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Supplementary material

Can sampling for vegetation characterisation surrogate for species richness? Case studies from the wet–dry tropics of northern Australia

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Traditional flora (inventory) survey in Northern Territory extends back to 1802 with Robert Brown's attempt to survey and document the flora of Australia (Brown 1810). This form of survey is mostly collection-based and taxonomically rigorous, but often involves little quantitative assessment of vegetation structure or species abundances (e.g. Chippendale 1974; Dunlop 1979; Lazarides *et al*. 1988; Cowie *et al*. 2012). Although the method provides the most verifiable and thus long-lived data, the rate of data acquisition was found to be relatively slow in NT at ~30–40 specimens (or species records) per botanist per day. Infertile taxa are mostly not collected and hence not recorded, and unfortunately some taxa are almost invariably encountered in an infertile condition. Also, the huge number of collections (potentially in excess of 2 million) needed to effectively document the flora of a large area such as NT may easily exceed available resources for processing, storage and curation. In spite of these limitations, this approach continues to be widely used across Australia (e.g. Bush Blitz 2020). Although it has been important for documenting the floristic diversity of many areas in NT (e.g. Chippendale 1974; Dunlop 1979; Lazarides *et al*. 1988; Cowie *et al*. 2012), the method is outside those considered in detail here.

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Table S1. Climate statistics for each of three national parks (NP) and one indigenous protected area (Anindilyakwa IPA) in the Northern Territory, Australia

Data are from Bureau of Meteorology's climate data online, see http://www.bom.gov.au/climate/data/, accessed 21 October 2020

	Coldest month (min.–max.)	Warmest month (min.–max.)	Mean annual temp (min.–max.)	Driest month (mean rainfall)	Wettest month (mean rainfall)	Mean annual rainfall
Groote Eylandt IPA Groote Eylandt Airport; station number 014518	July (15.7–28.9°C)	December (25.0–34.5°C)	20.9–32.2°C	August (1.3 mm)	March (290.0 mm)	1290.3 mm
Keep River NP Timber Creek; station number 014850	July (14.8–30.6°C)	November (25.1–38.4°C)	21.1–34.9°C	August (0.5 mm)	January (243.1 mm)	959.0 mm
Limmen NP Borroloola Airport; station number 014723	June (12.9–30.4°C)	November (23.9–37.6°C)	19.6–34.1°C	July–August (0.5 mm)	February (219.6 mm)	898.0 mm
Nitmiluk NP Katherine Council; station number 014902	June (14.0– 29.9°C)	November (24.7–38.0°C)	20.2–34.2°C	August (0.5 mm)	January (237.0 mm)	967.8 mm

Table S2. Model selection summary for species-sampling effort relationships of plant richness data collected using two survey methods (vegetation sampling and hybrid floristic survey) in three national parks (NP) and one indigenous protected area (Anindilyakwa IPA) in the Northern Territory, Australia

Nine modelling approaches are compared; d.f. is the degrees of freedom in the model, delta AIC (Δ_i) is the difference between model AIC value and the minimum AIC value of the candidate model set; Akaike weight (w_i) is the likelihood of the model being the best in the candidate set

	Model	d.f.	AIC	Δi	w_i		Model	d.f.	AIC	Δi	w_i
Groote Eylandt IPA											
Vegetation sampling	Weibull	5	169.0	0.0	1	Hybrid floristic survey	Weibull	5	1421.8	0.0	1
	Lomolino	4	884.3	715.2	0		Lomolino	4	1735.1	313.3	0
	Gitay	3	1758.4	1589.4	0		Gitay	3	1805.2	383.3	0
	Arrhenius	3	2247.3	2078.3	0		Arrhenius	3	2571.5	1149.7	0
	Asymptotic regression	4	2261.4	2092.4	0		Asymptotic regression	4	2599.7	1177.8	0
	Michaelis-Menten	3	2412.6	2243.6	0		Michaelis-Menten	3	2563.4	1141.6	0
	Gompertz	4	2606.9	2437.9	0		Gompertz	4	2788.1	1366.2	0
	Logistic regression	4	2768.4	2599.4	0		Logistic regression	4	2890.7	1468.9	0
	Gleason	3	3025.9	2856.9	0		Gleason	3	2624.6	1202.7	0
Limmen NP											
Vegetation sampling	Weibull	5	430.3	0.0	1	Hybrid floristic survey	Weibull	5	2039.7	0.0	1
	Lomolino	4	811.5	381.1	0		Lomolino	4	2275.4	235.7	0
	Gitay	3	1181.9	751.6	0		Gitay	3	3231.1	1191.3	0
	Arrhenius	3	1932.0	1501.6	0		Arrhenius	3	4011.2	1971.5	0
	Asymptotic regression	4	1843.7	1413.4	0		Asymptotic regression	4	3875.5	1835.8	0
	Michaelis-Menten	3	1869.3	1439.0	0		Michaelis-Menten	3	3743.9	1704.1	0
	Gompertz	4	2165.2	1734.9	0		Gompertz	4	4170.0	2130.2	0
	Logistic regression	4	2309.3	1879.0	0		Logistic regression	4	4326.5	2286.7	0
	Gleason	3	2500.6	2070.2	0		Gleason	3	3924.1	1884.3	0

	Model	d.f.	AIC	Δi	w_i		Model	d.f.	AIC	Δi	w_i
Keep River NP											
Vegetation sampling	Weibull	5	84.2	0.0	0.828	Hybrid floristic survey	Weibull	5	801.3	0.0	1
	Lomolino	4	87.4	3.1	0.172		Lomolino	4	924.6	123.3	0
	Gitay	3	337.9	253.7	0		Gitay	3	1345.8	544.5	0
	Arrhenius	3	465.7	381.5	0		Arrhenius	3	1853.5	1052.2	0
	Asymptotic regression	4	325.3	241.1	0		Asymptotic regression	4	1712.5	911.2	0
	Michaelis-Menten	3	267.9	183.7	0		Michaelis-Menten	3	1633.0	831.7	0
	Gompertz	4	486.2	401.9	0		Gompertz	4	1914.1	1112.9	0
	Logistic regression	4	538.3	454.1	0		Logistic regression	4	2010.0	1208.7	0
	Gleason	3	627.6	543.4	0		Gleason	3	1957.8	1156.5	0
Nitmiluk NP											
Vegetation sampling	Weibull	5	822.2	0.0	1	Hybrid floristic survey	Weibull	5	8136.7	0.0	1
	Lomolino	4	1039.4	217.2	0		Lomolino	4	9018.9	882.2	0
	Gitay	3	1253.9	431.7	0		Gitay	3	13889.7	5753.0	0
	Arrhenius	3	1971.3	1149.1	0		Arrhenius	3	15338.9	7202.2	0
	Asymptotic regression	4	1892.4	1070.2	0		Asymptotic regression	4	15361.0	7224.3	0
	Michaelis-Menten	3	1900.2	1078.0	0		Michaelis-Menten	3	15030.3	6893.6	0
	Gompertz	4	2159.6	1337.4	0		Gompertz	4	15920.5	7783.8	0
	Logistic regression	4	2280.8	1458.6	0		Logistic regression	4	16275.7	8139.0	0
	Gleason	3	2412.9	1590.7	0		Gleason	3	12107.9	3971.2	0