Supplement of Earth Syst. Sci. Data, 18, 8361–8376, 2026
https://doi.org/10.5194/essd-18-8361-2026-supplement
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Supplement of

Ecological change in the native Scottish pinewoods since 1971 – data from the Bunce 2018–2022 re-survey

Claire M. Wood et al.

Correspondence to: Claire M. Wood (clamw@ceh.ac.uk)

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Supplementary Material

Table S1: Change in stem count (trees & shrubs, saplings in brackets) between 1971 and the 2020s by species, for each pinewood site and as a mean across all sites – native woody species

Group	Site no.	Site	*Pinus sylvestris*	*Betula spp.*	*Alnus glutinosa*	*Fraxinus excelsior*	*Populus tremula*	*Salix spp.*	*Ilex aquifolium*	*Juniperus*	*Sambucus nigra*	*Quercus sp.*	*Sorbus spp.*	*Total change by site - natives*
Deeside Group	1	**Glen Tanar**	78 (9)											87
	2	**Ballochbuie**	56 (13)	1 (19)						8				97
	3	**Mar Lodge**	27 (4)	(2)										33
Speyside Group	4	**Abernethy**	58 (0)	-12									-6 (1)	41
	5	**Rothiemurchus**	14 (30)	17 (1)	1		-8	-42		1	1			15
	6	**Glenmore**	74 (47)	-3						5				123
	7	**Glen Feshie**	-35 (7)	16 (3)				3		5				-1
	27	**Dulnain**	33							4				37
Rannoch Group	8	**Black Wood of Rannoch**	22 (2)	-32 (19)				-55					1	-43
	9	**Meggernie**	12	86	5			5					-2	106
Great Glen Group	10	**Glen Moriston**	114	-190			-1	-52		1			-21	-149
	11	**Glengarry**	-43	171										128
	12	**Barisdale**	-4	17 (-6)					6	3			-25 (-5)	-14
	13	**Loch Arkaig & Glen Mallie**	-3	-8 (2)									-6 (2)	-13
	14	**Ardgour**	15	54		1		3						73
Strath Glass Group	15	**Glen Affric**	-18 (3)	29 (17)				6				1	-3 (3)	29
	16	**Glen Cannich**	39 (11)	-47 (29)				-16					4	20
	17	**Glen Strathfarrar**	18	33	1								-1	51
	18	**Guisachan & Cougie**	-5 (16)	65 (82)	3			-212					-52	-103
Wester Ross Group	19	**Coulin**	30 (4)	29 (116)	1								24	204
	20	**Achnashellach**	12	-125									-14	-127
	21	**Shieldaig**	19	-41									-16	-38
	23	**Loch Maree**	3 (13)	-46					5	2			7	-16
Northern Group	22	**Amat**	38	22	1					1			-1	61
Southern Group	24	**Black Mount**	-61	18	1			1					-123	-164
	25	**Glen Orchy**	0 (1)	131 (16)				1				2	5	156
	26	**Tyndrum**	0 (1)	-5 (35)		0 (1)							-4	32
	Mean		24.3	19.1	0.5	0.1	-0.3	-13.3	0.4	2.8	0	0.1	-8.8	24.9
	S.D.		41.8	77.5	1.1	0.3	1.5	48	1.5	8.9	0.2	0.4	31.5	212.7

Table S2. Change in mean stem count number (trees, saplings & shrubs) between 1971 and the 2020s by species, for each pinewood site and as a mean across all sites – non- native woody species

Group	Site no.	Site	*Larix sp.*	*P. contorta*	*Picea abies*	*P. nigra*	*Pseudotsuga menziesii*	*P. sitchensis*	*Total change by site - non-natives:*
Deeside Group	1	**Glen Tanar**					-4 (1)		-3
	2	**Ballochbuie**			12 (2)				14
	3	**Mar Lodge**							0
Speyside Group	4	**Abernethy**	46		-7			-6 (-1)	32
	5	**Rothiemurchus**							0
	6	**Glenmore**						-46	-46
	7	**Glen Feshie**	-32						-32
	27	**Dulnain**							0
Rannoch Group	8	**Black Wood of Rannoch**	-31		5			-1	-27
	9	**Meggernie**	2						2
Great Glen Group	10	**Glen Moriston**		2	11	14		-24	3
	11	**Glengarry**		-62	-192			-74	-328
	12	**Barisdale**							0
	13	**Loch Arkaig and Glen Mallie**	-50					28 (1)	-21
	14	**Ardgour**			38				38
Strath Glass Group	15	**Glen Affric**	-3 (-1)		-6				-10
	16	**Glen Cannich**	-11	-42	-10				-63
	17	**Glen Strathfarrar**							0
	18	**Guisachan and Cougie**	7	13	-124		-59	4	-159
Wester Ross Group	19	**Coulin**							0
	20	**Achnashellach**	1			-3		-9	-11
	21	**Shieldaig**							0
	23	**Loch Maree**							0
Northern Group	22	**Amat**							0
Southern Group	24	**Black Mount**							0
	25	**Glen Orchy**			94				94
	26	**Tyndrum**							0
	Mean		-4.4	-3.3	-6.3	0.4	-2.3	-4.7	-20.6
	S.D.		17.8	14.5	48.8	2.8	11.3	18.1	113.3

Table S3. Mean number of ground flora species per site and relative and absolute change between surveys (ND = no data).

Group	Site no.	Site	Mean number of species		Change	
			1971	2020s	Absolute	Percentage
Deeside Group	1	Glen Tanar	12.8	10.3	-2.5	-19.6
	2	Ballochbuie	21.2	15.4	-5.8	-27.4
	3	Mar Lodge	15.5	14.7	-0.8	-5.2
Speyside Group	4	Abernethy	13.6	12.9	-0.7	-4.9
	5	Rothiemurchus	16.4	16.2	-0.3	-1.5
	6	Glenmore	19.8	12.9	-6.8	-34.5
	7	Glen Feshie	18.9	16.4	-2.5	-13.2
	27	Dulnain	11.6	11	-0.6	-5.2
Rannoch Group	8	Black Wood	ND	17.1	ND	ND
	9	Old Wood of Meggernie	19.7	15.6	-4.1	-21
Great Glen Group	10	Glen Moriston	21.6	17.7	-3.9	-18.2
	11	Glengarry	13.6	21.7	8.1	59.9
	12	Barisdale	25.4	21.1	-4.3	-16.7
	13	Loch Arkaig & Glen Mallie	20.3	24.6	4.3	21.3
	14	Ardgour	22.3	18.3	-4	-18
Strath Glass Group	15	Glen Affric	20.6	17.8	-2.8	-13.4
	16	Glen Cannich	19	16.8	-2.2	-11.3
	17	Glen Strathfarrar	17.2	18.8	1.6	9.5
	18	Guisachan & Cougie	20.7	15.6	-5.1	-24.8
Wester Ross Group	19	Coulin	22.7	22.9	0.2	0.8
	20	Achnashellach	17.7	21.3	3.6	20.5
	21	Shieldaig	19.9	18.1	-1.8	-8.8
	23	Loch Maree	13.6	16.6	2.9	21.6
Northern Group	22	Amat	20.1	22.1	2	10
Southern Group	24	Black Mount	18.1	17.1	-1	-5.5
	25	Glen Orchy	19.7	14.2	-5.5	-27.9
	26	Tyndrum	21.4	25	3.6	17
		Mean	*18.6*	*17.5*	*-1.1*	*-4.5*

Table S4. List of top 25 ground flora species recorded, 2018-2022

	Species	Common name	No. of records	Change in position on list
1	*Calluna vulgaris*	Heather	392	=
2	*Vaccinium myrtillus*	Bilberry/Blaeberry	374	=
3	*Molinia caerulea*	Purple moor-grass	314	↑
4	*Deschampsia flexuosa*	Wavy hair grass	306	=
5	*Potentilla erecta*	Tormentil	289	↓
6	*Blechnum spicant*	Hard fern	278	↑
7	*Sorbus aucuparia*	Rowan	242	↑
8	*Erica tetralix*	Cross-leaved heather	190	↑
9	*Vaccinium vitis-idaea*	Cowberry	190	↓
10	*Pteridium aquilinum*	Bracken	189	=
11	*Carex echinata*	Star sedge	183	↑
12	*Betula seedling/sp*	Birch	181	↓
13	*Galium saxatile*	Heath bedstraw	170	↑
14	*Narthecium ossifragum*	Bog asphodel	150	↑
15	*Erica cinerea*	Bell heather	133	↑
16	*Juncus effusus*	Soft rush	123	↑
17	*Trichophorum cespitosum*	Deergrass	123	↑
18	*Eriophorum vaginatum*	Hare's Tail Cottongrass	106	↑
19	*Juncus squarrosus*	Heath rush	89	↑
20	*Succisa pratensis*	Devil’s bit scabious	89	↑
21	*Oxalis acetosella*	Wood-sorrel	88	↑
22	*Drosera rotundifolia*	Round-leaved sundew	86	↑
23	*Agrostis canina sens.lat.*	Brown bent	82	↓
24	*Eriophorum angustifolium*	Hare’s-tail cottongrass	81	↑
25	*Anthoxanthum odoratum*	Sweet vernal grass	73	↑

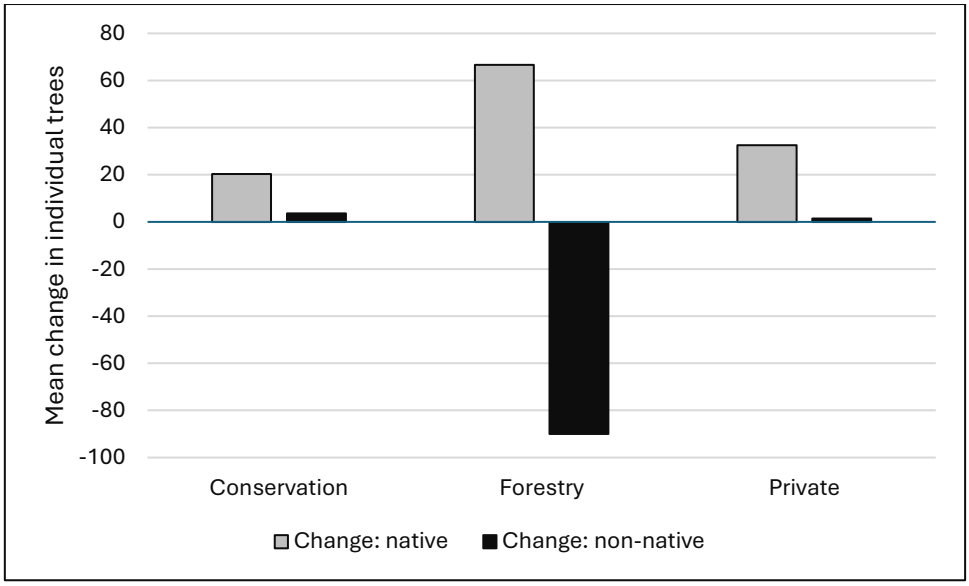


Figure S1. Change in native and non-native woody species, by site ownership