Supplementary Materials

Table S1. Site age and history of the sixteen vegetation plots. Restoration age refers to the time since native plantings began at a site (unpublished Hamilton City Council restoration database; Mackay et al. 2011). Maximum age is based on tree cores of the largest tree in each plot. Site history information is from Downs et al. (2000).

Study group	Plot	Restoration age	Maximum age	Site history/management
Restored with tree ferns	AJ Seeley Gully	52	35	*Dacrycarpus dacrydioides* forest planted > 50 years ago. *Cyathea dealbata* and *C. medullaris* were prominent in the understory.
	Minogue Park	33	9	Surrounded by *Dacrycarpus dacrydioides* forest planted 33 years ago and dominated by *Hoheria populnea* with some *Cyathea medullaris*.
	Pukete Farm Park	15	15	Adjacent to an *Agathis australis* grove planted approximately 15 years ago. Canopy of *Kunzea ericoides* with *Cyathea medullaris* and *C. dealbata* in the understory.
	North Pukete	21	21	Riverside vegetation supporting *Melicytus ramiflorus, Cyathea medullaris* and *C. dealbata*. Plantings took place approximately 20 years ago.
Restored without tree ferns	Brymer Park	23	16	Canopy of native pioneer trees, such as *Pittosporum eugenioides* and *Melicytus ramiflorus*.
	Hamilton Lake	21	13	*Podocarpus totara* forest was planted approximately 21 years ago. Some understory species were planted, but many are naturally regenerating.
	Tauhara Park	25	24	A stand of *Pittosporum eugenioides* planted 25 years ago, with native understory species.
	Till's Landing	18	18	*Pittosporum eugenioides* forest with *Melicytus ramiflorus* and *Pseudopanax arboreus.*
Unrestored with tree ferns	Chelmsford Park	NA	9	A canopy of the exotic tree *Salix cinerea* with occasional *Prunus serrulata*. *Dicksonia squarrosa* was prominent in the understory.
	Mangaiti Gully	NA	11	A stand of *Dicksonia squarrosa* with scarce native trees. *Carex geminata* was also prominent in the damp semi-swamp areas.
	River Road Gully	NA	15	*Salix cinerea* forest with *Dicksonia squarrosa* and occasional *Fuchsia excorticata*.
	Mangaonua Gully	NA	6	Edge of a *Dicksonia squarrosa* stand with occasional *Schefflera digitata* and *Coprosma robusta*.
Unrestored without tree ferns	Hukanui Gully	NA	12	*Salix cinerea* forest with other prominent exotic trees such as *Ligustrum sinense* and *L. lucidum.*
	Donny Park	NA	13	Exotic canopy of *Alnus glutinosa* and *Salix ×fragilis* with low native species richness.
	Porritt Stadium	NA	17	An exotic canopy of *Juglans ailantifolia* and *Salix cinerea*. *Tradescantia fluminensis* formed dense ground cover, preventing tree regeneration.
	Sandford Park	NA	7	Exotic canopy of trees such as *Salix ×fragilis* and *Prunus serrulata*. Groundcover was mainly *Tradescantia fluminensis* and *Hedera helix*.

Downs TM, Clarkson BD, Beard CM. 2000. Key Ecological Sites of Hamilton City, CBER Contract Report No. 5., Hamilton, Centre for Biodiversity and Ecology Research (University of Waikato).

MacKay DB, Wehi PM, Clarkson BD. 2011. Evaluating restoration success in urban forest plantings in Hamilton, New Zealand. Urban Habitats. 6(1).

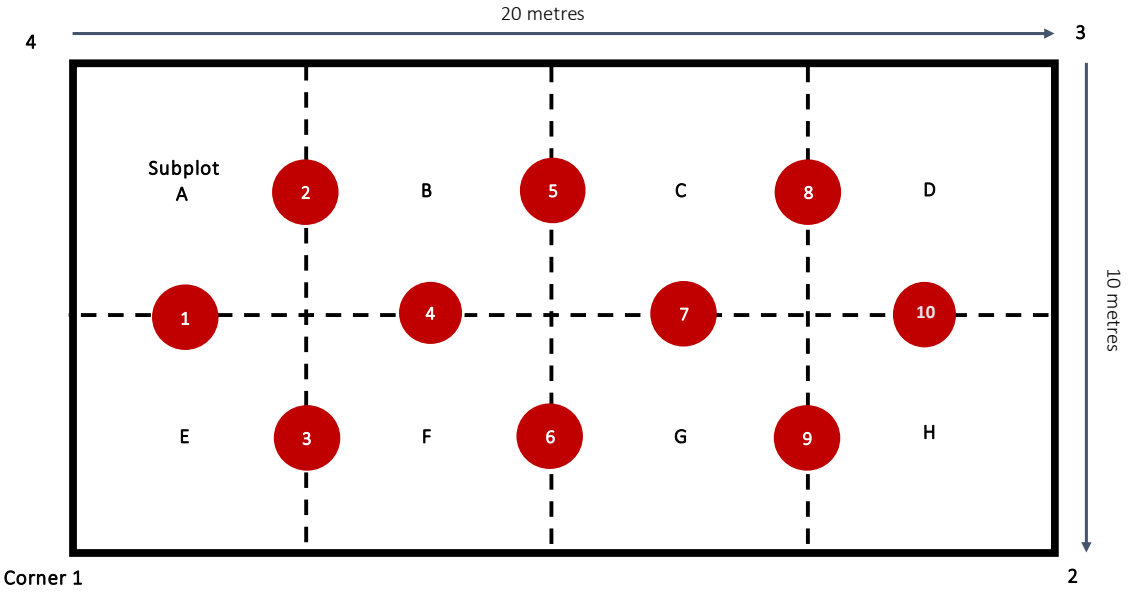

Figure S1. Vegetation plot design (200 m²). Seedlings were measured in ten circular seedling subplots (represented by numbers; 1.5 m radius), and ground ferns, groundcover, saplings, trees and epiphytes were measured per square subplot (represented by letters; 5 m²).

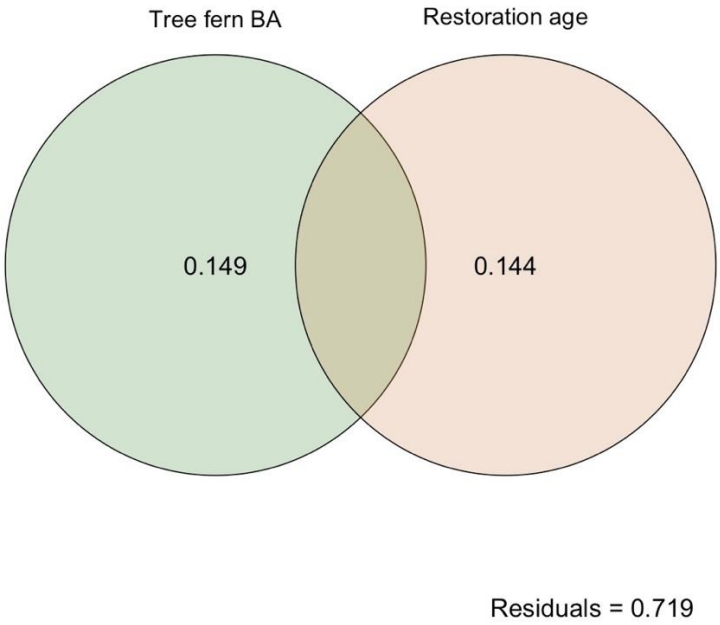

Figure S2. Variation partitioning of the effects of tree fern basal area and restoration age on community composition. Spatial predictors were removed as they did not have a significant influence on community structure.

Table S2. Generalised linear model results testing the effect of tree fern presence and restoration status on total native abundances, rarefied species richness, exotic plant abundances and rarefied richness, as well as abundance and rarefied richness of individual plant groups (i.e., seedlings, saplings, trees, ground ferns and epiphytes).

Model	Predictors	*Incidence Rate Ratio*	*CI*	*P*-value
Total native abundances	(Intercept)	294.83	119.39 – 679.37	<0.001
	Tree ferns [Yes]	0.76	0.28 – 1.93	0.571
	Status [Unrestored]	0.42	0.01 – 14.98	0.633
	Restoration age [log1p]	1.49	0.35 – 6.51	0.584
	Tree ferns [Yes] × Status [Unrestored]	14.12	2.92 – 108.85	0.003
Rarefied native species richness (n = 200)	(Intercept)	13.10	8.65 – 19.45	**<0.001**
	Tree ferns [Yes]	1.10	0.71 – 1.71	0.663
	Status [Unrestored]	1.18	0.27 – 5.17	0.825
	Restoration age [log1p]	1.60	0.87 – 2.97	0.133
	Tree ferns [Yes] × Status [Unrestored]	2.72	1.38 – 5.55	**0.005**
Total exotic abundances	(Intercept)	266.69	35.88 – 1933.01	**<0.001**
	Tree ferns [Yes]	0.30	0.10 – 0.76	**0.018**
	Status [Unrestored]	0.00	0.00 – 7.42	0.171
	Restoration age [log1p]	0.02	0.00 – 1.59	0.135
Rarefied exotic species richness (n = 50)	(Intercept)	7.14	2.77 – 17.96	**<0.001**
	Tree ferns [Yes]	0.62	0.31 – 1.18	0.154
	Status [Unrestored]	0.27	0.00 – 11.51	0.511
	Restoration age [log1p]	0.55	0.08 – 2.73	0.495
Native seedling abundances	(Intercept)	81.22	24.17 – 235.24	**<0.001**
	Tree ferns [Yes]	0.79	0.22 – 2.47	0.686
	Status [Unrestored]	0.86	0.01 – 95.67	0.949
	Restoration age [log1p]	2.18	0.36 – 13.92	0.390
Rarefied seedling richness (n = 50)	(Intercept)	4.53	2.46 – 8.00	**<0.001**
	Tree ferns [Yes]	0.47	0.22 – 0.93	**0.037**
	Status [Unrestored]	2.72	0.25 – 33.83	0.420
	Restoration age [log1p]	3.00	1.10 – 8.78	**0.036**
	Tree ferns [Yes] × Status [Unrestored]	3.89	1.26 – 13.07	**0.021**
Native sapling abundances	(Intercept)	86.15	46.11 – 156.68	**<0.001**
	Tree ferns [Yes]	1.06	0.60 – 1.86	0.835
	Status [Unrestored]	0.13	0.01 – 1.39	0.093
	Restoration age [log1p]	0.75	0.27 – 1.97	0.564

Rarefied sapling richness (n = 50)	(Intercept)	4.28	2.37 – 7.45	**<0.001**
	Tree ferns [Yes]	0.74	0.37 – 1.39	0.357
	Status [Unrestored]	1.39	0.15 – 13.76	0.775
	Restoration age [log1p]	2.17	0.86 – 5.66	0.103
	Tree ferns [Yes] × Status [Unrestored]	4.11	1.41 – 13.32	**0.013**
Native tree abundances	(Intercept)	35.61	20.68 – 60.00	**<0.001**
	Tree ferns [Yes]	1.37	0.85 – 2.22	0.193
	Status [Unrestored]	0.09	0.01 – 0.65	**0.018**
	Restoration age [log1p]	0.59	0.25 – 1.34	0.218
Rarefied native tree richness (n = 50)	(Intercept)	6.80	3.73 – 12.00	**<0.001**
	Tree ferns [Yes]	0.87	0.51 – 1.46	0.604
	Status [Unrestored]	0.63	0.07 – 5.99	0.685
	Restoration age [log1p]	1.19	0.46 – 3.01	0.711
Ground fern abundances	(Intercept)	12.67	2.26 – 49.91	**0.001**
	Tree ferns [Yes]	7.45	2.47 – 33.96	**0.002**
	Status [Unrestored]	0.15	0.00 – 8.77	0.368
	Restoration age [log1p]	0.38	0.05 – 2.02	0.288
Rarefied ground fern richness (n = 50)	(Intercept)	0.99	0.41 – 2.14	0.974
	Tree ferns [Yes]	3.98	2.24 – 7.60	**<0.001**
	Status [Unrestored]	1.42	0.12 – 16.66	0.776
	Restoration age [log1p]	0.95	0.34 – 2.54	0.922
Native epiphyte abundances	(Intercept)	15.28	0.03 – 493.91	0.211
	Tree ferns [Yes]	6.77	0.80 – 401.85	0.156
	Status [Unrestored]	3.35	0.00 – 22.29 x 10^6	0.850
	Restoration age [log1p]	0.89	0.00 – 252.60	0.963
Rarefied native epiphyte richness (n = 50)	(Intercept)	0.62	0.18 – 1.77	0.411
	Tree ferns [Yes]	5.40	2.42 – 14.23	**<0.001**
	Status [Unrestored]	10.21	0.59 – 229.80	0.123
	Restoration age [log1p]	2.25	0.72 – 7.26	0.163

Table S3. Pairwise comparisons of native vascular plant communities among the four site types using permutational multivariate analysis of variance (PERMANOVA) with restoration age (i.e., years since native plantings started) as a covariate. Data were Hellinger-transformed.

Group 1	Group 2	*F*-value	R^2	*P*-value
Unrestored without	Restored with	2.47	0.50	< 0.05
Unrestored without	Restored without	2.96	0.54	< 0.05
Unrestored with	Restored with	2.85	0.53	< 0.05
Unrestored with	Unrestored without	4.86	0.45	< 0.05
Unrestored with	Restored without	5.53	0.69	< 0.01
Restored with	Restored without	1.37	0.35	0.15

Table S4. Generalised linear model results testing the effect of tree fern presence and restoration status on total basal area (exotic trees, native trees and tree ferns), native woody tree basal area, tree fern basal areas and exotic tree basal area.

Model	Predictors	*Estimates*	*CI*	*P*-value
Total basal area (m^2 ha^{-1})	(Intercept)	-0.45	-1.58 – 0.67	0.427
	Tree ferns [Yes]	1.20	0.37 – 2.03	**0.004**
	Status [Unrestored]	-0.10	-4.32 – 4.12	0.962
Native woody tree basal area (m^2 ha^{-1})	(Intercept)	1.11	0.66 – 1.55	**<0.001**
	Tree ferns [Yes]	-0.07	-0.40 – 0.26	0.669
	Status [Unrestored]	-2.47	-4.14 – -0.80	**0.004**
	Restoration age [log1p]	-0.27	-0.98 – 0.44	0.456
Tree fern basal area (m^2 ha^{-1})	(Intercept)	-1.12	-2.02 – -0.22	**0.015**
	Tree ferns [Yes]	1.41	0.75 – 2.08	**<0.001**
	Status [Unrestored]	1.08	-2.32 – 4.47	0.534
	Restoration age [log1p]	0.20	-1.23 – 1.64	0.780
Exotic tree basal area (m^2 ha^{-1})	(Intercept)	-0.38	-1.47 – 0.72	0.501
	Tree ferns [Yes]	-0.81	-1.61 – 0.00	0.051
	Status [Unrestored]	2.08	-2.03 – 6.19	0.322
	Restoration age [log1p]	0.42	-1.32 – 2.16	0.633

Table S5. Three leading dominant trees or tree ferns for each site type based on the average basal area presented with the standard deviation. An asterisk denotes an exotic species.

Group	Species	Life form	Average basal area (m^2 ha^{-1})
Unrestored sites with tree ferns	*Dicksonia squarrosa*	Tree fern	20.28±11.20
	**Salix cinerea*	Tree	0.79±1.00
	Dicksonia fibrosa	Tree fern	0.73±1.50
Unrestored sites without tree ferns	**Salix cinerea*	Tree	1.93±2.70
	**Alnus glutinosa*	Tree	1.10±2.19
	**Salix ×fragilis*	Tree	1.07±1.86
Restored sites with tree ferns	*Cyathea dealbata*	Tree fern	5.38±0.60
	Kunzea ericoides	Tree	2.90±3.60
	Melicytus ramiflorus	Tree	2.06±1.50
Restored sites without tree ferns	*Pittosporum eugenioides*	Tree	5.30±5.43
	Kunzea ericoides	Tree	3.13±4.63
	Melicytus ramiflorus	Tree	3.00±2.01