

## Appendix 1

Table A1. Twelve defined habitat types with general descriptions of species composition and presence, ground cover, and presence of understory and canopy cover.

Habitat	Site	Description	Ground cover	Understory	Canopy (%)
Old-growth oak woodland	Crom Estate (semi-natural)	Oak woodland with a minimum age of 400 years. Dominated by oak ( <i>Quercus robur</i> ), ash ( <i>Fraxinus excelsior</i> ) and hazel ( <i>Corylus avellane</i> ).	Low level including: including ivy ( <i>Hedera helix</i> ), wood anemone ( <i>Anemone nemorosa</i> ), bluebell ( <i>Hyacinthoides non-scriptus</i> ), lords and ladies, ( <i>Arum maculatum</i> ) and ferns ( <i>Dryopteris filix-mas</i> , <i>Polystichum setiferum</i> , <i>Asplenium scolopendrium</i> )	Present	>50
Wet woodland	Crom Estate (semi-natural)	Associated with the lough and lake shores, periodically flooding. Dominated by willows ( <i>Salix</i> spp.), alder ( <i>Alnus glutinosa</i> ) and ash ( <i>Fraxinus excelsior</i> ).	Medium level including bramble ( <i>Rubus fruticosus</i> ), remote sedge ( <i>Carex remota</i> ), common marsh-bedstraw ( <i>Galium palustre</i> ) and creeping bent ( <i>Agrostis stolonifera</i> ).	Present	>60
Immature ash woodland	Crom Estate (semi-natural)	Broadleaf woodland less than 100 years old. Dominated by ash ( <i>Fraxinus excelsior</i> ), hazel ( <i>Corylus avellane</i> ), birch ( <i>Betula pendula</i> ), Hornbeam ( <i>Carpinus betulus</i> ).	Absent	Present	>70
Fen	Crom Estate (semi-natural)	Waterlogged peat fed by groundwater or flowing surface water. Vegetation dominated by common reeds ( <i>Phragmites australis</i> ), rushes ( <i>Juncus</i> sp.) and sedges ( <i>Carex</i> sp.).	Present, see description for details.	Absent	0
Agricultural	Crom Estate (semi-natural) and Slieve Gullion	Includes tilled fields, moor grass and rush fields but predominantly formed of grazed pasture.	Absent	Absent	0

Habitat	Site	Description	Ground cover	Understory	Canopy (%)
	(human modified)				
Parkland	Crom Estate (semi-natural)	Ground cover is largely formed of managed grassland, similar to agricultural land-use but with the presence of >200 year old oak ( <i>Quercus robur</i> ), lime ( <i>Tilia x europeaus</i> ) and yew ( <i>Taxus baccata</i> ) trees throughout.	Absent	Absent	<5
Buildings	Crom Estate (semi-natural) and Slieve Gullion (human modified)	Any building or road	Absent	Absent	0
Closed coniferous plantation	Slieve Gullion (human modified)	Immature coniferous plantation stands planted 17 – 45 years ago. Dominated by exotic species including Sitka spruce ( <i>Picea sitchensis</i> ) and Larch ( <i>Larix sp.</i> )	Absent	Absent	80%
Mature coniferous plantation	Slieve Gullion (human modified)	Mature coniferous plantation planted more than 45 years ago. Dominated largely by native Scots pine ( <i>Pinus sylvestrus</i> ), but stands of lodgepole pine ( <i>Pinus contorta</i> ) also prevalent.	Present at medium to high levels. Dominated by bracken ( <i>Pteridium aquilinum</i> ). Brambles ( <i>Sorbus rubus</i> ), and bilberry ( <i>Vaccinium myrtillis</i> ) also present.	Absent	20 – 70
Scrub	Slieve Gullion (human modified)	Composed of several habitats that share similar structural complexities. Largely gorse ( <i>Ulex europaeus</i> ), bracken ( <i>Pteridium aquilinum</i> ) and bramble ( <i>Sorbus fruticosus</i> ) dominated. Low presence of heather ( <i>Calluna vulgaris</i> ) and bilberry ( <i>Vaccinium myrtillus</i> ). Also includes clear cut debris, wind thrown debris and recently planted stands (< 10 years old).	Present at high level, see description for details.	Absent	0
Dry heath	Slieve Gullion (human modified)	Dominated by mature heather species ( <i>Calluna vulgaris</i> , <i>Erica cinerea</i> and <i>Erica tetralix</i> ) and bilberry	Present at medium level, see description for details.	Absent	0

Habitat	Site	Description	Ground cover	Understory	Canopy (%)
		<i>(Calluna vulgaris)</i> . Low levels of western gorse <i>(Ulex galii)</i> .			
Tree line	Slieve Gullion (human modified)	Field boundaries composed of deciduous trees. Dominated by hawthorn ( <i>Crataegus monogyna</i> ), blackthorn ( <i>Prunus spinosa</i> ) and ash ( <i>Fraxinus excelsior</i> ).	Present	Present	>50

Table A2. ID number, date of first capture, sex, age, and mass of all trapped individuals across both study sites.

ID number	Site	Sex	Age	Mass (kg)
PM01	Crom	male	adult	1.8
PM02	Crom	female	adult	1.3
PM03	Crom	male	adult (old)	1.9
PM04	Crom	female	adult	1.35
PM05	Crom	male	adult (old)	2.15
PM06	Crom	male	adult (young)	1.7
PM07	Crom	male	adult	2.05
PM08	Crom	female	adult	1.3
PM09	Crom	female	yearling	1.3
PM10	Crom	male	adult	1.7
PM11	Crom	female	yearling	1.4
PM12	Crom	male	adult	2.1
PM13	ROG	female	adult	1.45
PM14	ROG	male	adult	1.9
PM15	ROG	female	adult	1.2
PM16	ROG	male	adult (young)	1.5
PM17	ROG	male	adult	1.95
PM18	ROG	female	adult	1.3
PM19	ROG	male	adult	1.5
PM20	ROG	male	adult (young)	1.6
PM21	ROG	male	adult	2.1
PM22	Crom	female	adult	1.3
PM23	Crom	female	adult (old)	1.2
PM24	Crom	male	adult (young)	1.7
PM25	Crom	male	adult	1.95
PM29	ROG	male	adult (old)	1.8
PM31	Crom	male	adult (old)	1.7
PM32	Crom	male	yearling	1.95
PM33	ROG	male	yearling	1.4
PM34	ROG	male	yearling	1.7
PM35	Crom	male	adult (young)	1.9
PM36	Crom	female	yearling	1.3
PM37	Crom	female	yearling	1.0
PM38	Crom	male	yearling	1.5
PM39	Crom	female	yearling	1.3
PM40	Crom	male	adult (young)	1.6
PM41	ROG	male	adult	1.85
PM42	Crom	female	yearling	1.1

Table A3. Den locations by height and structure, and habitat across both study areas. Cavities were only recorded as such when the cavity was visible and could be confirmed. Tree-related structures refer to all possible structures within trees including: tree crowns, snags, ivy crowns, fungal brooms and squirrel dreys (nest-like constructions made from leaves and twigs). Number is number of uses, followed by the overall frequency of use (%).

Site	Category	Sub-category	Number	Frequency
Crom Estate (semi-natural)	above ground (>2 m)	cavities	8	4.23
		tree-related	176	93.12
	underground (<0 m)	cave system	0	0.00
		rocky crevice	0	0.00
		burrows	2	1.05
	man - made (0 – 2 m)	buildings	1	0.52
		stone walls	0	0.00
deadwood piles		2	1.05	
Slieve Gullion (human modified)	above ground (>2 m)	cavities	0	0.00
		tree-related	19	21.59
	underground (<0 m)	cave system	22	25.0
		rocky crevice	12	13.63
		burrows	16	18.18
	man - made (0 – 2 m)	buildings	3	3.49
		stone walls	11	12.5
		deadwood piles	5	5.68

Table A4. Tree species used as dens, number of uses and frequency of use by the European pine marten in two contrasting landscapes of Crom and Slieve Gullion.

Site	Species	Number	Frequency (%)
Crom Estate (semi natural; n = 184)	Oak ( <i>Quercus robur</i> )	102	55.43
	Ash ( <i>Fraxinus excelsior</i> )	37	20.11
	Lime ( <i>Tilia x europaea</i> )	25	13.59
	Silver Birch ( <i>Betula pendula</i> )	4	2.17
	Sycamore ( <i>Acer pseudoplatanus</i> )	3	1.63
	Alder ( <i>Alnus glutinosa</i> )	3	1.63
	Willow ( <i>Salix caprea</i> )	3	1.68
	Maple ( <i>Acer saccharum</i> )	2	1.08
Slieve Gullion (human modified; n = 19)	Ash ( <i>Fraxinus excelsior</i> )	7	36.84
	Hawthorn ( <i>Crataegus monogyna</i> )	4	21.05
	Brambles ( <i>Rubus fruticosus</i> )	3	15.79
	Sycamore ( <i>Acer pseudoplatanus</i> )	2	10.52
	Lodgepole pine ( <i>Pinus contorta</i> )	2	10.52
	Sitka spruce ( <i>Picea sitchensis</i> )	1	5.26

Table A5. Mean (95% cIm) ivy cover for each tree species used as dens by the European pine marten at Crom and Slieve Gullion. Only tree species used more than twice as dens are displayed.

Tree species	Mean ivy cover (%)	95% cIm (%)
Alder ( <i>Alnus glutinosa</i> )	23.33	10.00 – 36.66
Ash ( <i>Fraxinus excelsior</i> )	81.18	73.65 – 88.71
Hawthorn ( <i>Crataegus monogyna</i> )	98.00	97.92 – 99.08
Lime ( <i>Tilia x europaea</i> )	0.00	0.00 – 0.00
Oak ( <i>Quercus robur</i> )	75.51	71.06 – 79.96
Silver Birch ( <i>Betula pendula</i> )	65.33	32.67 – 97.99
Sycamore ( <i>Acer pseudoplatanus</i> )	66.25	43.77 - 88.73

Table A6. Bonferroni 95% CI from post hoc tests comparing differences in habitat selection for denning sites in Crom Estate. Significant values highlighted.

Habitat	Difference	Lower CL	Upper CL	p
Buildings-agriculture	15.90773	-11.6915	43.50692	1.000
Fen-agriculture	16.40173	-11.1975	44.00093	1.000
Immature-agriculture	10.14127	-17.4579	37.74047	1.000
Old growth-agriculture	54.05786	26.45866	81.65706	<b>&lt;0.001</b>
Parkland-agriculture	13.50964	-14.0896	41.10884	<b>&lt;0.001</b>
Wet woodland-agriculture	24.60144	-2.99776	52.20064	<b>&lt;0.001</b>
Fen-buildings	0.494002	-27.1052	28.0932	1.000
Immature-buildings	-5.76646	-33.3657	21.83274	1.000
Old growth-buildings	38.15013	10.55094	65.74933	<b>&lt;0.001</b>
Parkland-buildings	-2.39808	-29.9973	25.20111	1.000
Wet woodland-buildings	8.693712	-18.9055	36.29291	1.000
Immature-fen	-6.26046	-33.8597	21.33874	1.000
Old growth-fen	37.65613	10.05693	65.25533	<b>0.001</b>
Parkland-fen	-2.89208	-30.4913	24.70711	1.000
Wet woodland-fen	8.19971	-19.3995	35.79891	1.000
Old growth-immature	43.91659	16.31739	71.51579	<b>&lt;0.001</b>
Parkland-immature	3.368372	-24.2308	30.96757	1.000
Wet woodland-immature	14.46017	-13.139	42.05936	1.000
Parkland-old growth	-40.5482	-68.1474	-12.949	<b>&lt;0.001</b>
Wet woodland-old growth	-29.4564	-57.0556	-1.85722	<b>0.026</b>
Wet woodland-parkland	11.09179	-16.5074	38.69099	1.000

Table A7. Bonferroni 95% CI from post hoc tests comparing differences in habitat selection of adults for denning sites in Crom Estate. Significant values highlighted.

Habitat	Difference	Lower CL	Upper CL	p
Buildings-agriculture	15.90773	-23.134	54.94942	1.000
Fen-agriculture	16.40173	-22.64	55.44342	1.000
Immature-agriculture	10.80794	-28.2338	49.84963	1.000
Old growth-agriculture	56.38317	17.34148	95.42486	<b>&lt;0.001</b>
Parkland-agriculture	9.486025	-29.5557	48.52772	1.000
Wet woodland-agriculture	23.61325	-15.4284	62.65494	1.000
Fen-buildings	0.494002	-38.5477	39.5357	1.000
Immature-buildings	-5.09979	-44.1415	33.9419	1.000
Old growth-buildings	40.47544	1.433751	79.51714	<b>0.036</b>
Parkland-buildings	-6.4217	-45.4634	32.61999	1.000
Wet woodland-buildings	7.705521	-31.3362	46.74721	1.000
Immature-fen	-5.59379	-44.6355	33.4479	1.000
Old growth-fen	39.98144	0.93975	79.02314	<b>0.040</b>
Parkland-fen	-6.9157	-45.9574	32.12599	1.000
Wet woodland-fen	7.211519	-31.8302	46.25321	1.000
Old growth-immature	45.57523	6.53354	84.61693	<b>0.011</b>
Parkland-immature	-1.32191	-40.3636	37.71978	1.000
Wet woodland-immature	12.80531	-26.2364	51.847	1.000
Old growth - parkland	-46.8971	-85.9388	-7.85545	<b>0.008</b>
Wet woodland-old growth	-32.7699	-71.8116	6.27177	0.190
Wet woodland-parkland	14.12722	-24.9145	53.16892	1.000

Table A8. Bonferroni 95% CI from post hoc tests comparing differences in habitat selection of yearlings for denning sites in Crom Estate. Significant values highlighted.

Habitat	Difference	Lower CL	Upper CL	p
Buildings-agriculture	15.90773	-23.8489	55.6644	1.000
Fen-agriculture	16.40173	-23.3549	56.1584	1.000
Immature-agriculture	9.474604	-30.2821	49.23128	1.000
Old growth-agriculture	66.98255	24.81423	109.1509	<b>&lt;0.001</b>
Parkland-agriculture	17.53326	-22.2234	57.28994	1.000
Wet woodland-agriculture	25.58963	-14.167	65.3463	0.839
Fen-buildings	0.494002	-39.2627	40.25068	1.000
Immature-buildings	-6.43312	-46.1898	33.32355	1.000
Old growth-buildings	51.07482	8.9065	93.24314	<b>0.007</b>
Parkland-buildings	1.625535	-38.1311	41.38221	1.000
Wet woodland-buildings	9.681902	-30.0748	49.43858	1.000
Immature-fen	-6.92712	-46.6838	32.82955	1.000
Old growth-fen	50.58082	8.412499	92.74914	<b>0.008</b>
Parkland-fen	1.131534	-38.6251	40.88821	1.000
Wet woodland-fen	9.187901	-30.5688	48.94457	1.000
Old growth-immature	57.50794	15.33962	99.67626	<b>0.002</b>
Parkland-immature	8.058658	-31.698	47.81533	1.000
Wet woodland-immature	16.11502	-23.6416	55.8717	1.000
Parkland-old growth	-49.4493	-91.6176	-7.28096	<b>0.011</b>
Wet woodland-old growth	-41.3929	-83.5612	0.775402	0.058
Wet woodland-parkland	8.056367	-31.7003	47.81304	1.000

Table A9. Bonferroni 95% CI from post hoc tests comparing differences in habitat selection for denning sites in Ring of Gullion. Significant values highlighted.

Habitat	Difference	LCL	UCL	p
Buildings-agriculture	33.06817	9.064402	57.07193	<b>0.001</b>
Closed-agriculture	27.20899	3.205223	51.21275	<b>0.014</b>
Heath-agriculture	33.95662	9.952857	57.96039	<b>&lt;0.001</b>
Mature-agriculture	44.087	20.08323	68.09076	<b>&lt;0.001</b>
Scrub-agriculture	49.70935	25.70559	73.71312	<b>&lt;0.001</b>
Tree line-agriculture	50.70517	26.7014	74.70893	<b>&lt;0.001</b>
Closed-buildings	-5.85918	-29.8629	18.14459	1.000
Heath-buildings	0.888455	-23.1153	24.89222	1.000
Mature-buildings	11.01883	-12.9849	35.0226	1.000
Scrub-buildings	16.64119	-7.36258	40.64495	0.636
Tree line-buildings	17.637	-6.36676	41.64077	0.464
Heath-closed	6.747635	-17.2561	30.7514	1.000
Mature-closed	16.87801	-7.12575	40.88178	0.591
Scrub-closed	22.50037	-1.5034	46.50413	0.087
Tree line-closed	23.49618	-0.50758	47.49995	0.060
Mature-heath	10.13038	-13.8734	34.13414	1.000
Scrub-heath	15.75273	-8.25103	39.7565	0.834
Tree line-heath	16.74855	-7.25522	40.75231	0.615
Scrub-mature	5.622354	-18.3814	29.62612	1.000
Tree line-mature	6.618168	-17.3856	30.62193	1.000
Tree line-scrub	0.995814	-23.008	24.99958	1.000

Table A10. Bonferroni 95% CI from post hoc tests comparing differences in habitat selection of adults for denning sites in Ring of Gullion. Significant values highlighted.

Habitat	Difference	LCL	UCL	p
Buildings-agriculture	33.83347	-1.02027	68.68722	0.0634
Closed-agriculture	28.39946	-6.45428	63.25321	0.2185
Heath-agriculture	43.67176	8.818015	78.5255	0.0062
Mature-agriculture	35.31149	0.457746	70.16523	0.0449
Scrub-agriculture	42.25187	7.398127	77.10562	0.0087
Tree line-agriculture	51.10058	16.24683	85.95432	0.0011
Closed-buildings	-5.43401	-40.2878	29.41973	1
Heath-buildings	9.838285	-25.0155	44.69203	1
Mature-buildings	1.478016	-33.3757	36.33176	1
Scrub-buildings	8.418398	-26.4353	43.27214	1
Tree line-buildings	17.2671	-17.5866	52.12085	1
Heath-closed	15.27229	-19.5814	50.12604	1
Mature-closed	6.912026	-27.9417	41.76577	1
Scrub-closed	13.85241	-21.0013	48.70615	1
Tree line-closed	22.70111	-12.1526	57.55486	0.7425
Mature-heath	-8.36027	-43.214	26.49348	1
Scrub-heath	-1.41989	-36.2736	33.43386	1
Tree line-heath	7.428818	-27.4249	42.28256	1
Scrub-mature	6.940382	-27.9134	41.79413	1
Tree line-mature	15.78909	-19.0647	50.64283	1
Tree line-scrub	8.848705	-26.005	43.70245	1



Table A11. Bonferroni 95% CI from post hoc tests comparing differences in habitat selection of yearlings for denning sites in Ring of Gullion. Significant values highlighted.

Habitat	Difference	LCL	UCL	p
Buildings-agriculture	32.04776	-1.28062	65.37614	0.066
Closed-agriculture	25.62169	-7.70669	58.95006	0.273
Heath-agriculture	21.00311	-12.3253	54.33149	0.739
Mature-agriculture	55.78768	22.4593	89.11606	<b>&lt;0.001</b>
Scrub-agriculture	59.65267	26.32429	92.98104	<b>&lt;0.001</b>
Tree line-agriculture	50.17796	16.84958	83.50634	<b>&lt;0.001</b>
Closed-buildings	-6.42607	-39.7545	26.90231	1.000
Heath-buildings	-11.0447	-44.373	22.28373	1.000
Mature-buildings	23.73992	-9.58846	57.0683	0.411
Scrub-buildings	27.60491	-5.72347	60.93328	0.176
Tree line-buildings	18.1302	-15.1982	51.45858	1.000
Heath-closed	-4.61858	-37.947	28.7098	1.000
Mature-closed	30.16599	-3.16238	63.49437	0.100
Scrub-closed	34.03098	0.7026	67.35936	<b>0.042</b>
Tree line-closed	24.55627	-8.77211	57.88465	0.344
Mature-heath	34.78457	1.456194	68.11295	<b>0.036</b>
Scrub-heath	38.64956	5.321179	71.97794	<b>0.015</b>
Tree line-heath	29.17485	-4.15353	62.50323	0.124
Scrub-mature	3.864985	-29.4634	37.19336	1.000
Tree line-mature	-5.60972	-38.9381	27.71866	1.000
Tree line-scrub	-9.47471	-42.8031	23.85367	1.000