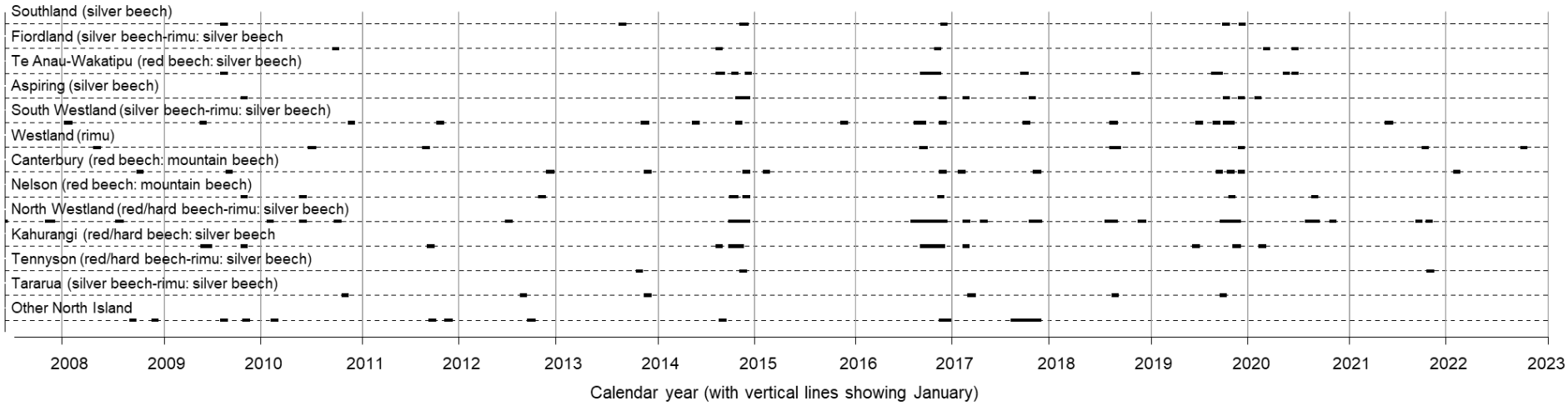
Supplementary material, Walker et al. Effects of aerial 1080 operations on rodent and mustelid tracking rates on New Zealand's conservation land.

Appendix S1. Dates of aerial 1080 management operations in different regions and the frequency distribution of operations across calendar months.

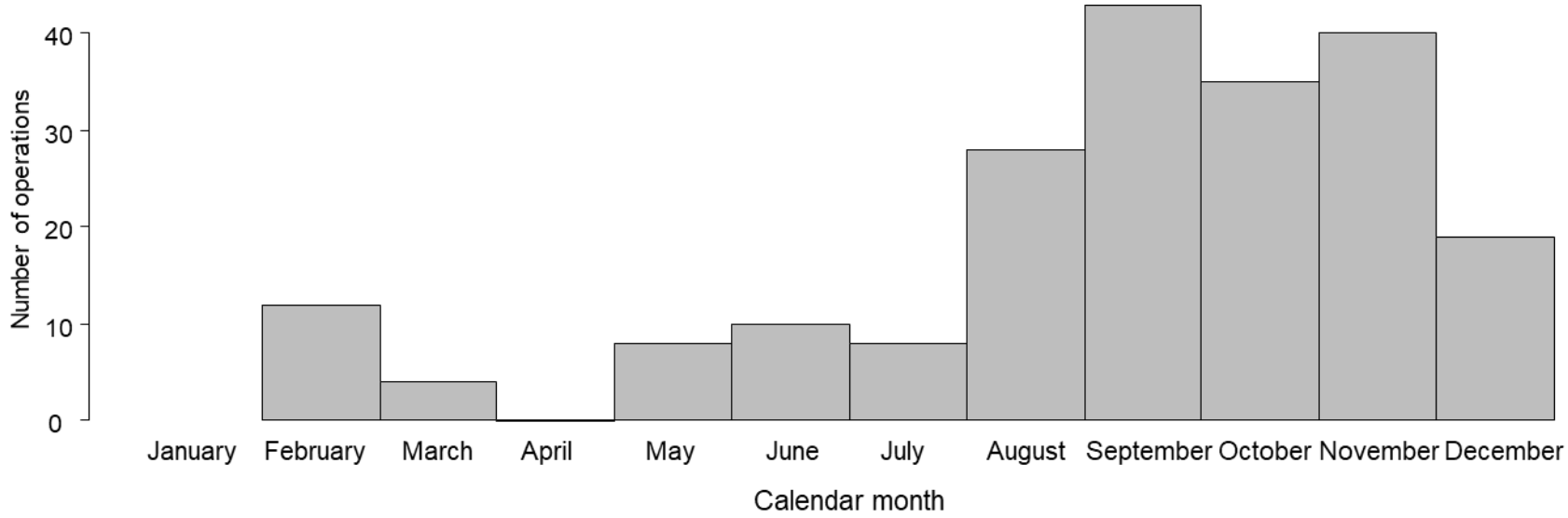
In Appendix S1, Panel (a) shows the dates (black symbols) on which an aerial 1080 operation affecting monitored tracking tunnels was undertaken on conservation land in 13 regions between mid 2007 and late 2022. Vertical grey lines show the January of each calendar year. The figure shows that high numbers of operations were undertaken in the later months of 2014, 2016 and 2019, following beech mast events. However, operations were also undertaken in other years, for example to respond to regionally localised beech and rimu (*Dacrydium cupressinum*) mast events, or to coincide with the vulnerable life stages of indigenous species, or on a rotational basis to protect forest canopies from possum browse.

Panel (b) shows the frequency distribution of aerial 1080 operations between mid 2007 and late 2022 across the 12 months of the year.

(a)



(b)


Number of operations
0
10
20
30
40
January
February
March
April
May
June
July
August
September
October
November
December
Calendar month

Supplementary material, Walker et al. Effects of aerial 1080 operations on rodent and mustelid tracking rates on New Zealand's conservation land.

Appendix S2. Numbers of unique records in the dataset from tracking tunnels in different elevation zones in each rodent year.

Appendix S2 shows numbers of unique records in the dataset from tracking tunnels in different elevation zones (in m asl) (columns) in each rodent year (1 October to 30 September) (rows) from 1998 to 2022.

	0 to 200	**200 to 400**	**400 to 600**	**600 to 800**	**800 to 1000**	**1000 to 1200**	**1200 to 1400**	**1400 to 1600**
1998	-	-	10	32	5	-	-	-
1999	17	74	101	10	-	-	-	-
2000	-	176	276	-	-	-	-	-
2001	-	172	311	81	-	-	-	-
2002	681	209	599	873	118	9	-	-
2003	1,936	825	1,102	1,352	180	11	-	-
2004	2,095	866	1,141	2,332	524	12	-	-
2005	2,169	1,607	1,775	3,418	1,064	7	-	-
2006	2,994	5,596	7,058	5,623	2,049	12	-	-
2007	3,217	6,749	7,156	5,221	1,584	365	77	-
2008	2,963	4,249	4,557	4,242	1,153	228	89	-
2009	2,878	5,308	8,377	7,251	2,471	459	29	-
2010	3,861	5,743	8,062	6,709	1,975	239	39	-
2011	5,656	6,277	7,891	7,866	2,501	713	90	-
2012	4,903	4,983	7,335	6,717	2,301	568	63	-
2013	5,955	4,639	5,854	5,387	2,379	659	73	-
2014	6,635	7,621	9,516	8,651	4,018	1,276	444	9
2015	5,633	7,584	9,691	8,937	4,311	1,367	516	16
2016	6,929	8,790	10,716	11,574	8,393	3,949	1,292	26
2017	7,075	7,507	9,542	10,466	8,427	3,908	1,153	20
2018	5,784	5,898	7,615	9,110	7,462	3,403	839	23
2019	6,764	8,821	10,318	10,447	9,237	5,027	1,498	26
2020	5,448	7,225	7,911	8,630	7,704	4,886	1,577	23
2021	5,769	5,680	6,279	6,436	5,668	3,108	604	14
2022	3,850	2,887	3,115	3,288	3,177	1,810	374	-

Supplementary material, Walker et al. Effects of aerial 1080 operations on rodent and mustelid tracking rates on New Zealand's conservation land.

Appendix S3. Number of unique records in the dataset from tracking tunnels in different zones of mean annual temperature in each rodent year.

Appendix S3 shows numbers of unique records in the dataset from tracking tunnels in different zones of mean annual temperature (MAT) (in ℃) (columns) in each rodent year (1 October to 30 September) (rows) from 1998 to 2022.

	4 to 5℃	**5 to 6℃**	**6 to 7℃**	**7 to 8℃**	**8 to 9℃**	**9 to 10℃**	**10 to 11℃**	**11 to 12℃**	**12 to 13℃**	**13 to 14℃**	**14 to 15℃**
1998	-	-	-	-	5	4	31	7	-	-	-
1999	-	-	-	32	105	65	-	-	-	-	-
2000	-	-	-	-	340	112	-	-	-	-	-
2001	-	-	-	-	333	174	38	19	-	-	-
2002	-	-	27	78	437	672	979	296	-	-	-
2003	-	-	35	228	890	1,325	2,170	758	-	-	-
2004	-	-	44	535	2,015	1,391	2,238	749	-	-	-
2005	-	-	34	1,151	3,503	2,226	2,170	764	5	178	16
2006	-	-	57	2,478	9,019	6,483	3,036	1,085	285	829	83
2007	-	59	222	2,049	9,352	6,399	4,160	1,139	705	332	-
2008	-	67	197	1,582	6,857	4,656	2,501	1,228	276	155	-
2009	-	18	270	2,882	11,633	7,647	2,633	1,533	164	30	-
2010	-	32	343	2,179	9,237	8,791	3,596	2,029	295	124	19
2011	-	89	677	2,601	9,255	9,655	5,072	2,490	421	663	99
2012	-	75	623	2,396	7,939	8,359	4,889	2,000	208	354	40
2013	-	70	514	2,340	6,617	7,641	5,090	2,042	307	306	34
2014	4	577	1,392	4,426	12,088	12,250	5,217	1,882	339	-	-
2015	2	525	1,510	4,512	11,690	12,423	5,024	1,840	485	52	-
2016	4	1,316	4,953	9,101	13,956	12,711	6,106	2,884	589	52	-
2017	11	1,510	5,811	8,926	11,978	10,537	5,696	2,742	781	104	-
2018	12	1,016	4,188	7,483	11,058	8,742	4,280	2,564	794	-	-
2019	14	1,696	6,167	9,900	13,668	11,839	5,698	2,433	727	-	-
2020	6	1,641	5,632	8,492	11,486	9,701	4,118	1,635	702	-	-
2021	4	914	4,071	6,348	9,005	8,540	2,806	1,239	635	-	-
2022	2	601	2,273	3,531	4,774	4,966	1,355	597	401	-	-

Supplementary material, Walker et al. Effects of aerial 1080 operations on rodent and mustelid tracking rates on New Zealand's conservation land.

Appendix S4. Predictor variables included in boosted regression tree models, showing the range of values along with units of measurement.

In the Appendix S4 the range of values represented is shown in parentheses in column 1 along with units of measurement. The type of variable (column 2) is either binary factor, factor, numeric or integer, and the number of classes in multilevel factors is also shown where relevant. Sources of information are identified in column 3.

Predictor variable	Variable type	Source or reference	Rat track model	Mouse tracks	Mustelid tracks	Sampling frequency
Geographic region						
Region	Factor (17 classes)	This paper	+	+	+	
Timing						
Rodent year (1 October to 30 September)	Factor (1998 to 2022)	Tracking database (DOC, unpublished data)	+	+	+	
Season	Factor (4 classes: Spring, Summer, Autumn, Winter)	Tracking database (DOC, unpublished data)	+	+	+	
Setting period	Factor (5 classes: 1,3,7,14, or 21 days)	Tracking database (DOC, unpublished data)	+	+	+	
Environment[1]						
July ground frost (3.0 to 27.9 °C)	Numeric	McCarthy et al. (2021)	+	+		+
Mean annual temperature[2] (4.7 to 14.4 °C)	Numeric	McCarthy et al. (2021)	+	+	+	+
Mean annual rainfall (749 to 7,962 mm)	Numeric	McCarthy et al. (2021)	+	+	+	+

[1] All climate layers sourced from McCarthy et al. (2021) were originally derived from the Land Environments of New Zealand (LENZ; Leathwick et al. 2003) or from additional climate layers developed by Landcare Research for that product (cited as Landcare Research, unpublished data, 2003) or other projects (cited as Landcare Research, unpublished data, 2013 and 2015). Each climate layer is an interpolated mathematical surface (thin-plate spline) fitted using information about the climate, location and elevation of a number of meteorological stations. Temperature and rainfall data estimates used to derive the environmental data layers were collected at meteorological stations over the period from 1950 to 1980, while data describing humidity and solar radiation consisted of averages of all data collected up until 1980.

[2] Over the period from 1950 to 1980. Note that between 1972 and 2022 there was a median increase in average annual temperature of 0.19°C per decade (Statistics New Zealand 2023).

Supplementary material, Walker et al. Effects of aerial 1080 operations on rodent and mustelid tracking rates on New Zealand's conservation land.

Predictor variable	Variable type	Source or reference	Rat track model	Mouse tracks	Mustelid tracks	Sampling frequency
Rainfall to potential evapotranspiration ratio (20 to 245)	Numeric	McCarthy et al. (2021)	+	+		+
Annual Penman moisture deficit (0 to 393 mm)	Numeric	McCarthy et al. (2021)	+	+	+	+
October vapour pressure deficit (0 to 47 kPa)	Numeric	McCarthy et al. (2021)	+	+		+
Beech stems per hectare[3] (0 to 330)	Numeric	Landcare Research, unpublished data, 2015 (100 m)	+	+	+	+
Ecosat forests class	Factor (12 classes[4])	Shepherd et al. (2005)				+
Land element	Factor (10 classes[5])	Landcare Research, unpublished data, 2013 (100 m)	+	+		+
Elevation (0 to 1,422 m asl)	Numeric	McCarthy et al. (2021)				+
Mean annual solar radiation (11.8 to 15.4 MJ/m^2/day)	Numeric	Landcare Research, unpublished data (2003)				+
Management						
Days since last 1080 operation (0 to 2554)	Numeric	DOC management database (DOC, unpublished data)	+	+	+	
Number of previous 1080 operations (0 to 9)	Numeric	DOC management database (DOC, unpublished data)	+	+	+	
Rodents tracked						

[3] Stems >30cm dbh per hectare, where dbh = diameter of tree at breast height, predicted by a BRT model which used data from the LUCAS (the New Zealand Land-Use and Carbon Analysis System) natural forest plots (MFE 2010).

[4] The typology is derived from canopy spectral characteristics: 1. Subalpine scrub, 2. Coastal forest, 3. Kauri forest, 4. Podocarp forest, 5. Podocarp-broadleaved forest, 6. Beech forest, 7. Broadleaved forest, 8. Podocarp-broadleaved / Beech forest, 9. Beech / Broadleaved forest, 10. Beech / Podocarp-broadleaved forest, 12. Unspecified indigenous forest, 14. Other.

[5] Based on classification of landform elements from a digital elevation model (J. Barringer, Manaaki Whenua – Landcare Research, unpublished data, 2013): 1. Ridge, 2. Shoulder, 3. Valley, 4. Footslope, 5. Backslope, 6. Channel, 7. Hollow, 8. Spur, 9. Terrace, 10. Plateau.

Predictor variable	Variable type	Source or reference	Rat track model	Mouse tracks	Mustelid tracks	Sampling frequency
Ship rats tracked	Binary factor (0/1)	Tracking database (DOC, unpublished data)		+		

References

Leathwick J, Morgan F, Wilson G, Rutledge D, McLeod M, Johnson K 2003. Land environments of New Zealand: a technical guide. Wellington, Ministry for the Environment. 237 p.

McCarthy JK, Leathwick JR, Roudier P, Barringer JR, Etherington TR, Morgan FJ, Odgers NP, Price RH, Wiser SK, Richardson SJ. New Zealand Environmental Data Stack (NZEnvDS): a standardised collection of spatial layers for environmental modelling and site characterisation. New Zealand Journal of Ecology 45(2): 3440. https://dx.doi.org/10.20417/nzjecol.45.31

MfE (Ministry for the Environment). 2010. Measuring carbon emissions from land-use change and forestry: the New Zealand land-use and carbon analysis system, INFO 527. Wellington: Ministry for the Environment.

Shepherd JD, Ausseil A-G, Dymond JR 2005. Ecosat Forests: a 1:750,000 scale map of indigenous forest classes in New Zealand. Manaaki Whenua Press, Lincoln.

Statistics New Zealand 2023. https://www.stats.govt.nz/indicators/temperature (accessed 13 September 2024).

Supplementary material, Walker et al. Effects of aerial 1080 operations on rodent and mustelid tracking rates on New Zealand's conservation land.

Appendix S5. Representation of tracking data in regions over time and intervals of days since the last aerial 1080 operation.

In Appendix 5, each column shows one of 15 intervals of days since the last aerial 1080 operation (**Days since 1080 interval**) and rows show 9 rodent years (2014 to 2022). "Predicted at" shows the number of days since the last aerial 1080 operation at which the prediction for that interval was made. An entry of '1' in a cell indicates that at least 10 tracking tunnel records were sampled within a named region, and within that interval of days since the last aerial 1080 operation, and within that rodent year.

Bold cell entries in the top row for each region show the total number of years in which >9 tracking tunnel records were available within each interval of days since the last aerial 1080 operation, within that region.

Predictions from the BRT models were not made for a region unless there were >9 tracking tunnel records within the same 2°C MAT zone within one of the first 14 intervals, and within the 15th interval (i.e. >2,372 days since the last aerial 1080 operation).

Days since 1080 interval	**0-34**	**35-68**	**69-137**	**138-228**	**228-319**	**320-456**	**456-639**	**640-821**	**821-1004**	**1005-1186**	**1186-1369**	**1370-1643**	**1643-2008**	**2009-2372**	**2372-9800**
Predicted at	**23**	**46**	**91**	**183**	**274**	**365**	**548**	**730**	**913**	**1095**	**1278**	**1460**	**1825**	**2190**	**2554**
Southland	**2**	**3**	**2**	**4**	**3**	**4**	**3**	**4**	**3**	**0**	**1**	**2**	**2**	**0**	**6**
2014	1	1		1	1	1						1	1		1
2015		1	1	1	1										1
2016						1	1								1
2017		1		1				1	1						1
2018							1	1			1				1
2019								1	1			1	1		1
2020	1		1	1	1	1									
2021						1	1								
2022								1	1						
Fiordland	**2**	**2**	**4**	**3**	**3**	**4**	**3**	**5**	**1**	**1**	**2**	**1**	**0**	**0**	**9**
2014		1									1	1			1
2015			1	1	1	1									1
2016						1	1	1							1
2017	1		1	1	1			1							1
2018						1	1	1							1
2019								1	1	1					1
2020	1	1	1	1							1				1
2021			1		1	1									1
2022							1	1							1

Supplementary material, Walker et al. Effects of aerial 1080 operations on rodent and mustelid tracking rates on New Zealand's conservation land.

Days since 1080 interval	**0-34**	**35-68**	**69-137**	**138-228**	**228-319**	**320-456**	**456-639**	**640-821**	**821-1004**	**1005-1186**	**1186-1369**	**1370-1643**	**1643-2008**	**2009-2372**	**2372-9800**
Predicted at	**23**	**46**	**91**	**183**	**274**	**365**	**548**	**730**	**913**	**1095**	**1278**	**1460**	**1825**	**2190**	**2554**
Te Anau-Wakatipu	**6**	**5**	**5**	**5**	**5**	**7**	**5**	**5**	**3**	**4**	**2**	**5**	**6**	**4**	**9**
2014	1	1										1	1		1
2015	1	1	1	1	1	1							1	1	1
2016	1					1	1	1						1	1
2017	1	1	1	1	1	1			1	1					1
2018			1	1	1	1	1	1		1	1	1			1
2019	1	1	1			1	1	1	1	1		1	1		1
2020	1	1	1	1	1	1				1	1	1	1	1	1
2021				1	1	1	1	1				1	1	1	1
2022							1	1	1				1		1
Aspiring-	**4**	**3**	**3**	**4**	**4**	**6**	**4**	**6**	**4**	**3**	**1**	**3**	**2**	**0**	**9**
2014												1	1		1
2015	1	1	1	1	1	1									1
2016						1	1	1							1
2017	1	1		1				1	1						1
2018	1		1	1	1	1	1								1
2019						1	1	1	1	1		1			1
2020	1	1	1	1	1	1		1	1	1					1
2021					1	1	1	1		1	1				1
2022								1	1			1	1		1
South Westland	**5**	**4**	**8**	**7**	**4**	**8**	**7**	**7**	**6**	**6**	**5**	**5**	**4**	**4**	**9**
2014	1	1	1	1	1	1		1	1	1				1	1
2015	1		1	1	1	1	1	1							1
2016	1	1	1	1		1	1	1							1
2017		1	1	1	1	1	1		1	1	1				1
2018		1	1	1		1	1	1	1		1	1	1		1
2019	1		1	1		1	1	1	1	1	1	1	1	1	1
2020	1		1	1	1	1	1	1	1	1	1	1	1	1	1
2021			1			1	1			1	1	1	1		1
2022								1	1	1		1		1	1

Days since 1080 interval	**0-34**	**35-68**	**69-137**	**138-228**	**228-319**	**320-456**	**456-639**	**640-821**	**821-1004**	**1005-1186**	**1186-1369**	**1370-1643**	**1643-2008**	**2009-2372**	**2372-9800**
Predicted at	**23**	**46**	**91**	**183**	**274**	**365**	**548**	**730**	**913**	**1095**	**1278**	**1460**	**1825**	**2190**	**2554**
Central Westland	**1**	**3**	**2**	**3**	**1**	**2**	**2**	**4**	**3**	**2**	**2**	**4**	**2**	**3**	**9**
2014									1	1	1	1		1	1
2015															1
2016												1	1	1	1
2017		1		1										1	1
2018							1	1							1
2019		1	1	1	1			1	1	1					1
2020		1				1	1				1	1			1
2021						1		1	1			1	1		1
2022	1		1	1				1							1
Nelson	**4**	**2**	**3**	**3**	**2**	**3**	**4**	**6**	**3**	**2**	**2**	**3**	**3**	**1**	**8**
2014	1					1	1	1			1	1			1
2015	1	1	1	1	1							1	1		1
2016	1					1	1	1							1
2017			1						1						1
2018							1	1		1	1				1
2019								1	1	1		1	1		1
2020	1	1	1	1	1								1	1	1
2021				1		1	1	1							
2022								1	1						1
Canterbury	**6**	**5**	**5**	**5**	**6**	**8**	**5**	**8**	**3**	**2**	**1**	**2**	**2**	**1**	**9**
2014	1	1		1	1	1	1	1				1	1		1
2015	1	1	1	1	1	1	1	1	1	1			1	1	1
2016					1	1	1	1			1	1			1
2017	1	1	1	1	1	1		1	1						1
2018		1	1	1	1	1				1					1
2019	1					1	1	1							1
2020	1	1	1	1	1	1		1							1
2021						1	1	1							1
2022	1		1					1	1						1

Days since 1080 interval	**0-34**	**35-68**	**69-137**	**138-228**	**228-319**	**320-456**	**456-639**	**640-821**	**821-1004**	**1005-1186**	**1186-1369**	**1370-1643**	**1643-2008**	**2009-2372**	**2372-9800**
Predicted at	**23**	**46**	**91**	**183**	**274**	**365**	**548**	**730**	**913**	**1095**	**1278**	**1460**	**1825**	**2190**	**2554**
North Westland	**9**	**6**	**6**	**7**	**6**	**7**	**6**	**6**	**6**	**5**	**5**	**7**	**5**	**4**	**9**
2014	1	1										1	1	1	1
2015	1	1	1	1	1	1									1
2016	1		1			1	1	1				1			1
2017	1	1	1	1	1	1		1	1	1		1	1		1
2018	1	1	1	1	1	1	1	1	1	1	1		1	1	1
2019	1	1		1	1	1	1	1	1	1	1	1	1	1	1
2020	1	1	1	1	1		1	1	1	1	1	1	1	1	1
2021	1		1	1	1	1	1	1	1	1	1	1			1
2022	1			1		1	1		1		1	1			1
Kahurangi	**6**	**4**	**5**	**4**	**4**	**6**	**5**	**4**	**4**	**4**	**2**	**5**	**3**	**1**	**7**
2014	1	1	1						1	1		1	1		1
2015	1		1	1	1	1									1
2016	1	1	1			1	1	1							1
2017	1	1	1	1	1	1		1	1	1					1
2018					1	1	1	1			1	1			1
2019	1	1		1			1	1	1	1		1	1		1
2020	1		1	1	1	1	1			1	1	1	1	1	1
2021						1	1					1			
2022									1						
Tennyson	**6**	**3**	**2**	**5**	**4**	**5**	**3**	**6**	**2**	**3**	**3**	**6**	**6**	**6**	**9**
2014	1			1	1										1
2015		1	1	1	1	1									1
2016						1	1	1							1
2017								1	1						1
2018										1	1	1			1
2019												1	1		1
2020													1	1	1
2021														1	1
2022	1														1
Tararua	**1**	**0**	**3**	**3**	**2**	**5**	**4**	**5**	**3**	**2**	**2**	**4**	**2**	**1**	**7**
2014			1	1		1	1	1							1
2015						1	1	1	1	1					1
2016								1	1	1	1	1			1
2017			1								1	1	1		1
2018					1	1	1					1	1	1	1
2019			1	1		1									1
2020	1			1	1										
2021						1	1	1				1			1
2022								1	1						

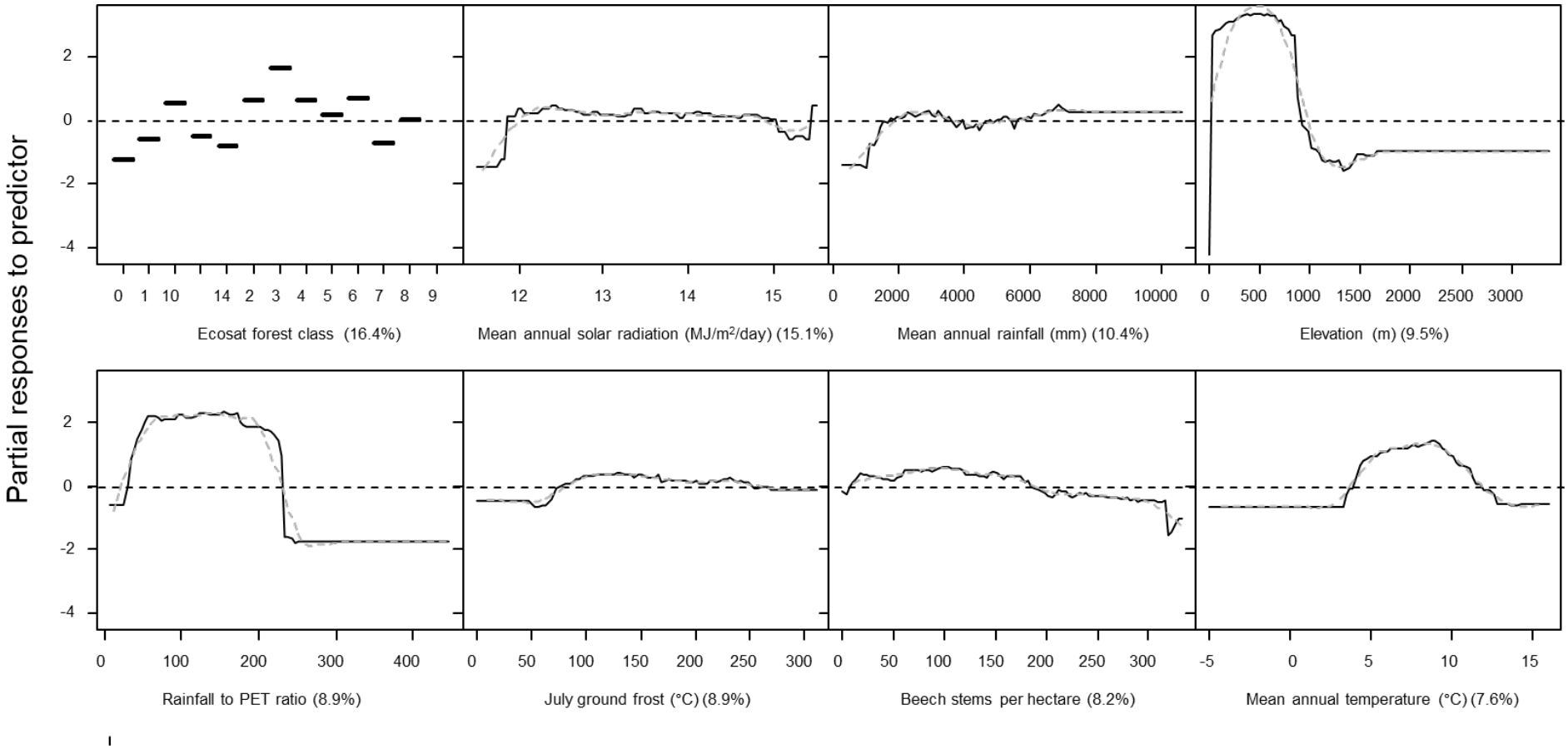
Days since 1080 interval	**0-34**	**35-68**	**69-137**	**138-228**	**228-319**	**320-456**	**456-639**	**640-821**	**821-1004**	**1005-1186**	**1186-1369**	**1370-1643**	**1643-2008**	**2009-2372**	**2372-9800**
Predicted at	**23**	**46**	**91**	**183**	**274**	**365**	**548**	**730**	**913**	**1095**	**1278**	**1460**	**1825**	**2190**	**2554**
Other North Island	**2**	**2**	**2**	**2**	**1**	**2**	**2**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**9**
2014								1	1	1			1		1
2015											1	1	1	1	1
2016	1											1		1	1
2017	1	1	1	1									1	1	1
2018		1	1	1	1	1	1								1
2019						1	1	1	1						1
2020								1	1	1					1
2021										1	1				1
2022												1			1
Other Northwestern South Island	**5**	**2**	**3**	**5**	**5**	**8**	**4**	**5**	**3**	**4**	**3**	**5**	**4**	**3**	**9**
2014	1										1	1	1		1
2015	1		1	1	1	1								1	1
2016						1	1	1						1	1
2017				1	1	1		1	1	1					1
2018	1		1	1	1	1	1	1			1	1			1
2019	1	1				1	1	1	1	1		1	1		1
2020	1		1	1	1	1				1	1	1			1
2021		1		1	1	1						1	1		1
2022						1	1	1	1	1			1	1	1
Other Northeastern South Island	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**
2014															1
2015															1
2016															1
2017															1
2018															1
2019															1
2020															1
2021															1
2022															1

Days since 1080 interval	**0-34**	**35-68**	**69-137**	**138-228**	**228-319**	**320-456**	**456-639**	**640-821**	**821-1004**	**1005-1186**	**1186-1369**	**1370-1643**	**1643-2008**	**2009-2372**	**2372-9800**
Predicted at	**23**	**46**	**91**	**183**	**274**	**365**	**548**	**730**	**913**	**1095**	**1278**	**1460**	**1825**	**2190**	**2554**
Other Southeastern South Island	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**9**
2014															1
2015															1
2016															1
2017															1
2018															1
2019		1													1
2020			1	1	1										1
2021						1	1								1
2022								1	1						1
Other Southwestern South Island															**2**
2016															1
2017															1

Supplementary material, Walker et al. Effects of aerial 1080 operations on rodent and mustelid tracking rates on New Zealand's conservation land.

Appendix S6. Partial dependence plots for the eight most influential variables in our in the BRT model of sampling frequency.

In Appendix S6, partial responses are fitted effects on the response after accounting for the average effects of all other variables. Relative influence of each variable in the model is show in parentheses in the horizontal-axis label. Vertical axes are on the logit scale of the link function in the model, centred to have zero mean (indicated by grey dashed horizontal lines) over the data distribution, and have identical ranges within each row. The final model had 16,700 trees, an interaction depth of 4, and a learning rate of 0.05.



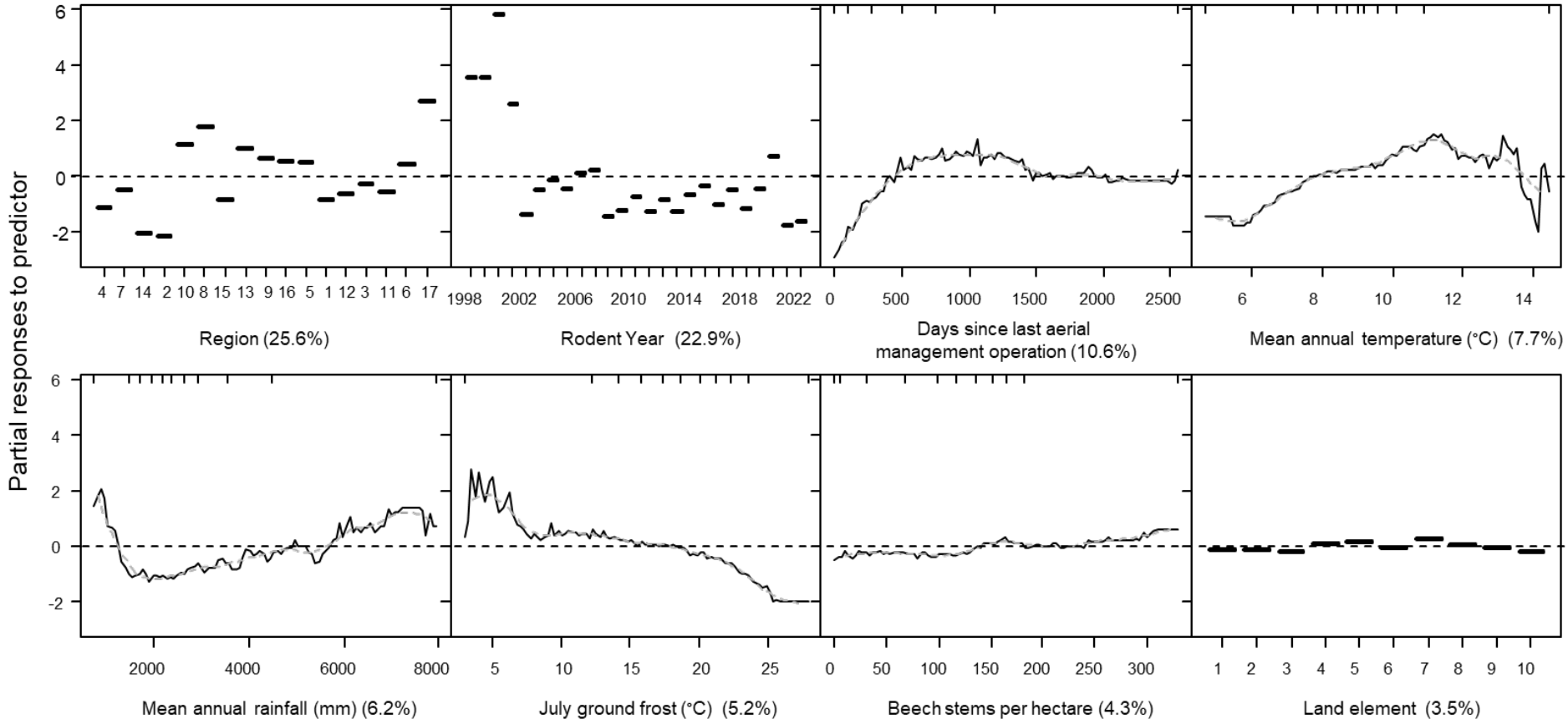
Appendix S7. Relative influence of variables in our model of sampling frequency.

Appendix S7 shows the relative influence (RI) of variables in our model of sampling frequency (cross validation correlation coefficient [cvCC] 0.86 ± 0.00). Predictions from this model were used to define a prediction grid which ensured that predictions were not made outside the environmental range of the data.

Variable	Relative Influence
Annual penman moisture deficit	3.4
Landscape element	5.1
October vapour pressure deficit	6.6
Mean annual temperature	7.6
Nothofagus stem density	8.2
July ground frost	8.9
Rainfall:potential evapotranspiration ratio	8.9
Elevation	9.5
Mean annual rainfall	10.4
Mean annual solar radiation	15.1
Ecosat forest class	16.4

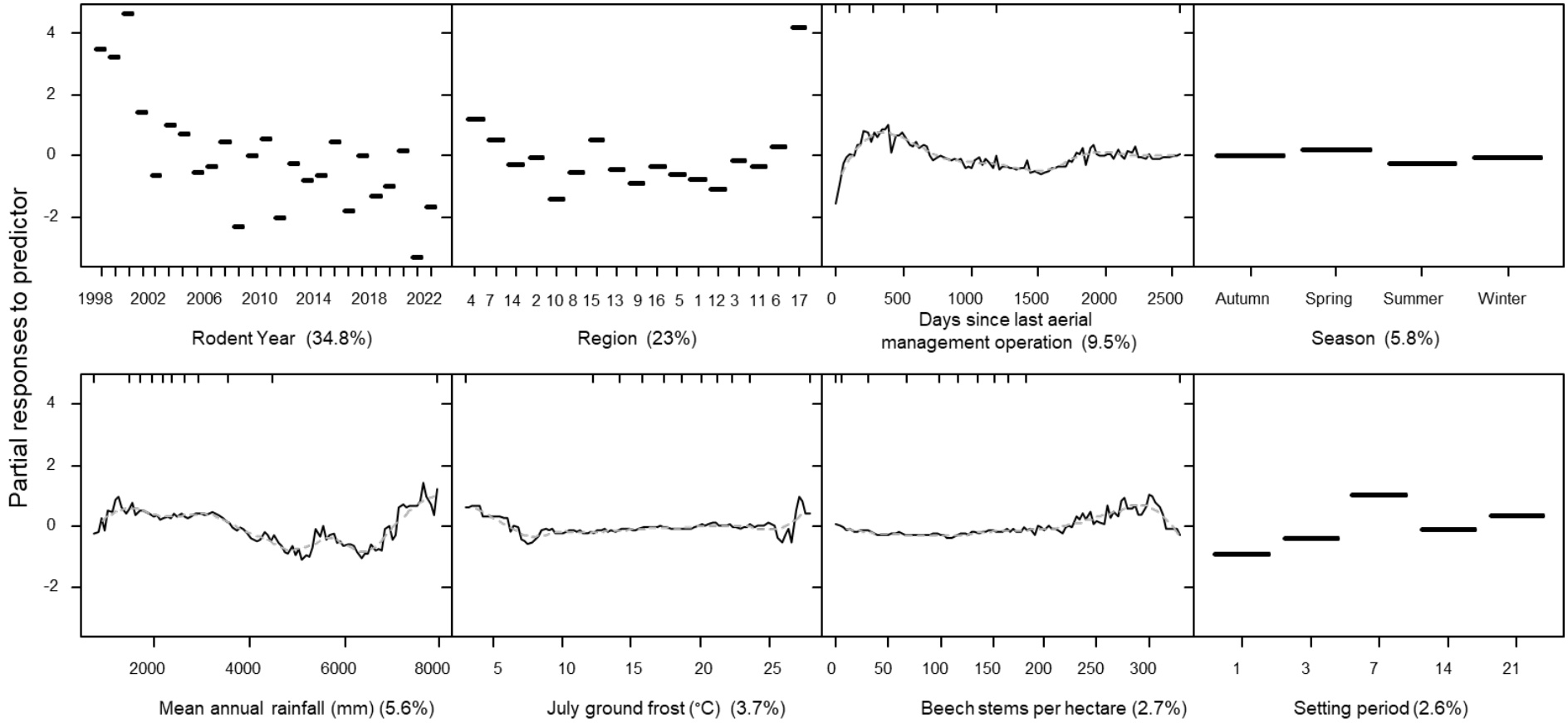
Appendix S8. Partial dependence plots for the eight most influential variables in our BRT model of ship rat tracks.

In Appendix S8, partial responses are fitted effects on the response after accounting for the average effects of all other variables. Relative influence of each variable in the model is show in parentheses in the horizontal-axis label. Vertical axes are on the logit scale of the link function in the model, centred to have zero mean (indicated by dashed horizontal lines) over the data distribution. Tick marks along the top of subplots show deciles of the distribution of data points across each continuous variable. The final model had 10,350 trees, an interaction depth of 4, and a learning rate of 0.2.



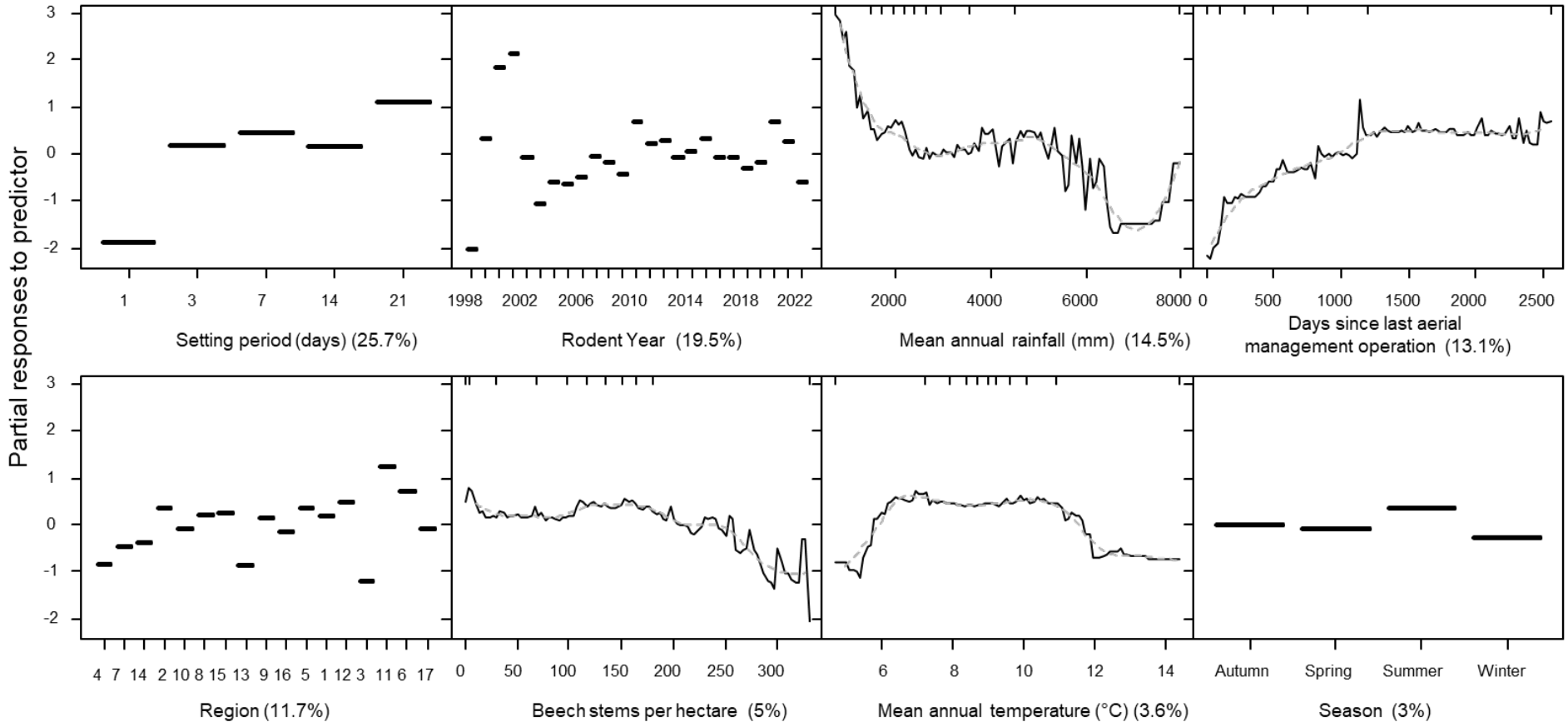
Appendix S9. Partial dependence plots for the eight most influential variables in our BRT model of mouse tracks.

In Appendix S9, partial responses are fitted effects on the response after accounting for the average effects of all other variables. Relative influence of each variable in the model is show in parentheses in the horizontal-axis label. Vertical axes are on the logit scale of the link function in the model, centred to have zero mean over the data distribution. Tick marks along the top of subplots show deciles of the distribution of data points across each continuous variable. The final model had 10,150 trees, an interaction depth of 4, and a learning rate of 0.20.



Appendix S10. Partial dependence plots for the eight most influential variables in our BRT model of mustelid tracks.

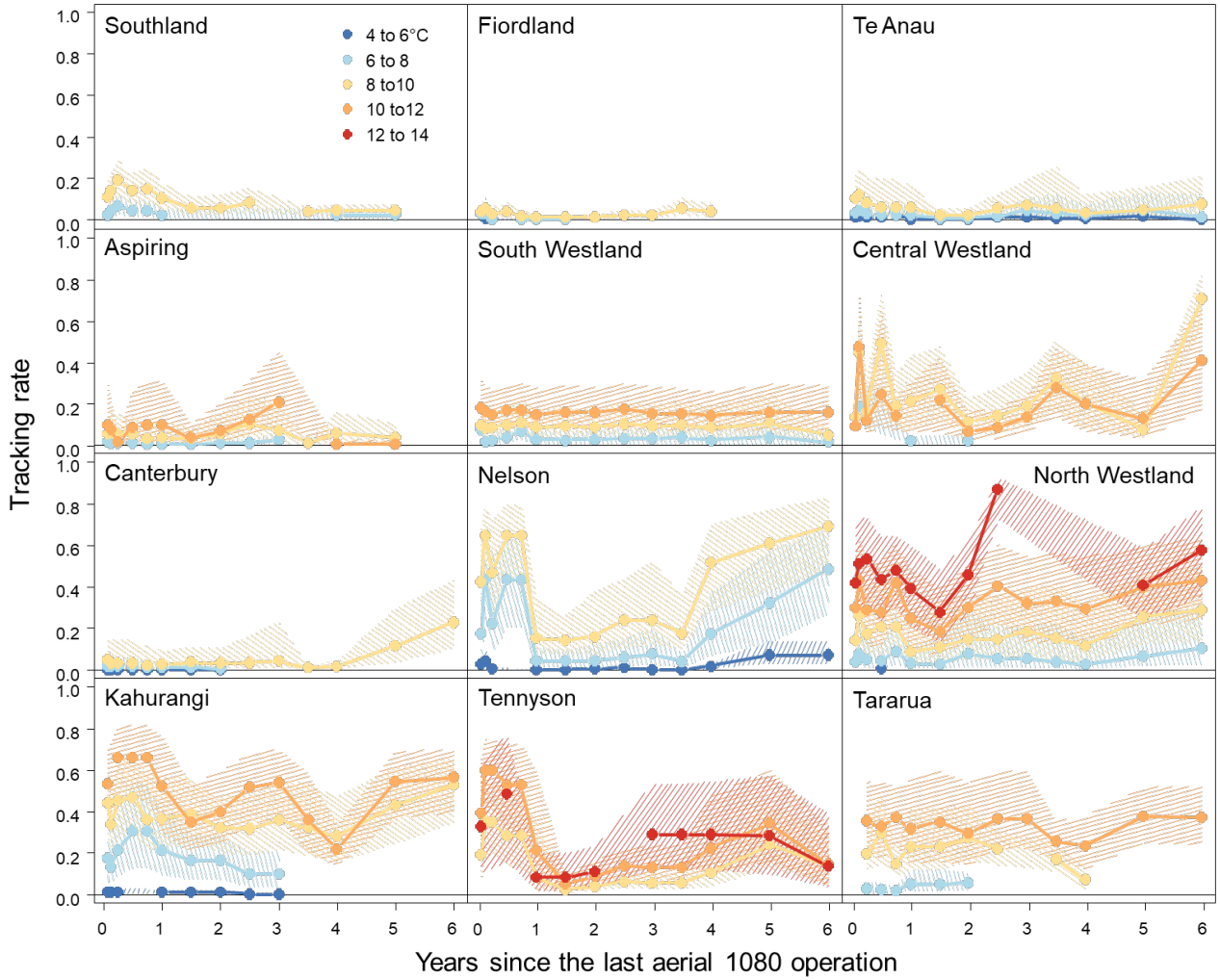
In Appendix S10, partial responses are fitted effects on the response after accounting for the average effects of all other variables. Relative influence of each variable in the model is show in parentheses in the horizontal-axis label. Vertical axes are on the logit scale of the link function in the model, centred to have zero mean (indicated by grey dashed horizontal lines) over the data distribution. Tick marks along the top of subplots show deciles of the distribution of data points across each continuous variable. The final model had 10,100 trees, an interaction depth of 4, and a learning rate of 0.1.



Supplementary material, Walker et al. Effects of aerial 1080 operations on rodent and mustelid tracking rates on New Zealand's conservation land.

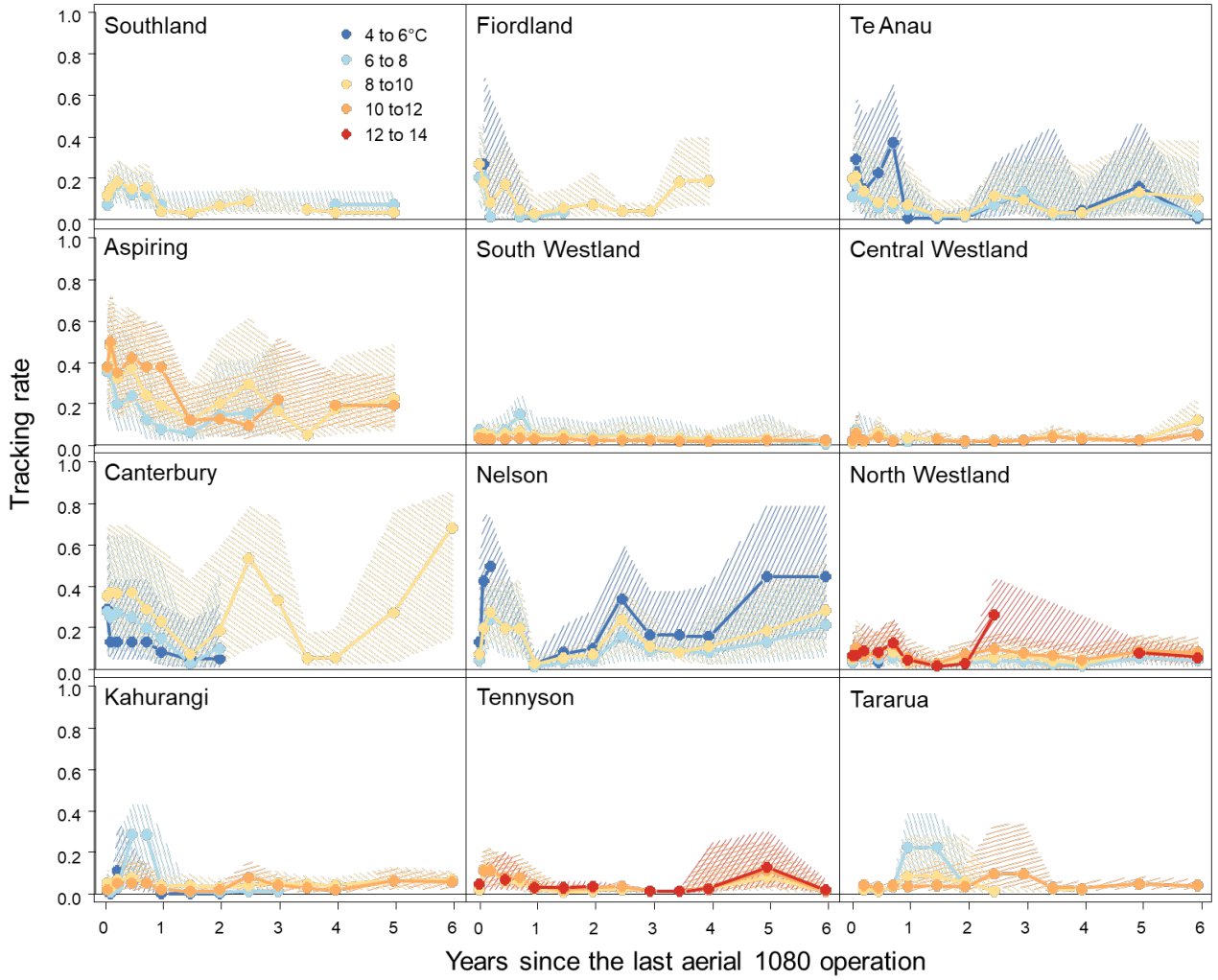
Appendix S11. Predicted unmanaged tracking rates of ship rats at different lengths of time after the last 1080 operation

In Appendix S11, lines and symbols show the medians of predictions of unmanaged tracking rates of ship rats in 5 temperature zones across 12 geographic regions at different lengths of time after the last aerial 1080 operation. The interquartile ranges of predictions are shown as hatched polygons.



Appendix S12. Predicted unmanaged tracking rates of mice at different lengths of time after the last 1080 operation.

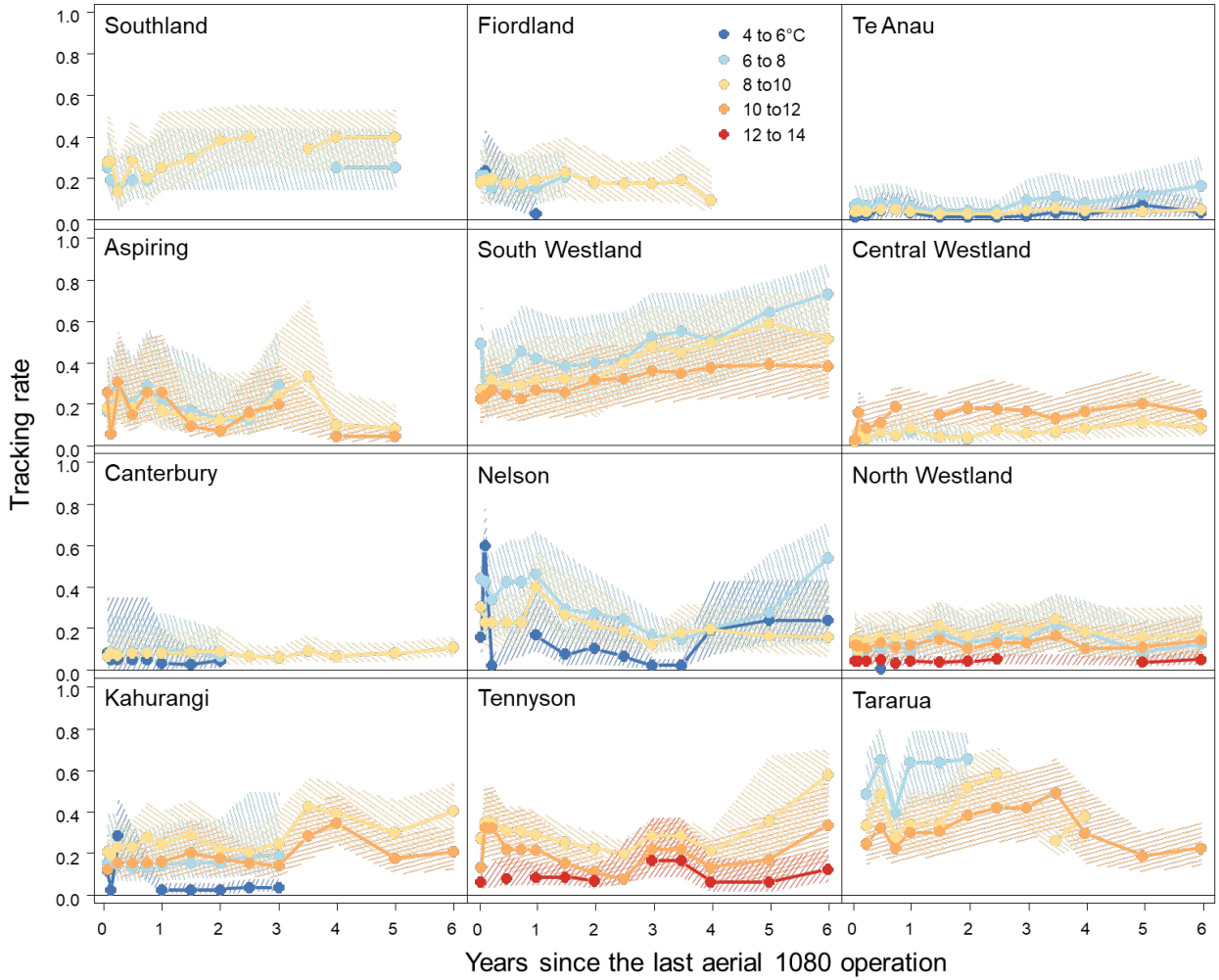
In Appendix S12, lines and symbols show the medians of predictions of unmanaged tracking rates of mice in 5 temperature zones across 12 geographic regions at different lengths of time after the last aerial 1080 operation. The interquartile ranges of predictions are shown as hatched polygons.



Supplementary material, Walker et al. Effects of aerial 1080 operations on rodent and mustelid tracking rates on New Zealand's conservation land.

Appendix S13. Predicted unmanaged tracking rates of mustelids at different lengths of time after the last aerial 1080 operation.

In Appendix S13, lines and symbols show the medians of predictions of unmanaged tracking rates of mustelids in 5 temperature zones across 12 geographic regions at different lengths of time after the last aerial 1080 operation. The interquartile ranges of predictions are shown as hatched polygons.



Appendix S14. Parameter estimates for the best model of ship rat tracking rates through the winter and spring of the 2019 mast seeding year.

Appendix S14 shows the parameter estimates (on the complementary log-log scale of the link function) for the best models of ship rat tracking rates along lines through the winter and spring of the 2019 mast seeding year. MAT is mean annual temperature; Std Error is standard error; z value is the number of standard errors lying between zero and the estimated value of the parameter used to test the null hypothesis that the coefficient (parameter) is 0; Pr(>|z|) is the two-tailed p-value associated with the z value (values <0.001 show that the tracking rate has a statistically significant relationship with the predictor at the 99.9% confidence level).

	Mean estimate	Std. Error	z value	Pr(>|z|)
Model 13 predictor				
Intercept	−6.601	0.751	-8.788	<0.001
Aerial 1080 in the previous 4 years	0.906	0.191	4.732	<0.001
MAT	0.553	0.065	8.568	<0.001
Autumn (vs Winter)	−1.207	0.117	-10.283	<0.001