Supplementary Material

Appendix S1. Vegetation species recorded in 16 paired 100 m^2 sites in WKP and MFE on the Coromandel peninsula to determine the effect of habitat features on the abundance of *Leiopelma archeyi*. Vegetation species and taxon were further categorised into functional groups such as might affect the behaviour of frogs, whose phytotaxonomic skills are unknown. Note: *exotic flora species.

Scientific Name	Functional Group	Six-letter code
Adiantum cunninghamii	Ground fern/climbing fern	*Adicun*
Agathis australis	Tree	*Agaaus*
Alseuosmia macrophylla	Shrub	*Alsmac*
Asplenium bulbiferum	Ground fern/climbing fern	*Aspbul*
Asplenium flaccidum	Epiphyte	*Aspfla*
Asplenium lamprophyllum	Ground fern/climbing fern	*Asplam*
Asplenium oblongifolium	Ground fern/climbing fern	*Aspobl*
Astelia fragrans	Monocot tuft	*Astfra*
Astelia solandri	Monocot tuft	*Astsol*
Astelia hastata	Epiphyte nest	*Asthas*
Astelia trinervia	Monocot tuft	*Asttri*
Beilschmiedia tawa	Tree	*Beitaw*
Blechnum discolor	Nest	*Bledis*
Blechnum filiforme	Ground fern/climbing fern	*Blefil*
Blechnum fraseri	Ground fern/climbing fern	*Blefra*
Blechnum fluviatile	Nest	*Bleflu*
Blechnum nigrum	Ground fern/climbing fern	*Blenig*
Blechnum novae-zelandiae	Ground fern/climbing fern	*Blenov*
Blechnum vulcanicum	Ground fern/climbing fern	*Blevul*
Brachyglottis repanda	Shrub	*Brarep*
Cardamine debilis	Herb/low growing (< 1.5 m)	*Cardeb*
Carpodetus serratus	Small tree < 12 m	*Carser*
*Cirsium arvense**	Herbs/low growing (< 1.5 m)	*Cirarv*
Cordyline australis	Palm like	*Coraus*
Cordyline banksia	Palm like	*Corban*
Coprosma arborea	Shrub	*Coparb*
Coprosma grandifolia	Shrub	*Copgra*
Coprosma lucida	Shrub	*Copluc*
Coprosma robusta	Shrub	*Coprob*
Coprosma spathulata	Shrub	*Copspa*
Ctenopteris heterophylla	Epiphyte	*Ctehet*
Cyathea cunninghamii	Tree fern	*Cyacun*
Cyathea dealbata	Tree fern	*Cyadea*
Cyathea medullaris	Tree fern	*Cyamed*
Cyathea smithii	Tree fern	*Cyasmi*
Dacrydium cupressinum	Tree	*Daccup*
Dacrydium dacrydioides	Tree	*Dacdac*
Dawsonia superba	Moss/lichens	*Dawsup*
Dendrobium cunninghamii	Epiphyte	*Dencun*
Dianella nigra	Monocot low growing structure	*Dianig*
Dicksonia squarrosa	Tree fern	*Dicsqu*
Dysoxylum spectabile	Tree	*Dysspe*
Elaeocarpus dentatus	Tree	*Eladen*
Empodisma robustum	Restiad	*Emprob*
Filmy fern species	Epiphyte	*Filfer*
Freycinetia banksii	Nest	*Freban*
Gahnia setifolia	Monocot tuft	*Gahset*
Gahnia xanthocarpa	Monocot tuft	*Gahxan*
Geniostoma ligustrifolium	Shrub	*Genlig*
Gleichenia dicarpa	Ground fern/climbing fern	*Gledic*
Griselinia littoralis	Tree	*Grilit*

Appendix S1. Continued.

Scientific Name	Functional Group	Six-letter code
Hedycarya arborea	Small tree < 12 m	*Hedarb*
Ixerba brexioides	Small tree < 12m	*Ixebre*
Kunzea ericoides	Dry shrub	*Kuneri*
Lastreopsis hispida	Ground fern/climbing fern	*Lashis*
Laurelia novae-zelandiae	Tree	*Launov*
Leptopteris hymenophylloides	Ground fern/climbing fern	*Lephym*
Leptospermum scoparium	Dry shrub	*Lepsco*
Leucopogon fasciculatus	Dry shrub	*Leufas*
Lichen species	Moss/lichens	*Licspp*
Lotus pedunculatus	Herbs/low growing (< 1.5 m)	*Lotped*
Lycopodium deuterodensum	Herbs/low growing (< 1.5 m)	*Lycdeu*
Lycopodium volubile	Climber	*Lycvol*
Lygodium articulatum	Epiphyte vines	*Lygart*
Melicytus ramiflorus	Tree	*Melram*
Metrosideros carminea	Climber	*Metcar*
Metrosideros diffusa	Climber	*Metdif*
Metrosideros fulgens	Climber	*Metful*
Metrosideros perforata	Climber	*Metper*
Metrosideros robusta	Climber	*Metrob*
Microlaena avenacea	Monocot low growing structure	*Micave*
Microsorum pustulatum	Epiphyte	*Micpus*
Moss species	Moss/lichens	*Mosspp*
Myrsine australis	Shrub	*Myraus*
Myrsine salicina	Small tree <12 m	*Myrsal*
Nestegis lanceolata	Tree	*Neslan*
Olearia rani	Shrub	*Oleran*
Phyllocladus trichomanoides	Tree	*Phytri*
*Pinus radiata**	Tree	*Pinrad*
Piper excelsum	Shrub	*Pipexc*
Pittosporum umbellatum	Small tree < 12 m	*Pitumb*
Podocarpus laetus	Tree	*Podlae*
Podocarpus totara	Tree	*Podtot*
Pomaderris kumeraho	Shrub	*Pomkum*
Prumnopitys ferruginea	Tree	*Prufer*
Prumnopitys taxifolia	Tree	*Prutax*
Pseudopanax arboreus	Shrub	*Psearb*
Pseudopanax crassifolius	Tree	*Psecra*
Pseudopanax discolor	Shrub	*Psedis*
Pseudopanax lessonii	Shrub	*Pseles*
Pterostylis banksii	Herb/low growing (< 1.5 m)	*Pteban*
Pteridium esculentum	Ground fern/climbing fern	*Pteesc*
Quintinia serrata	Small tree < 12 m	*Quiser*
Rhopalostylis sapida	Palm like	*Rhosap*
Ripogonum scandens	Epiphyte vines	*Ripsca*
Rubus cissoides	Epiphyte vines	*Rubcis*
*Rubus fruticosus**	Shrub	*Rubfru*
Schefflera digitata	Shrub	*Schdig*
Trifolium repens	Herb/low growing (<1.5 m)	*Trirep*
Tmesipteris tannensis	Epiphyte	*Tmetan*
Toronia toru	Shrub	*Tortor*
*Ulex europaeus**	Shrub	*Uleeur*
Uncinia uncinata	Monocot low growing structure	*Uncunc*
Weinmannia silvicola	Tree	*Weisil*

Appendix S2. Data and OpenBUGS code for the closed-population mark-recapture analysis. See article webpage on NZES website for this article to download .zip file.

Appendix S3. Number of *Leiopelma archeyi* captured, individually identified, and released during three nights of surveying in 16 paired 100 m^2 disturbed and undisturbed sites in two areas (WKP & MFE) on the Coromandel peninsula. Disturbed sites were further categorised according to the years when disturbance took place (1980s, 1990s, and 2010–16). Habitat characteristics (elevation, average temperature, average humidity) were recorded at the beginning and end of each frog survey. Vegetation characteristics (canopy cover above 1.35 m and average top height of dominate vegetation in metres) were recorded after the completion of frog surveys.

Pairs	Variables	Disturbed Site	Undisturbed site
Pair 1: 1980 WKP	Total no. frogs	5	1
	Mean SVL	27.31	23.70
	Elevation	212	211
	Mean temperature nocturnal surveys	9.2	9.0
	Mean humidity nocturnal surveys	95.7	97.6
	Canopy cover above 1.35 m (%)	40	85
	Average top height vegetation (m)	12	12
Pair 2: 1980 WKP	Total no. frogs	4	15
	Mean SVL	28.28	23.88
	Elevation	217	214
	Mean temperature nocturnal surveys	17.8	17.7
	Mean humidity nocturnal surveys	93.6	94.0
	Canopy cover above 1.35 m (%)	70	60
	Average top height vegetation (m)	10	14
Pair 3: 1980 WKP	Total no. frogs	4	0
	Mean SVL	23.51	0
	Elevation	N/A	N/A
	Mean temperature nocturnal surveys	15.7	16.2
	Mean humidity nocturnal surveys	94.9	95.2
	Canopy cover above 1.35 m (%)	25	75
	Average top height vegetation (m)	7.5	14
Pair 4: 1980 WKP	Total no. frogs	9	0
	Mean SVL	25.95	0
	Elevation	222	225
	Mean temperature nocturnal surveys	14.5	14.3
	Mean humidity nocturnal surveys	97.7	98.1
	Canopy cover above 1.35 m (%)	40	85
	Average top height vegetation (m)	8	13
Pair 5: 1980 WKP	Total no. frogs	1	1
	Mean SVL	N/A	22.2
	Elevation	200	190
	Mean temperature nocturnal surveys	16.8	16.9
	Mean humidity nocturnal surveys	90.9	90.6
	Canopy cover above 1.35 m (%)	40	50
	Average top height vegetation (m)	6	10
Pair 6: 1990 WKP	Total no. frogs	10	13
	Mean SVL	19.57	20.64
	Elevation	152	149
	Mean temperature nocturnal surveys	16.7	16.3
	Mean humidity nocturnal surveys	94	96.8
	Canopy cover above 1.35 m (%)	60	70
	Average top height vegetation (m)	8	9
Pair 7: 1990 WKP	Total no. frogs	3	0
	Mean SVL	21.33	0
	Elevation	261	N/A
	Mean temperature nocturnal surveys	15.7	15.2
	Mean humidity nocturnal surveys	87.6	90.6
	Canopy cover above 1.35 m (%)	95	95
	Average top height vegetation (m)	6	8
Pair 8: 1990 WKP	Total no. frogs	10	6
	Mean SVL	25.32	27.95
	Elevation	213	211

Appendix S3. Continued.

Pairs	Variables	Disturbed Site	Undisturbed site
	Mean temperature nocturnal surveys	10	9.4
	Mean humidity nocturnal surveys	97.2	97.6
	Canopy cover above 1.35 m (%)	45	85
	Average top height vegetation (m)	14	12
Pair 9: 2010–16	Total no. frogs	4	16
WKP	Mean SVL	26.12	25.6
	Elevation	252	244
	Mean temperature nocturnal surveys	16.5	16.2
	Mean humidity nocturnal surveys	93.2	94.5
	Canopy cover above 1.35 m (%)	50	90
	Average top height vegetation (m)	4	14
Pair 10: 2010–16	Total no. frogs	12	18
WKP	Mean SVL	24.19	22
	Elevation	239	N/A
	Mean temperature nocturnal surveys	16.3	14.2
	Mean humidity nocturnal surveys	98.2	96.8
	Canopy cover above 1.35 m (%)	40	95
	Average top height vegetation (m)	15	17
Pair 11: 2010–16	Total no. frogs	2	10
WKP	Mean SVL	28.55	26.43
	Elevation	259	268
	Mean temperature nocturnal surveys	16.9	16.7
	Mean humidity nocturnal surveys	96.9	96.5
	Canopy cover above 1.35 m (%)	50	80
	Average top height vegetation (m)	2	10
Pair 12: 2010–16	Total no. frogs	2	4
WKP	Mean SVL	28.75	29.00
	Elevation	254	247
	Mean temperature nocturnal surveys	12.8	13.2
	Mean humidity nocturnal surveys	91.1	88.6
	Canopy cover above 1.35 m (%)	20	90
	Average top height vegetation (m)	11	9
Pair 13: 2010–16	Total no. frogs	14	7
MFE	Mean SVL	26.62	22.93
	Elevation	N/A	448
	Mean temperature nocturnal surveys	15.1	15.1
	Mean humidity nocturnal surveys	98.9	98.2
	Canopy cover above 1.35 m (%)	N/A	N/A
	Average top height vegetation (m)	12	20
Pair 14: 2010–16	Total no. frogs	3	1
MFE	Mean SVL	31.02	26.22
	Elevation	312	312
	Mean temperature nocturnal surveys	16.1	15.7
	Mean humidity nocturnal surveys	93.8	97.3
	Canopy cover above 1.35 m (%)	N/A	N/A
	Average top height vegetation (m)	18	25
Pair 15: 1990	Total no. frogs	1	0
MFE	Mean SVL	32.68	0
	Elevation	317	303
	Mean temperature nocturnal surveys	17.3	16.5
	Mean humidity nocturnal surveys	85.3	91.8
	Canopy cover above 1.35 m (%)	60	90
	Average top height vegetation (m)	12	12
Pair 16: 1990	Total no. frogs	0	0
MFE	Mean SVL	0	0
	Elevation	286	277
	Mean temperature nocturnal surveys	18.5	18.4
	Mean humidity nocturnal surveys	85.2	83.3
	Canopy cover above 1.35 m (%)	90	96
	Average top height vegetation (m)	13	22

Appendix S4. Unscaled PCA biplot of the means and standard deviations from the disturbance periods and undisturbed sites at WKP (yellow) and MFE (green) plotted with the functional groups (Appendix S3) derived from the maximum cover values from the RECCE tier data. There is a distinction in vegetation characteristics between WKP and MFE. WKP sites overlap in association with restiads, shrubs, trees, tree ferns and dry shrubs. MFE had a greater abundance of epiphyte nest and tree ferns.