

Appendix to the Department of Conservation Wild Animal Operational Research Plan 2026 to 2030: Research needs not included in the Wild Animal Operational Research Plan



Department of
Conservation
Te Papa Atawhai



**New Zealand
Government**
Te Kāwanatanga
o Aotearoa

Cover: A DOC staff member monitors vegetation condition in Fiordland. Photo: *Department of Conservation*

**Appendix to the Department of Conservation Wild Animal Operational Research Plan
2026 to 2030: Research needs not included in the Wild Animal Operational Research Plan**

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Introduction

The Department of Conservation Te Papa Atawhai (DOC) Wild Animal Research Plan 2026 to 2030 sets out where DOC will focus its wild animal operational research efforts through to 2030, to deliver measurable biodiversity gains from wild animal management on public conservation land. The plan outlines the research needs prioritised as having the most potential to improve DOC's wild animal management on public conservation land and support increased biodiversity gains. The research plan provides information on the process used to identify knowledge gaps and corresponding research needs, and how these were prioritised for inclusion in the plan.

This appendix sets out the research needs identified during the development of the research plan that were not prioritised for inclusion in the plan. This information may be used to inform future research planning beyond 2030 and support others to identify where they may wish to take the lead in wild animal research.

Wild animal research needs

Research needs are presented under three themes:

- distribution and population estimates
- monitoring impacts and outcomes
- control tools and methods.

The information provided for each research need includes the following:

- **target species** for the research (deer, chamois, goats, pigs, tahr)
- **management objectives** that each research need will contribute to most significantly:
 - eradication
 - suppression to low levels, to protect rare and vulnerable ecosystems and species
 - threats-led suppression, to prevent transformational change on a landscape level
 - containment and exclusion to prevent range expansion.

Distribution and population estimates

1. Investigate and/or refine new or existing tools and methods to measure absolute densities of deer

Current tools, such as faecal pellet or camera trap indices, provide an index of relative abundance and are not an absolute measure of wild animal density. While we already have methods testing underway that may help us address this (e.g., camera trap distance sampling), further work is recommended.

Target species	Management objective			
	Eradication	Suppression to low levels	Threats-led suppression	Containment & exclusion
Deer	✓	✓	✓	

2. Generate more accurate deer population growth models to improve population modelling

Generating more accurate deer population growth models would provide a helpful tool for predicting changes in deer numbers relative to control or environmental conditions in New Zealand. Much of what we know about deer population models comes from international research and may not reflect what is observed locally.

Target species	Management objective			
	Eradication	Suppression to low levels	Threats-led suppression	Containment & exclusion
Deer	✓	✓	✓	✓

3. Improve knowledge of dispersal of goats at different densities and habitats

Understanding dispersal and recolonisation mechanisms in wild goats is useful knowledge for control or eradication operations.

Target species	Management objective			
	Eradication	Suppression to low levels	Threats-led suppression	Containment & exclusion
Goats	✓	✓		✓

4. Undertake multi-species monitoring at sites where only one species is being controlled

Pre- and post-control monitoring inherently captures multi-species data when they are present, however, analysis of that data is usually only focused on the target species. Of interest would be how control of one species affects the distribution and behaviour of non-target species.

Target species	Management objective			
	Eradication	Suppression to low levels	Threats-led suppression	Containment & exclusion
Goats		✓	✓	
Deer		✓	✓	
Tahr		✓	✓	✓
Pigs	✓	✓	✓	

5. Improve knowledge of goat spatial habitat use

Improving knowledge of goat spatial habitat use is important for increasing the efficiency of control of goats in both open and closed habitats. Given goats' gregarious nature, they tend to be easier than other wild animal species to manage. This research may therefore be more relevant to the final stages of goat removal, to enable targeting of refugia where they are most likely to occur.

Target species	Management objective			
	Eradication	Suppression to low levels	Threats-led suppression	Containment & exclusion
Goats	✓	✓	✓	✓

6. Review and test tools for detection of pigs at low densities

We need to review and test detection probabilities of different monitoring tools for pigs at low densities. Because DOC only manages pigs at very few sites, pig detection tools are more useful in an eradication or incursion context. Early detection and removal of pigs at sites where they are controlled (e.g., eradications) is an important part of incursion management.

Target species	Management objective			
	Eradication	Suppression to low levels	Threats-led suppression	Containment & exclusion
Pigs	✓			✓

7. Improve knowledge on the rate of pig population increase after control effort ceases, under different circumstances

Improving knowledge on the rate of pig population increase after control effort stops is critical to determining the future of management regimes, for example, how frequently to revisit a site and undertake control following heavy suppression or removal.

Target species	Management objective			
	Eradication	Suppression to low levels	Threats-led suppression	Containment & exclusion
Pigs		✓	✓	✓

8. Improve knowledge of pig dispersal, habitat use and home range (with a focus on habitat preferences in different landscapes)

Improving knowledge of pig dispersal, habitat use and home range is important for delineating management areas, deploying targeted control tools (e.g., bait stations or traps) and determining reinvasion rates.

Target species	Management objective			
	Eradication	Suppression to low levels	Threats-led suppression	Containment & exclusion
Pigs	✓	✓	✓	✓

9. Improve knowledge of tahr dispersal mechanisms and rates into low-density and/or unoccupied areas

Improving knowledge of tahr dispersal mechanisms and rates into low-density or unoccupied areas is essential for the statutory containment of tahr within the defined feral range and control of populations outside the feral range. However, it would be challenging to deliver.

Target species	Management objective			
	Eradication	Suppression to low levels	Threats-led suppression	Containment & exclusion
Tahr	✓	✓	✓	✓

Monitoring impacts and outcomes

10. Develop density impact functions for chamois, deer, goats and tahr

Understanding density thresholds of wild animals is important for linking control to management outcomes, monitoring their impacts and conserving native biodiversity. However, we lack much of the fundamental knowledge required to develop density impact functions for most wild animal species in New Zealand. Density impact functions may be developed once we have addressed prerequisite knowledge gaps, such as research needs 1 to 4, 6, 9 and 10 in the Wild Animal Operational Research Plan.

Target species	Management objective			
	Eradication	Suppression to low levels	Threats-led suppression	Containment & exclusion
Chamois		✓		
Deer		✓	✓	
Goats		✓	✓	
Tahr		✓	✓	

11. Monitor impacts of pigs on fauna (including abundance index, damage metric and outcomes)

While there are scattered New Zealand case studies of pig impacts on fauna, this knowledge requires thorough review to determine if and where monitoring is required.

Target species	Management objective			
	Eradication	Suppression to low levels	Threats-led suppression	Containment & exclusion
Pigs	✓	✓	✓	

12. Monitor impacts of pigs on vegetation structure and composition

As with research need 10 above, monitoring the impacts of pigs on vegetation structure and composition first requires a thorough review to determine if and where monitoring is required. The feral pig disturbance method in the DOC Monitoring and Insights Toolbox could have some field testing planned to answer this question.

Target species	Management objective			
	Eradication	Suppression to low levels	Threats-led suppression	Containment & exclusion
Pigs		✓	✓	

13. Capture data needed to develop density impact functions for pigs on flora and fauna

Important knowledge prerequisites, such as those identified in research needs 10 and 11, are needed to develop density impact functions. Discrete research projects may be useful but should first be determined through a systematic review of existing knowledge.

Target species	Management objective			
	Eradication	Suppression to low levels	Threats-led suppression	Containment & exclusion
Pigs		✓	✓	✓

Control tools and methods

14. Develop more cost-effective control tools for deer

The cost effectiveness of the (very limited) deer control DOC undertakes can be assessed through better procedures for recording and reporting control data. Systems are being implemented to allow more accurate control costs to be determined, and from here improvements can be made to the tools for delivery.

Target species	Management objective			
	Eradication	Suppression to low levels	Threats-led suppression	Containment & exclusion
Deer	✓	✓	✓	✓

15. Develop more cost-effective tools for control of goats

The cost effectiveness of the goat control DOC undertakes can be assessed through better procedures for recording and reporting control data. Systems are being implemented to allow more accurate control costs to be determined, and from here improvements can be made to the tools for delivery.

Target species	Management objective			
	Eradication	Suppression to low levels	Threats-led suppression	Containment & exclusion
Goats	✓	✓	✓	✓

16. Improve knowledge of the cost effectiveness of different control tools for deer and goats at different densities (e.g., at different stages of eradication or suppression)

As with research needs 13 and 14, we need more streamlined and timely reporting on control operations, including eradications, so we can draw on that knowledge for future operations. This will enable us to plan and implement control methods and tools to maximise their cost effectiveness at varying densities.

Target species	Management objective			
	Eradication	Suppression to low levels	Threats-led suppression	Containment & exclusion
Deer	✓	✓	✓	✓
Goats	✓	✓	✓	✓

17. Improve tahr control tools and their detection probabilities in forested habitats, especially at low densities

The Tahr Programme spends a significant amount of time and cost controlling tahr outside the feral range, predominantly in forested areas. Conventional control tools (e.g., thermal aerial control) are not always suitable in forests. Improving knowledge of control tools for tahr and their detection probabilities in different forest types is also applicable to other ungulate species.

Target species	Management objective			
	Eradication	Suppression to low levels	Threats-led suppression	Containment & exclusion
Tahr	✓	✓	✓	✓

18. Improve knowledge of the cost effectiveness of different control tools for tahr at different densities (e.g., at different stages of eradication)

We have a good understanding of the cost effectiveness of tahr in alpine areas, because helicopter control is much more suitable than ground hunting. The cost effectiveness of controlling tahr at different densities in forests is still a knowledge gap. Most tahr populations outside the legal feral range are in forests and have historically been challenging to control. We have yet to successfully eradicate any outlying tahr populations from forests. This research gap is dependent on first understanding how tahr use forests, as highlighted in research need 16 above and research need 4 in the Wild Animal Operational Research Plan.

Target species	Management objective			
	Eradication	Suppression to low levels	Threats-led suppression	Containment & exclusion
Tahr	✓	✓	✓	✓

19. Review and test current control tools for pigs and scope new ones

Literature reviews and field trials with population-level results monitoring are needed to improve knowledge of the cost-effective application of, and pig responses to, traditional and new pig control tools. This is needed at different spatial scales and pig densities, in different habitats and times of year, considering the temporal sequencing of tools at different points on the passive-aggressive spectrum. This work will inform the creation of pig control best practice to guide DOC and external decision-making and maximise pig control results.

Target species	Management objective			
	Eradication	Suppression to low levels	Threats-led suppression	Containment & exclusion
Pigs	✓	✓	✓	✓