

## Supplementary Materials

**Appendix S1.** Study site descriptions and design of assessments of deer mortality in 26 operations using aerial 1080 in cereal baits.

Operation name	Location	Area treated (ha)	Habitat type	Month/year baited	Deer species	Deer assessment methods
Orongorongo	41°21' S 174°58' E	3817	1	06/1999	Red	Faecal pellet counts and incidental observations of dead deer
Wainuiomata	45°16' S 170°45' E	3556	1	06/1999	Red	Faecal pellet counts and incidental observations of dead deer
Blue Mountains	45°56' S 169°23' E	6400	2	08/2001	Fallow	Radio-collared deer (n = 3), double carcass searches (mark-recapture), hunter kill-rates
Waianakarua	45°16' S 170°45' E	c. 4000	1	06/2002	Red	Carcass searches by hunters over 47 ha
Waipunga	38°52' S 176°32' E	21000	1	08/2005	Red	Live deer seen, faecal pellet counts, footprint counts, double carcass searches (mark-recapture)
Caples 2006	44°53' S 168°17' E	1900	3	10/2006	Fallow	Carcass searches along transects 100 m apart (c. 90 km total)
Caples 2009	44°53' S 168°17' E	1900	3	08/2009	Fallow	Carcass searches along c. 4 km of transect plus incidental observations
Lake McRae: broadcast	42°11' S 173°20' E	9762	4	11/2008	Red	Live deer seen, incidental ground and aerial observations of carcasses
Lake McRae: cluster sowing	42°11' S 173°20' E	7658	4	11/2008	Red	Live deer seen, incidental ground and aerial observations of carcasses
Isolated Hill: broadcast	41°54' S 173°59' E	1213	3	10/2009	Red	Live deer seen, incidental carcass observations
Isolated Hill: cluster sowing	41°54' S 173°59' E	1384	3	10/2009	Red	Live deer seen, incidental carcass observations
Waitutu	46°13' S 167°09' E	25000	1	10/2010	Red	Carcass searches for non-target species over c.2000 ha
Tihoi 3B: broadcast	38°44' S 175°33' E	13811	1	05–08/2011	Red	Faecal pellet counts, track counts, live deer seen, double carcass searches (mark-recapture), incidental observations
Hauhungaroa AS3: strip-sown	38°44' S 175°37' E	2982	1	05–08/2011	Red	Faecal pellet counts, track counts, live deer seen, double carcass searches (mark-recapture), incidental observations
Hauhungaroa 2013: broadcast	38°37' S 175°36' E	10732	1	9–10/2013	Red	Comparison with previous trials, incidental observations
Hauhungaroa 2013: strip sown	38°43' S 175°30' E	4632	1	9–10/2013	Red	Comparison with previous trials, incidental observations
Lower Dart	44°42' S 168°19' E	3700	3	10/2006	White-tailed	About 50% of core area searched along transects 100 m apart (c. 18 km total)
Dart/Routeburn 2009	44°42' S 168°19' E	4450	3	08/2009	White-tailed	Search along 450 m long transects (c. 18 in Dart) plus incidental observations
Dart/Routeburn 2014	44°42' S 168°19' E	10500	3	08/2014	White-tailed	Camera traps, live deer seen, double carcass searches (mark-recapture)
Abbey Rocks–Windbag	43°42' S 169°21' E	14500	3	10/2011	Red	Incidental observations of live deer along 18 rat monitoring transects (quarterly 2011–2015)
Abbey Rocks	43°42' S 169°21' E	15386	3	11/2014	Red	Incidental observations of live deer along 18 rat monitoring transects (quarterly 2011–2015)
Moeraki	43°44' S 169°14' E	29327	3	11/2013	Red	Incidental observations of live deer along 20 rat monitoring transects (quarterly 2011–2015)

Operation name	Location	Area treated (ha)	Habitat type	Month/year baited	Deer species	Deer assessment methods
Hauhungaroa–Tihoi	38°42' S 175°33' E	53000?	1	07/2016	Red	Camera traps, carcass searches in 29 89-ha areas
Molesworth	42°14' S 173°11' E	62000	4	10/2017	Red	Aerial carcass searches with mark-recapture, post-control aerial live deer counts
Timaru Creek	44°32' S 169°26' E	3754	5	06/2018	Red	Trail camera monitoring, incidental observations
Upper Awatere	42°05' S 173°22' E	9447	4	06/2019	Red	Radio-collared deer (n = 11)

Habitat types: 1 = Podocarp-hardwood forest, 2 = Beech forest and exotic pines, 3 = Beech-podocarp forest, 4 = Grassland-shrub, 5 = Beech forest-alpine grassland-shrub

**Appendix S2.** Operational protocols for aerial 1080 baiting projects using cereal RS5 (short field-life) or Wanganui No. 7 (W 7) (longer field-life) baits. The toxic loading for all operations was 0.15% 1080 weight for weight. Cinnamon was used as a lure in all but the 2011 Tihoi operations where orange lure was used.

Operation name	Years since previous aerial baiting. NP = not previously poisoned	Pre-fed	Toxic bait size (g)	Bait type	Sowing rate (kg ha <sup>-1</sup> )	Sowing type 1 = broadcast 2 = aggregated	Area searched for carcasses (ha)	References (all DOC references except for DOC (2008) are operational reports on the EPA website)
Orongorongo	NP	No	10		3.1	1	NA	Meenken & Sweetapple (2000)
Wainuiomata	NP	Yes	10		3.1	2	NA	Meenken & Sweetapple (2000)
Blue Mountains	NP	Yes	6	RS5	2.0	1	358	Nugent & Yockney (2004)
Waianakarua	NP	Yes	12		2.0	1	47	Lorigan et al. (2002)
Waipunga	NP	Yes	12	W7	2.0	1	1446	Morriss et al. (2006)
Caples 2006	NP	Yes	6?		2.0	1	c. 950	DOC (2008)
Caples 2009	3	Yes	6		1.0	1	c. 100	EPA (2019)
Lake McRae; broadcast	NP?	No	6	RS5	2.5	1	NA	EPA (2019), Nugent et al. (2009)
Lake McRae: cluster sowing	NP?	No	6	RS5	1.0	2	NA	EPA (2019), Nugent et al. (2009)
Isolated Hill: broadcast	8, 12, 16	Yes	6	RS5	3.0	1	NA	Nugent & Morriss (2010)
Isolated Hill: cluster sowing	8, 12, 16	Yes	6	RS5	0.25	2	NA	Nugent & Morriss (2010)
Waitutu	NP	Yes	12	RS5	2.0	1	2000	EPA (2019), C. Bishop (pers. comm.)
Tihoi 3B: broadcast	6, 11, 17	Yes	12	W7	1.5	1	326	Nugent et al. (2012)
Hauhungaroa AS3: strip sown	6, 11, 17	Yes	12	W7	0.7	2	326	Nugent et al. (2012)
Hauhungaroa 2013: broadcast	2, 8, 13, 19	Yes (× 2)	12	RS5	1.5	1	NA	Morriss et al. (2014)
Hauhungaroa 2013: strip sown	2, 8, 13, 19	Yes	6	RS5	0.5	1	NA	Morriss et al. (2014)
Lower Dart	NP	Yes	6?		2.0	1	c.1300	DOC (2008)
Dart/Routeburn 2009	3, 8	Yes	6		1.0	1	c. 50	EPA (2019)
Dart/Routeburn 2014	3	Yes	6	RS5	1.0	1	400	McBrearty (2015)
Abbey Rocks–Windbag	2	Yes	6 or 12	RS5	1.0	1	NA	EPA (2019), Malham et al. (2019)
Abbey Rocks (2019)	5	Yes	6	RS5	1.0	1	NA	EPA (2019), Malham et al.
Moeraki (2019)	3	Yes	6 or 12	RS5	1.0 or 2.0	1	NA	EPA (2019), Malham et al.
Hauhungaroa –Tihoi	3, 5, 6, 11, 17	Yes (× 2)	6	RS5	1.5	1	29 x 89	Nugent et al. (2017)
Molesworth	9, 11 or NP	Yes	6	RS5	2.0	1	29800	Morriss et al. (2018), Pinney (2019)
Timaru Creek	NP	Yes	12	RS5	2.0	1	NA	Morriss & Nugent (2018)
Upper Awatere	6	Yes	6	RS5	2.0	1	NA	Morriss et al. (2019)

**Appendix S3.** Numbers of photographs of live red deer, by sex-age class, recorded at camera traps over 3 months immediately before and 3 months immediately after aerial 1080 baiting, Timaru Creek, 2018. The relative reduction is the reduction in the number of deer detections in the poisoned area, taking into account the presumed natural reductions in visitation rate in a nearby un-poisoned area of similar habitat. Derived from Morriss and Nugent (2018).

	Poisoned area		Non-poisoned area		Relative reduction
	No. pre-poisoning	No. post-poisoning	No. pre-poisoning	No. post-poisoning	
Adult males	162	8	71	41	88.5%
Adult females	231	8	76	52	94.9%
Young deer	242	7	125	71	94.9%
<b>All</b>	<b>635</b>	<b>23</b>	<b>272</b>	<b>164</b>	<b>93.9%</b>

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