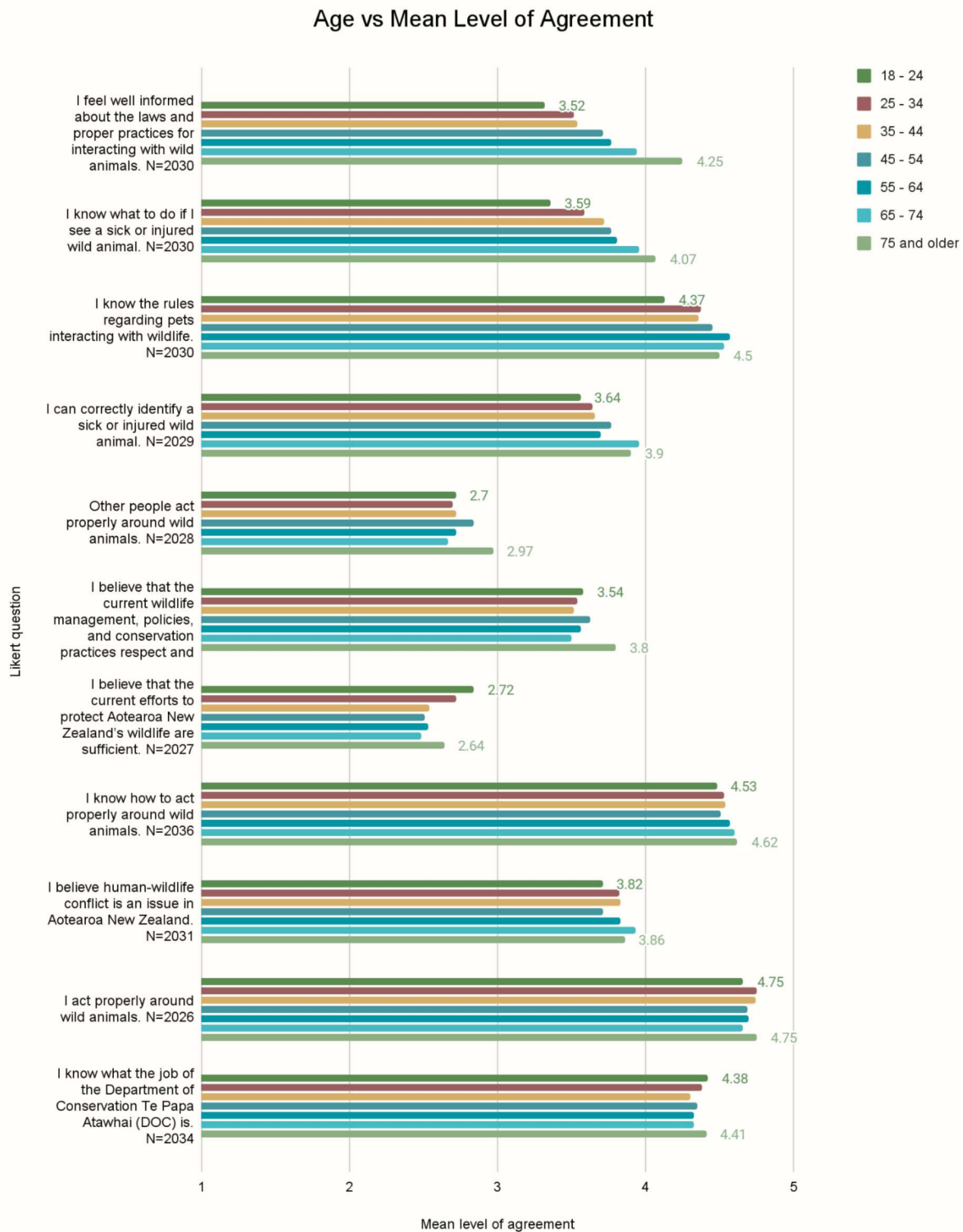


Figure F.5. Age vs Mean Level of Agreement

Māori Mean Level of Agreement vs Pākehā Mean Level of Agreement

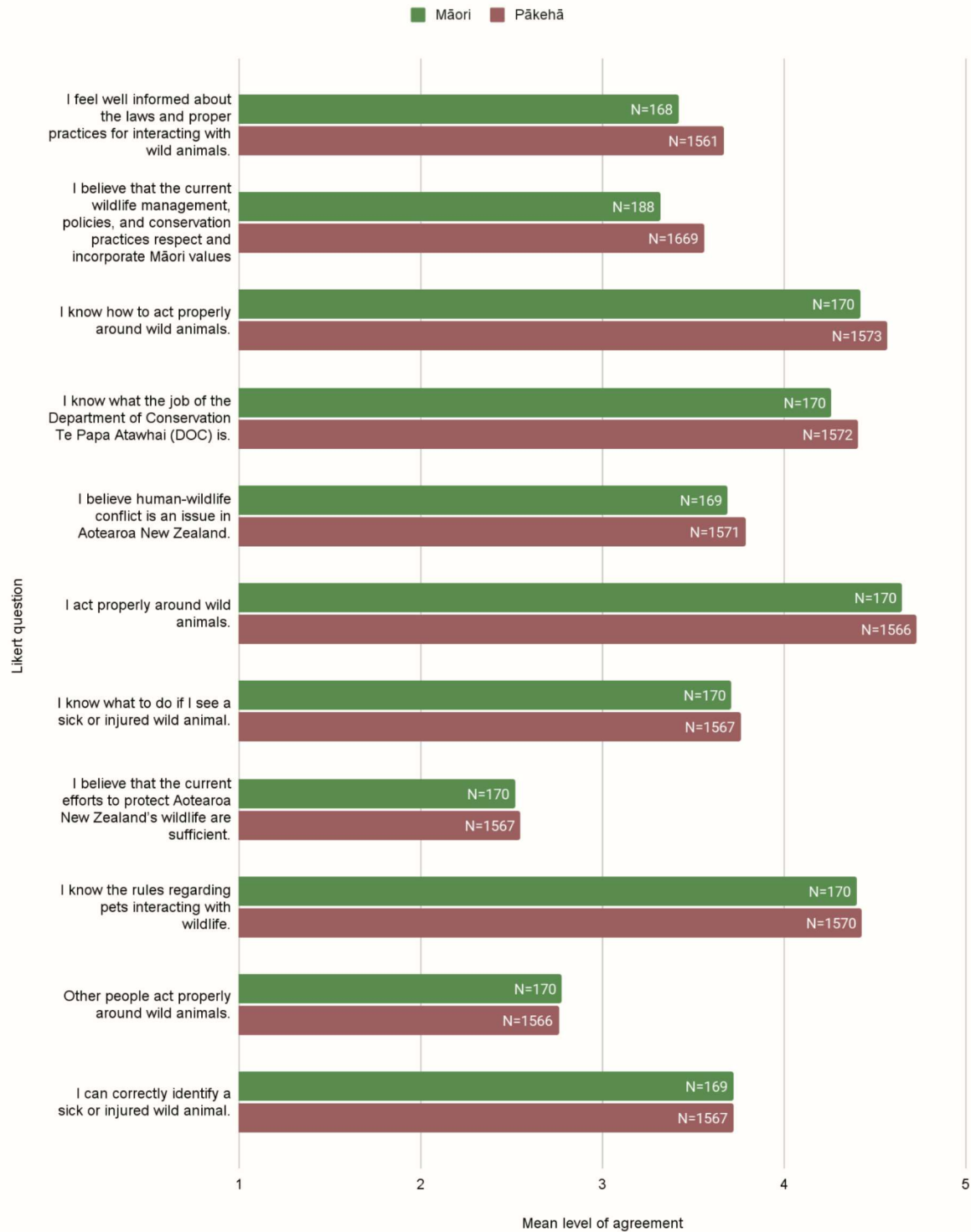


Figure F.6. Māori Mean Level of Agreement vs Pākehā Mean Level of Agreement

Men's Mean Level of Agreement vs Women's Mean Level of Agreement

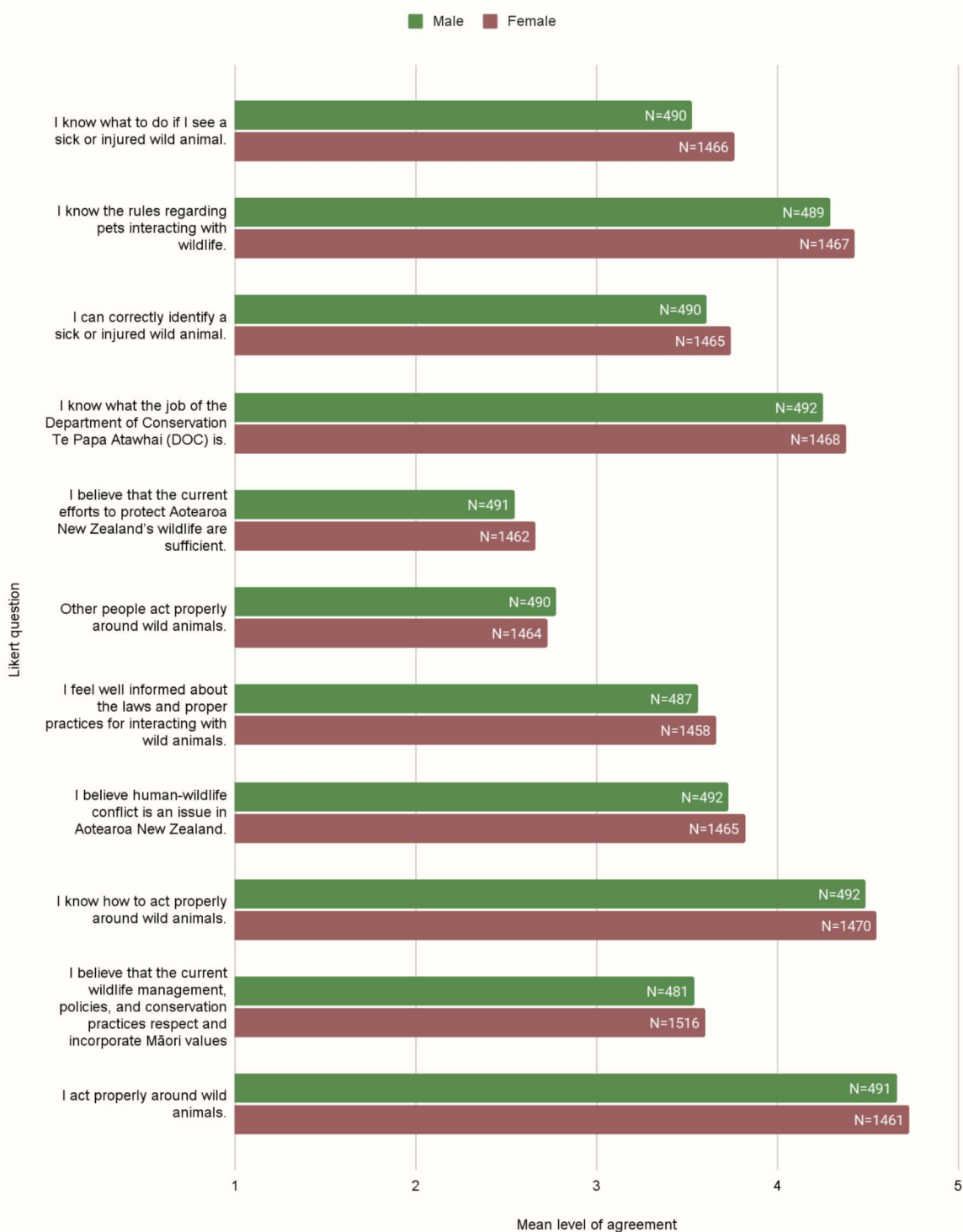


Figure F.7. Men's Mean Level of Agreement vs Women's Mean Level of Agreement

Do you have any additional comments, thoughts, or experiences you'd like to share with us about conservation education or human-wildlife interactions in New Zealand?

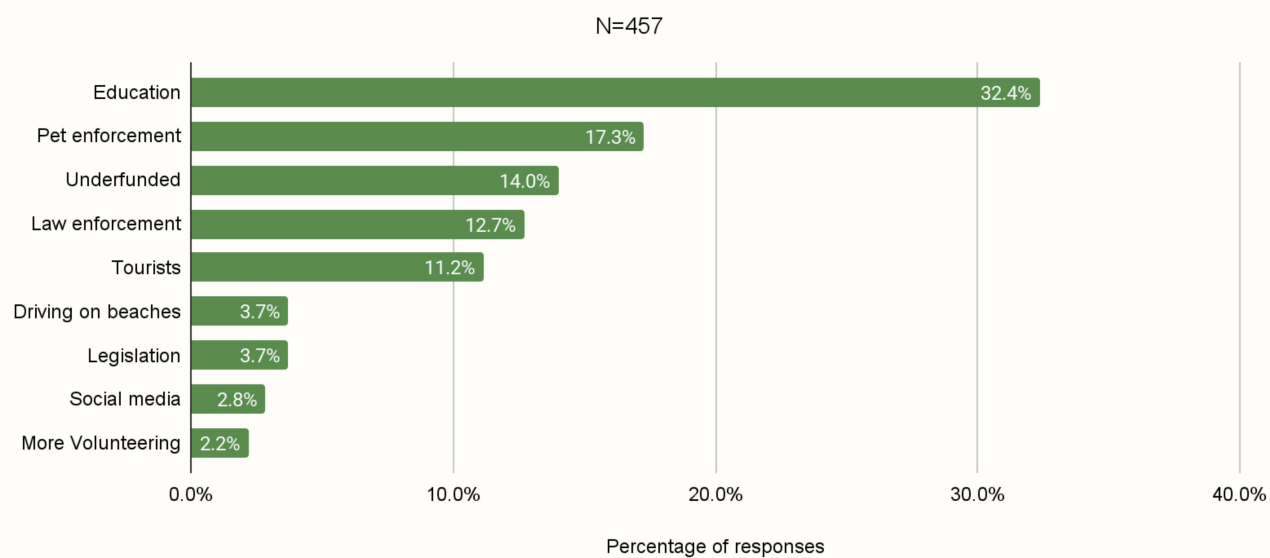


Figure F.8. Do you have any additional comments, thoughts, or experiences you'd like to share with us about conservation education or human-wildlife interactions in New Zealand?

Appendix G: Expert Interview Transcript - Kelly Eaton

Transcript April 9, 2025, 11:00 AM

Jason, Connor: Start with the easy ones, what is your name?

Eaton, Kelly: Kelly Eaton

Jason, Connor: Okay, perfect. What is your ethnicity?

Eaton, Kelly: New Zealand European.

Jason, Connor: And then are you a New Zealand native?

Eaton, Kelly: Born and bred, yes, you can say you answer that question. Yep. About six generations then, so I'll say yes. I would say pretty native.

Jason, Connor: What is your work title and who is your employer?

Eaton, Kelly: So I am a supervisor at the Department of Conservation. Let's call it 15 years, and I've been a biodiversity Ranger for 12 of those years.

Jason, Connor: You kind of answered this, but this is the next question. How long have you worked with this organisation and how long have you held your current title?

Eaton, Kelly: Going back in time, I've been with DOC and Hawkes Bay since 2013, where I came in as a biodiversity Ranger and been a supervisor we'll call it the last three years. Before that I was with DOC in Taranaki for three years as well as a biodiversity Ranger. You can do the maths. I'm not.

Jason, Connor: Thank you. That's great. And then the next question is, have you seen an increase or decrease in certain types of negative human-wildlife interactions in recent years and essentially we define that as people trying to approach, feed or even handle animals just out in the wild?

Eaton, Kelly: I suppose yes, but that's through visibility on social media, you know, I guess, you know, I don't know if you've run to see some little girl touching her. Was it a fuel inquested Penguin this week all over the place? What else in Hawks Bay, we get people feeding seals, fish. A lot of people like to interact with seals. I think just because of social media, there's a bit more visibility to what's going on. It may not have not been an actual increase. It's just we see it regulated.

Jason, Connor: Yeah, that's great. And you touched on this a little bit, but could you describe any occasions where you personally have observed these negative interactions?

Eaton, Kelly: When I was in Taranaki a very large seal, you know, this time of year, they like to come and rest. And there's a lovely coastal walkway up there and one side of east on a park bench. So, you know, I put up some signs and try to encourage people not to get in its way and interact. I went to check on it and there were about 5 boys with skateboards chasing it and getting between it and the water. I yelled at them from so far away. But yeah, normally we don't see it. We just hear about it later or learn about the animal that's in a place where the public are more likely to come across it and have those interactions. So with seals, it's often we just put up signs we can't sit around all day guarding them. In just education, trying to encourage people not to do that, yeah.

Jason, Connor: Good. Yeah, I guess that's true. People just call you, you don't really watch, but that's true.

Eaton, Kelly: No, no. We're often, yeah, it can't be everywhere.

Jason, Connor: What additional resources support or policy changes do you think would help mitigate human-wildlife conflicts in New Zealand's national parks?

Eaton, Kelly: As a ranger you know the capacity. Having more staff that are able to get out there, seeing us being seen that people know a DOC Ranger might be about maybe they won't try anything silly. The compliance capacity as well. So when we do hear of somebody doing something they shouldn't have the right ranges who are able to respond and follow up on it is important. It's probably one of the biggest struggles we have on the front line, we've got a lot of things we're expected to do. We can't do it all to the standard we would like. I guess I'm probably not well versed enough in policy. Yeah, resource is probably the biggest one from where I'm sitting.

Jason, Connor: You know, staffing seems like an issue in a lot of places just in general, even in America it's. Let's see. Last couple questions. What are the challenges you face in influencing human behaviour to reduce disturbances in wildlife?

Eaton, Kelly: I think education, yeah, teaching people why you do not interact with student types of wildlife as much as we might do some social media content, not everyone follows social media. We can have all the signs in the world and everyone just walks past them. We have a lot of examples of

that. What else can you do? You know, I guess if you prosecute every, every now and then, it might make a bit of media, more people might become more aware, but it's quite a recurrence as far as I'm aware.

***Jason, Connor:** To what extent do you believe that current New Zealand laws regarding human-wildlife conflict are being effectively enforced? And if you know who enforces these laws and how?*

Eaton, Kelly: Not fully knowledgeable around that one, but it's probably us. And it's just where resourcing comes into it again and we prioritize a lot of things we're supposed to prioritize and someone petting a Penguin probably isn't going to make the top of that list.

***Jason, Connor:** This is similar, so it's OK if you don't have all the information regarding this, but which laws, if any, do you believe are well enforced and which are not well enforced? And do you think any new laws should be created?*

Eaton, Kelly: Not knowledgeable enough to answer that one.

***Jason, Connor:** OK. And then the last one is another lock question, but I guess I'll ask regardless. Do you believe any additional laws or regulations need to be put in place to better protect wildlife in which specific areas of protection would you like these to include?*

Eaton, Kelly: Not knowledgeable enough to answer that one.

***Jason, Connor:** That's all the questions we have for you today. And do you have any additional comments for us?*

Eaton, Kelly: No, no. I think you hit the gist. You know as much as the law component is the practical delivery of those ingredients. It's where we fall over sometimes. Yeah. Sort of reflecting on wildlife interactions in my own journey in yogis growing up, I probably wasn't interacting with native wildlife. But you know, pits and possums and all those sort of things. And it's those experiences that can lead someone on the journey of caring about what's going to happen to our native wildlife. So it's kind of a balance, I suppose. Of what an interaction is? Is it a good one or a bad one, but you know the animal's well-being. Especially our native wildlife as a priority. For us. Yeah. No, it'll do.

***Jason, Connor:** Absolutely. Well, thank you for your time.*

Appendix H: Expert Interview Transcript - Professor Bruce Robertson

Interview conducted April 15, 2025, 10:00 AM

Transcript not published per interviewee's request.

Appendix I: Expert Interview Transcript - Brenda Lee

Transcript April 16, 2025, 9:45 AM

Jason, Connor: Thank you for coming. What is your preferred name?

Lee, Brenda: Brenda.

Jason, Connor: Have you lived in the US your whole life?

Lee, Brenda: I have.

Jason, Connor: And what is your ethnicity?

Lee, Brenda: White Caucasian.

Mahe, Hunter: That's fine. And just to add to—you can skip any questions that you wanna skip if you don't wanna answer.

Lee, Brenda: OK.

Mahe, Hunter: All right, start. What is your work title and who is your employer?

Lee, Brenda: So my work title is Executive director of Colorado Bear Coalition and get to know that I founded and run.

Mahe, Hunter: Awesome. How long has it been since you've worked with the organization, or how long have you held your title? So how long since you founded the company?

Lee, Brenda: I wanna say it's been three years. Three years? Yeah.

Mahe, Hunter: Have you seen an increase or decrease in any types of negative? Human-wildlife interactions. That's been your case. We're gonna keep on saying human-wildlife, but human bear interactions, your specialty in recent years. Have you seen any negative interaction?

Lee, Brenda: OK, so negative. Can you define what negative interaction is?

Mahe, Hunter: Yeah, definitely like people approaching animals, feeding them or trying to grab them. You know, stuff that they're not supposed to do.

Lee, Brenda: I haven't personally seen it. I've certainly seen things on the news, like that woman who grabbed the cub last year off the fence. I don't know if you guys saw that video, but I think it was in Florida or something. No, I mean I've seen negative interaction. In the sense of bears being killed because they were attracted into town and the people who attracted the bear didn't. Weren't intentionally attracting it, but didn't do anything to stop it.

Maher, Hunter: *What do you mean by like, attracting it? They just kind of were egging the bear on and they followed, followed them or something.*

Lee, Brenda: No, no more of them have livestock. And so kind of like just having available food attractants. But I haven't seen anyone actually do anything inappropriate with a bear.

Maher, Hunter: *Oh, okay got it. Thank you. What additional resources support or policy changes do you think that would help reduce animal and human interactions in Colorado or the United States? I'm not sure if it's specific to Colorado that there's rules or laws, or it's just the United States.*

Lee, Brenda: So I think trash reduces trash as an attractant.

Maher, Hunter: *Please, let's hear them.*

Lee, Brenda: So when I talk about attractants, it's human attractants that bring wildlife into urban areas. So you know where I live is in Boulder, Colorado and it's right next to the Rocky Mountains. So we have wildlife like mountain lions and bears often coming in and out of town. But really reducing the human attractants that we know bring bears into town that, like high calorie foods and that would be in trash, bird feeders, beehives, livestock. And so by putting more responsibility on people. And human behavior and less focus on the bear because. The agencies pretty much across the US. Respond to crises. This situation, because their number one priority is human safety and so if a large animal's in town and they think it's not safe, they will kill the animal. And so my group is all about what can we proactively do to prevent that bear from being in town in the first place? And if the bear is just cruising through town because we live right next to, you know, open space wilderness, not staying. So if they come in and they don't get a reward, then they leave. So it's really focused on human behavior.

Jason, Connor: *Thank you. What are some challenges that you face when influencing human behavior to reduce conflict with wildlife? Kind of like what you're just talking about.*

Lee, Brenda: Well, it's, you know, people I think in general don't like to change. And so the biggest is probably people saying, well, this has never been a problem before, so why should I have to change? And The thing is, it is a newer problem because there's more and more people, and with climate change and other factors that are affecting. Bear habitat, more housing, more just urban. And sprawl. Bears are coming into contact with people more often, and when I say contact, it may just be a bear sighting that someone lived in the neighborhood for their whole life and they've never seen a bear. And so they think it's a one off. But there's areas where the Bears are coming into more towns. The biggest barrier is like getting people to connect the dots and it's, you know, connecting that. If you leave trash out. And a bear thinks like a bear. It's hungry and it's got an amazing nose, and especially in the fall, it's bulking up for hibernation. So maybe eating up to 30,000 calories a day, that's a lot of berries.

Jason, Connor: *That adds up.*

Lee, Brenda: So it's like, well, I could spend all day eating berries. Or I could just hit these trash cans and be done and go to sleep. And they're also really smart. So they do know the trash schedule. They know when.

Jason, Connor: *Really.*

Lee, Brenda: Oh yeah, they're really smart. The real issue is bird feeders—they're a big problem. People love attracting birds, but what they don't realize is that by feeding birds, they could be putting a bear's life at risk. And it's a tough issue to solve because it's hard to enforce. Most bird feeders are in people's backyards, out of sight. I don't think feeding birds is that special. People can be stubborn about it—saying things like, 'I'm saving the birds.' But if you really want to help, plant native vegetation instead. That way, you can attract birds without drawing in bears. Sure, there are bird feeders with special designs, but bears are strong. If they're hungry enough, they'll knock them over. It really comes down to helping people understand that if you truly care about wildlife, you'll make choices that don't put bears in danger.

Maher, Hunter: *I'm just curious, like with the trash, that seems like a big, big issue. What do you recommend for people to do? Are there blocks for the trash cans or I don't know how you do it?*

Lee, Brenda: Yeah, yeah, yeah. So there's a very resistant trash can. So we don't call them bear proof because bears are smart and given enough time, they do figure them out. Which is really kind of amazing. So there's berries in cans on the market. They're very expensive. They range anywhere from \$250 to \$400.00 per can. Most people have three cans because you have compost, recycling and trash. So that's that, that's a big cost for people. Trash haulers that supply the cans charge extra to pick up those cans, because if they get damaged, they're really expensive to replace. So another thing that we're really working on is enclosures to put trash cans in an enclosure that's bear resistant. And so that means that it probably should be metal. You don't want to have a lever door handle because they can push down on the lever. Although I just learned recently that the law here, I don't know if it's true in Colorado, so I need to look into whether you have to have a lever because otherwise it's not. Handicap or it's not ADA.

Jason, Connor: *Interesting, yeah.*

Lee, Brenda: Yeah. So because we always recommend a door knob that appears so we may be putting on like a keypad. Instead. So just trying to figure that out. Out. So basically it's trying to outsmart a bear, and which isn't always. They're so curious and they're smart. So it's ongoing.

Maher, Hunter: *It just seems like they adapt to whatever new creative idea you come up with.*

Lee, Brenda: That's right. Like, here's a really good example. And this has to do with backpacking. Yeah, I've backpacked all my life. And you always hung it up and you know, barriers have figured that out. And then you can have the bear canisters that are like plastic bins that they can't open. They can't move it with their paw, and it's really thick plastic. So there is one in Yosemite. They were finding that backpackers kept losing their canisters in this one backpacker's campground and they were and they couldn't find them. They just disappeared and they kept hearing this. So someone discovered that. The bear had been rolling the can. To the side of this little rocky area and then pushed it over and as it bounced down the rocks, it broke open. And then the bear would go around the other way and then get the food. So yeah.

Jason, Connor: *That's pretty next level.*

Lee, Brenda: That's right.

Maheer, Hunter: I am familiar with putting all your food in a bag and then throwing it up in a tree with the rope. So they already outsmarted that or some bears.

Lee, Brenda: Yeah. Yes, some bears have. Yeah. So that's where you have to keep kind of changing things because once they figure out like, oh, everyone's doing this and I'll figure that one, then you have to come up with something else.

Jason, Connor: Got it.

Lee, Brenda: And that's true with fair resistant trash can. So a lot of them have to get certified up in Montana to be bear resistant. And there's a grizzly. And then there's black bear. So grizzly ones are really heavy duty and we just have black bears in Colorado. But even with those, the Bears have figured out if they knock it over and sit on it and bounce on it, it pops the top. Or see them behind it and push down and it pops the edges and then they can pull it.

Jason, Connor: OK. Yeah, my mind is blown but. What educational efforts are being made by your organization to help inform the public? If that's an area that you cover? Yeah.

Lee, Brenda: Yeah, we do. We do a lot of presentations to HOA, so you know Hoa's and also Rotary clubs and schools. Community groups and the type of education is really connecting the dots for people that bears are here and we're seeing more of them because. Their habitat is being. Whatever. It's being populated by people and so. There's a reason we see more bears, but it's really important to look at our own yards. And are there trees where the Bears could be hiding under and mount lions as well? And really just minimizing any rewards that a bear would get. And beehives are another one that they like the larva of beehives, because it's really high in protein. So they're not even necessarily after the honey. That's kind of like frosting on the cake. Direction after the larva and so electric fencing. We do a lot of electric fencing installations around hobby beehives and chickens. Because bears. Black bears are typically omnivores, but they typically just eat berries and roots and stuff. But if there is a chicken and it's hungry, it will eat the chicken. They're opportunists. So yes, we do a lot of education around that. Like what can you do to remove attractants? And if you can't remove them. Because you have your beehives in your backyard, then you need to put electric fencing around it.

Jason, Connor: Amazing. Well, that's all the questions we have for you. Your responses were amazing.

Lee, Brenda: OK.

Maier, Hunter: *Thank you very much.*

Appendix J: Expert Interview Transcript - Dr. Ox Lennon

Transcript April 17, 2025, 9:30 AM

McQuillan, Luke: What is your preferred name?

Lennon, Ox: Ox.

McQuillan, Luke: Have you lived in Aotearoa New Zealand, your whole life?

Lennon, Ox: Yeah, I lived in England for one year.

McQuillan, Luke: How do you describe your ethnicity?

Lennon, Ox: Pākehā

McQuillan, Luke: What is your work title and who's your employer

Lennon, Ox: Conservation manager and the wellington zoo

McQuillan, Luke: How long have you worked with this organization and how long have you held your current title?

Lennon, Ox: Both are the same. It's four and a half years.

McQuillan, Luke: Have you seen an increase or decrease in certain types of negative human-Wildlife interactions in recent years like approaching animals, feeding them things like that?

Lennon, Ox: No, we're talking about wild animals?

McQuillan, Luke: Yeah, we're in the zoo

Lennon, Ox: No, I wouldn't know. I'd want to be, like, oh, we're gonna do a study, you know, yeah?

McQuillan, Luke: Have you seen anything in the zoo then?

Lennon, Ox: I mean, no, I don't think so. I wouldn't have noticed it's trend either way. Yeah

Ford, Gavin: Is it mostly consistent, or do you not see it?

Lennon, Ox: Yeah, I don't see it very often, and. I've not noticed anything that would tell me it's

trending up or down.

McQuillan, Luke: *Could you describe specific instances of human-wildlife conflict that you have observed or heard of?*

Lennon, Ox: When we talk about human-wildlife conflict, you guys have a definition for it?

McQuillan, Luke: *We mean when people are doing things that are typically seen as to be bad behavior, so it could be harassing animals, feeding them, or trying to pick them up. There was that thing in Australia, where an American person picked up a baby wombat, something like that, where it's harmful to the animal.*

Lennon, Ox: So, we're talking about humans causing harm to animals. We're not talking about Kaka attacking houses, and that kind of thing, kaka eating stuff off of roofs.

Ford, Gavin: *Not as much.*

Lennon, Ox: Specific examples. I saw a while ago, maybe like eight years ago, first thing on my mind was I saw someone on Tick Tock in New Zealand with a picture they were holding a species of lizard or Gecko and they had a picture that was like "These things sell for 10K on the black market." and I dubbed it into DOC Wildlife, whatever. At the time they had something that was like preventing Wildlife crimes but I think it's since been dissolved, but yeah, I was, like, oh ****, I didn't know if they had a permit or anything, but I was like, they definitely shouldn't be posting, like being like these sells lots of money on the black market, even if they're like working with Doc or whatever. I do see people putting on the like lizard pages on Facebook that I'm part of posting. Sometimes they'll find a lizard, and they'll be holding it in the picture that they put to get ID and people be like, oh, you shouldn't pick them up or whatever, but sometimes it might be in their house so they're trying to get it out.

McQuillan, Luke: *I know. So many people trying to pick up like skinks and little lizards, cuz, you see all the time on YouTube or whatever people will try to pick them up and yeah.*

Lennon, Ox: Then I've seen news articles where people like running over Seagulls. Seagulls get a lot of abuse, even though they're endangered or they are threatened. Were you asking personal stuff or, seeing stuff from the news counts as well?

McQuillan, Luke: *Both*

Lennon, Ox: People running over seagulls at the beach. That's what comes to mind?

McQuillan, Luke: *Do you think there is an issue with specific laws or law enforcement and finding people or anything like that? with enforcement things, a lot of people think that there is difficulty with actually enforcing laws or getting fees to people and things like.*

Lennon, Ox: Yeah, and doc used to have. I can't remember the title they had for it, but it was a unit that was investigating Wildlife smuggling and like lizards one of their threats is poaching from the wild and selling on the black market and they used to have a unit that's job was investigating. That sort of started and it got defunded, so there's nothing that investigates that kind of thing, so unless it stumbles across your lap, I don't think there's anything trying to prevent that? So that's probably the thing that comes to mind.

McQuillan, Luke: *Yeah, I think that's actually a specific recurring problem. They just decreased funding and then they have to stop programs.*

Lennon, Ox: So there's like there might be action taken if it's like... The example here was ages ago now that, like, someone was discovered on a flight out of New Zealand with lizards in their underpants, and there was another example of an ice cream container that was found hidden in the potato gardens in Christchurch. If that kind of thing happens where it's incidentally discovered there's sort of attempt at prosecution, but there's nothing to look for those crimes happening to try and solve them.

Ford, Gavin: *Is poaching lizards in the wild a large issue?*

Lennon, Ox: For lizards, it's one of their threats. It's probably the third one after habitat destruction, and predation. It's more of a threat to lizards than on the wildlife in New Zealand because they're easier to smuggle because they're so small and people want to buy them, more so than people want to buy birds and stuff. People are into collecting them, and they live a really long time, New Zealand lizards. So people were interested in buying them and keeping them.

McQuillan, Luke: *Are you aware of any current educational efforts made by Zoo or your organization to help inform the public of issues regarding human-wildlife conflict or how to properly*

act around animals?

Lennon, Ox: Yeah, there is and maybe we should go back. Another human-wildlife conflict in Wellington, specifically, is people feeding Kaka, feeding them inappropriate food that causes cross-beak. Did you hear of this?

McQuillan, Luke: *No*

Lennon, Ox: If they get fed the wrong kind of food, like human food that's got the wrong kind of nutrients, then the babies of those ones are born with metabolic bone disease, and they're born with... or the adult also can get it too, but definitely effects the babies, and they get born with their bones are soft, and they're bent, and the beaks can be like this, so they can't really eat. So that is happening in Wellington, because people feed the kaka. They're not trying to attack the animals or anything. They like them but that causes problems for them. So there is a Wellington Zoo, Zealandia. I think just those two have collaborated on messaging around not feeding Kaka or not, feeding birds in general. But kaka are the worst ones for it, I think yeah. Yeah, aside from that, we don't have really specifically targeted messages about human-wildlife conflict.

McQuillan, Luke: *Do you think there is room for improvement in that?*

Lennon, Ox: I think that in Wellington, that's a message that is important because it's actually something that's happening. Would you count... What would you think about pet cats?

McQuillan, Luke: *We've looked into quite a bit of that with cats and dogs and their issues. Do you think that's a problem that needs more?*

Lennon, Ox: I just wonder if it falls into your definition of human-wildlife conflict.

McQuillan, Luke: *Yeah, it's cats and pets too.*

Lennon, Ox: That's a big part of human-wildlife conflict in Wellington then. Because people let their pet cats roam. That's like the most common way to tell a pet cat in New Zealand, so that's like a really big conflict for most of our native animals, I think pretty much all of them, because they all can be predated by cats. We have messages around keeping a pet cat inside. We call it Safe cat Safe wildlife. That message is shared by us and a bunch of other zoos because it came from a zoo and SPCA collaboration. Other orgs also have messaging around there, but they maybe have a specific campaign

that I'm aware of. SPCA sometimes asks you to keep them inside and sometimes not. They're got mixed messages on that.

McQuillan, Luke: Do you think that's been helpful with the zoos, or do you think there's more that should be done?

Lennon, Ox: I think it would be good if more people... I think if lots and lots of organizations really pushed that message, it would help change the culture a bit, and it's a social norm.

McQuillan, Luke: You think it's kind of limited right now some zoos and a few organizations?

Lennon, Ox: Yeah, I think it's seen as quite a controversial message in New Zealand, but I think SPCA could definitely be like cats should be kept inside. Cats should be contained on people's property.

Ford, Gavin: So, SPCA. They sometimes say that you should let your cat outside?

Lennon, Ox: If you go to their website they have a page that tells about keeping the cat inside and it's better for the cat, but it's not a big message for them, and I think that they aren't very happy for cats to be wrong. They're really consistent on messaging about desexing cats and about microchipping them, so they'll always be likely to catch the desex and microchip, but I don't think you'd find a cultural acceptance of cat inside messaging at SPCA across the whole org. So, I think there could be if councils, government, SPCA, vets, zoos, all these different organizations were all in agreement on that, and push that message a lot it could help change the culture. In New Zealand, dogs used to roam around a lot as well in lots of places and now I'm in cities, at least they're mostly contained, and the cultural shift for cats as well.

Ford, Gavin: Dogs seem to be a very big problem because they're not necessarily more aggressive, but get at more exotic birds especially with kiwi birds.

Lennon, Ox: Yeah, dogs are a problem for kiwi for sure, so anywhere that dogs can coincide with kiwi, dogs are a problem. But in Wellington City, for example, dog predation is not a big issue. Well actually, it is for korora, the little bit of penguins, so that's another, what human-wildlife conflict that's pet Focused. People keeping their dogs are on a lead at the Waterfront, and we have messaging around that here as well. A lot of people don't care to keep their dog only when they're walking out,

even in on-lead areas only. Dogs let off, and they don't understand that the dogs can kill penguins without them knowing about it. So, yeah. That's all over the country, I suppose. So korora and kiwi as far as I know, those are the two species that have the most danger from dog predation. The Kiwi are very vulnerable to that. Sorry, I keep jumping back to earlier questions.

***McQuillan, Luke:** Oh no, not at all. That's really great. But the last question we really have is: Are there any additional questions or comments you have for us? Or, things that you think could be done better?*

Lennon, Ox: I think you should have a more clear definition of what you mean by human-wildlife conflict. Think about what you're actually talking about. From my experience of human-wildlife conflict, I felt like it often means problems that wildlife causes for humans that then causes persecution of the animals.

***McQuillan, Luke:** I think that's what's mostly seen around the world. We've been looking into a lot of articles from what other organizations have done and they're all about animals destroying crops or houses or hurting people?*

Lennon, Ox: Yeah, you should think about how you define that okay. If you're talking about humans, causing problems for wildlife? There's heaps of stuff that falls under that. Like building houses, building roads, that's human problems for wildlife. Having pets without controlling your pets. It's hard to know where you're cutting off that stuff. Yeah, direct attacking Wildlife as well. What's the question? What DOC could do for human-wildlife conflict?

***McQuillan, Luke:** If you think that there is something where they, you were saying, how they used to have the task force.*

Lennon, Ox: Yeah, I can't remember what it's called. You can probably find it if you Google that.

***McQuillan, Luke:** Do you think like reinstituting, that would be a good idea?*

Lennon, Ox: Yes, I do, for sure. Because it looks like DOC are the only ones that could do that, I suppose. It's hard to tell Doc to do stuff when I know that they have not enough money to do anything. I think that other civil organizations could do more about respectable, responsible pet ownership. Councils could do more, I reckon, around pet control, for sure. Talking about that, are you

guys counting habitat destruction and stuff under human-wildlife conflict?

McQuillan, Luke: *Yeah, we're really considering everything that humans do to animals, so it's either indirect with someone's pets, and you could say that it's indirect with habitat loss.*

Lennon, Ox: A huge problem in this country, is that there's lots and lots of permitted activities of habitat destruction. That there's very little oversight of the effects that it has on wildlife. And it's often just like allowed with no understanding of the effects on wildlife and there is no mitigation or compensation or any remedy for the effects. You guys familiar with the resource management act?

Ford, Gavin: *Yes.*

Lennon, Ox: Under the resource management act, councils, regional councils, give permission for activities that don't destroy habitat. So, using this as an example again. I'll use an example from Wellington to explain. On the waterfront between Kilbirnie and the Airport. The council built a cycleway there, between the road and the water. And where that cycleway was built... So, the regional council gives permission for that sort of building. I think it was the city council that wanted to build it maybe or maybe the Regional Council, but whichever they gave permission to build that road. The council was responsible for giving the permission under the resource management act. The council employs an ecology team, and they were like, "oh, they'll be korora living there on the waterfront, so we should do a plan for korora management. Where we'll move the animals, or we'll create new habitat for them," that kind of thing, but none of them thought about lizards living there. There was no recompense for lizards. There was no looking for lizards. There was no lizard management plan, nothing. And, the council just gave a permit with no requirement for lizard management. That means the developer which I think might have been the council or might have been the city council. The developers were then allowed to just build that because they have a permit. They don't have any legal obligation to manage lizards at all. But my PhD colleague, Chris Woolley, he happened to be doing a study in that site, before they built it. He chose it for a site he was looking at Urban lizard populations, and he found a really, really thriving lizard population there, which is one of the few thriving lizard populations he found in any of the cities he looked at. But he knew that it was about to be completely demolished for this cycleway, so he let the council know, and they ended up doing a mitigation translocation for the lizards that were there. Elsewhere, my PhD was on the effects of mitigation translocation. There are not actually not very effective tools. They don't work

very well. The point of that is that if Chris had happened to have been doing his PhD study in that area, they would have just destroyed all that habitat. Without thinking about lizards at all and there would have been no legal repercussions for that. No one would have noticed. There's just all these holes in that whole process. That's happening all over the country. So, if there's no one at the regional council that happens to notice, happen to think about lizards, there's no remedy for them.

***McQuillan, Luke:** It's really surprising because I mean, when you think about New Zealand, you think of being environmentally conscious, but I do. Understand where that would come from because I think at least from a tourist perspective. When you think of New Zealand, you think more of birds and Marine Wildlife than you think of lizards. So I mean of course it's wrong that they're overlooked, but I feel like in my eyes, it kind of makes sense that they would be over some other animal.*

Lennon, Ox: Yeah, it's like a cultural thing, I think. But it's weird that even ecologists are not thinking about it. But it also shows that those problems with that legislation, it's like really the responsibility for... So there is a responsibility in legislation that any negative effects on the environment should be remedied, I think. I'd have to look at the exact words for it. I can't remember what it is. The legislation does say that that sort of thing shouldn't happen, but the responsibility for enforcing that has devolved to councils, and then there's no one checking if councils have done it. It's really convoluted and confusing legislation, and there's no oversight of where the councils have applied it correctly, really. Or very little oversight. I think there's like test cases for the environment for it and stuff like that, but that kind of thing just happens all over the place. So that's something that could be really fixed. The resource management Act, yeah.

***Ford, Gavin:** I guess there's no process to go through? Check these animals in these locations*

Lennon, Ox: The council would be the ones to say that needs to happen and if they don't say that, there's no one else going "did you do that? Did you say that those animals need to be checked," or whatever.

***McQuillan, Luke:** Our advisor, so he's a professor from our school that's here. He keeps on bringing out how the government has changed to be a conservative government now, and that's having large issues with funding and things like that for DOC. So, do you think that's like a large issue with this?*

Lennon, Ox: Yeah, for sure. I mean, DOC has always been underfunded but they're cutting

government funding includes DOC. They're also introducing legislation that is anti-environmental, and they explicitly are anti-environmental in many ways. Shane Jones, for example, his goodbye Freddie quote, if you've heard about that one. He was, like, "oh, if there's a frog in the way of our road that we want to build, then it's goodbye Freddie," like Freddie being a frog's name. It's like Freddo frogs, chocolate frogs from Australia. I don't know why is it Freddie? Maybe it's a French thing? That kind of thing you can look up goodbye Freddie and you'll find that quote, but he explicitly doesn't give a **** about animals specifically in the environment. And then there's plenty of legislation like Fast Track legislation, the regulatory standards bill is another one that they want to bring in that's about prioritizing personal property rights over environment, or anything. That's from the act party. A lot of the legislation that they're introducing is aimed at removing environmental protections.

Lennon, Ox: Yeah, I'm like, are there any other human-wildlife conflicts I can think of that come under your big umbrella? What other ones have you guys heard about?

McQuillan, Luke: *We focused originally on urbanization. Like just expansion, and issues that that has with wildlife. Then also like a lack of caring, so people intentionally harm animals, or just avoiding all the signs and all the information just doing what they want, and then also a lack of education, so people will try to interact with them in a way that they think is right but it's actually wrong. Now we're taking interviews, and we did a lot of surveys to understand what public perceptions are and how they differ from what DOC says. We're working with Brian Vayndell from DOC, and he talks about how people just really don't know how to act. One thing that's interesting is a lot of people say that they do know how to act around animals, it's kind of interesting to see that. And then, also we're looking at just how other people have worked to improve it. In most other places they have tons of predators, so it's more of an issue of people being attacked by animals. Just that kind of thing. We're probably going to focus on education because that's a large issue, and as college students, there's nothing we can really do about legislation. We can give recommendations, but we were talking to Brian the other day and saying, there's this whole issue with Doc and Regional councils being separate so they can't work together as much. I asked him if do you think there's a chance that we could find a way that the rangers from DOC and the regional councils could work together or something like that, and he said it in a perfect world it would be great, but it could never really happen.*

Ford, Gavin: *An issue that people brought up when we did a survey is the difference between council land and DOC land, it's kind of hard to know who to contact. Do you think that is an issue?*

Lennon, Ox: I guess. It's probably an issue if you're another person that wants to use the land somehow, but I don't know if it's a big problem for wildlife specifically. What would be the problem for wildlife?

McQuillan, Luke: *It's enforcement not so much that, but so people aren't are pretty incentive. People have brought in dead possum, and stuff like that or call DOC when it's the council's land, Regional Council's land, and they can't do anything then. You know, most people just connect any conservation thing with DOC and not with Regional Councils. Then things often take longer.*

Lennon, Ox: What can't DOC do?

McQuillan, Luke: *They can't enforce laws, or give people fines or anything if they're on Regional Council land.*

Lennon, Ox: Really? Aren't they responsible for the wildlife act wherever it is though?

McQuillan, Luke: *I think it's only their land. They're not allowed to have Rangers on Regional council land.*

Ford, Gavin: *There's some weird enforcement stuff around DOC enforcing. They don't have very many rangers that have actually been certified to enforce stuff.*

Lennon, Ox: Yeah, true. I thought of another human-wildlife conflict. Overfishing. White bait. They're endangered species. You're familiar with those quite a bit? They're fry of five different species of fish. People will catch them at their fry stage. It's a traditional food or whatever. People are really into it. But three of the five species are critically endangered or endangered, and there's rules about when you can catch them and stuff, but they get overfished for sure. And it's not good for those species that are endangered. I'm sure there's lots of other examples of overfishing, like people inside Marine reserves, or catching too many fish. For catching too many fish out on fishing boats. Oh, I'm sorry, something I can think of now that just comes to my mind now that I'm expanding it. Fishing tackle or line using inappropriate fishing gear on fishing boats that kills seabirds is another really big one. Especially albatross, and mollymawk, and those kinds of really long lived seabirds. That's a big

Wildlife conflict, and they put all those cameras on boats to try and stop that. Are you familiar with that? Because those animals, if they get killed in adulthood, that's really, really bad for the population because their natural state is to live a really, really long time and give birth rarely and not die until they're old. It's not normal for them to have mortality throughout their adulthood. Even a small amount of additional mortality to species like that can cause a decline. And also fishing can affect dolphins, and kill dolphins and making noise in the harbor can also kill dolphins and over fishing also kills the korora. Because they don't have any food.

***McQuillan, Luke:** I feel like that's all around the world, you know, fishing with nets especially. It just kills so many different things.*

Lennon, Ox: Using these lines that don't sink fast enough because diving Birds dive down and get them near the surface. And chucking out. Bits of fish that bring those birds that then get them caught on the lines. Abandoning fishing gear. We get plenty of seabirds here that have swallowed hooks and stuff like that, or they have been tangled up in nets and stuff.

***Ford, Gavin:** You do that stuff for wildlife here?*

Lennon, Ox: Yeah, we take wildlife patients, any native species except for tui. Because tui are really common in Wellington now. So if we just looked after the tui and we wouldn't have space for other species? And not black bill gulls because they're like pests. They're over population. You can just copy-paste that stuff up to the earlier question.

***McQuillan, Luke:** This has been really helpful and gave a lot of information. I mean, a lot of things, surprisingly, that other people haven't touched on, which is good. Thank you.*