

## Chapter 7 Appendices: Correlation matrices and significance test results for ecosystem service indicators

**Table 7.8: Results from correlations of summary means per Broad habitat (CS UK Results from 2007), stock in 2007**

	Plant species richness	Soil invertebrate diversity	Bee food plants	Butterfly food plants	LOI	SLA
Plant species richness	1	ns	R <sup>2</sup> =+0.52** ns with calc grass removed	R <sup>2</sup> =+0.67*** ns with calc grass removed	ns	Ns
Soil invertebrate diversity		1	ns	ns	ns	Ns
Bee food plants			1	R <sup>2</sup> =+0.8***	ns	Ns
Butterfly food plants				1	Ns	ns
LOI					1	R <sup>2</sup> =-0.8***
SLA						1
Habitat provision	R <sup>2</sup> =-0.26, p=0.08 with calc grass removed r <sup>2</sup> =0.35, p<0.05	ns	ns	R <sup>2</sup> =-0.35*, still sig with BH removed	ns	ns

**Table 7.9: Results from correlations of summary means per Broad habitat (CS UK Results from 2007), change between 98 and 2007**

	Plant species richness	Soil invertebrate diversity	Bee food plants	Butterfly food plants	LOI	SLA
Plant species richness	1	ns	ns	ns	ns	ns
Soil invertebrate diversity		1	ns	ns	ns	ns
Bee food plants			1	R <sup>2</sup> =+0.42*	ns	ns
Butterfly food plants				1	ns	ns
LOI					1	ns
SLA						1
Habitat provision	ns	ns	ns	ns	ns	ns

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

	Positive
	Negative

**Table 7.10: Results from correlations of plot/square level variables by Country, England stock in 2007**

	Plant species richness	Soil invertebrate diversity	Bee food plants	Butterfly food plants	ASPT freshwater invertebrates	LOI	SLA
Plant species richness	1	3.5**	28.9***	33***	4.2***	2.1*	ns
Soil invertebrate diversity		1	3.8***	5.8***	3.6***	2.9**	-2.8**
Bee food plants				38.7***	3.1**	-2.8**	4.3***
Butterfly food plants					4.5***	ns	-3**
ASPT freshwater invertebrates						3.9***	-3.3**
LOI							-9.3***
cultural	3.7***	3.2**	ns	2.9**	ns	8***	-7.5***
Arable area	-7.9***	-3.8***	-7.3***	-7.4***	-5.1***	-7.4***	6.6***
Woodland area	6.1***	4.1***	4.5***	5.1***	ns	ns	Ns
Improved Grass area	ns	ns	5.9***	ns	ns	-3.5***	6.5***
ELS	-3.4***	ns	-2.6**	-3.4***	-3**	ns	3.9***
SSSI	ns	2.8**	-2*	ns	ns	7.3***	-10.6***

**Table 7.11: Results from correlations of plot/square level variables by Country, Scotland stock in 2007**

	Plant species richness	Soil invertebrate diversity	Bee food plants	Butterfly food plants	ASPT freshwater invertebrates	LOI	SLA
Plant species richness	1	ns	17.7***	21.8***	ns	-2.3*	ns
Soil invertebrate diversity		1	ns	ns	ns	-3.2**	2.4*
Bee food plants				26***	-2.2*	-4.7***	29.2***
Butterfly food plants					ns	3.1***	-3.1**
ASPT freshwater invertebrates						ns	-2.7**
LOI							-17.6***
cultural	ns	3.3**	-4.6**	-2.2*	ns	ns	-4.1***
Arable area	-6.1***	ns	-2.4*	-5.2***	-2.4*	-6.7***	9.3***
Woodland area	ns	3.7***	ns	ns	ns	-4.7***	3.7***
Improved Grass area	-2.9**	2.3*	2.6**	-5.2***	-3.1**	-9.7***	12.6***
SSSI	ns	ns	ns	ns	ns	2*	-2.8**

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

**Table 7.12: Results from correlations of plot/square level variables by Country, Wales stock in 2007**

N=487	Plant species richness	Soil invertebrate diversity	Bee food plants	Butterfly food plants	ASPT freshwater invertebrates	LOI	SLA
Plant species richness	1	ns	13.8***	15.6***	ns	-2.3*	Ns
Soil invertebrate diversity		1	ns	ns	ns	ns	Ns
Bee food plants				21.2***	ns	-7.9***	9.4***
Butterfly food plants					ns	-3**	Ns
ASPT freshwater invertebrates						ns	-2.1*
LOI							-7.4***
cultural	ns	ns	ns	ns	ns	2.2*	-3.3**
Arable area	-2*	ns	ns	ns	ns	-2.5*	2.3*
Woodland area	3.4***	ns	3.3**	3.4***	ns	-3.8***	Ns
Improved Grass area	-3.1**	ns	3.5***	ns	-2.6*	-5.7***	9.1***
SSSI	ns	ns	-5***	-2.6**	ns	3.2**	-6.1***

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

**Table 7.13: Results from correlations of plot/square level variables by Broad Habitat, stock in 2007, Broadleaved Woodland**

	Total taxon richness of plant species in CS main plots	Appropriate diversity	Soil invertebrate diversity	Bee Pollinator	Butterflies	Average score per taxon for macro-invertebrates	LOI	SLA
Plant species richness	1	4***	-2.1*	10.5***	9.6***	ns	ns	5.8**
Appropriate diversity		1	-2.4*	ns	5.3***	ns	ns	ns
Soil invertebrate diversity			1	ns	ns	ns	ns	ns
Bee food plants				1	13.3***	ns	ns	6.6***
Butterfly food plants					1	ns	ns	2.3*
ASPT freshwater macro-invertebrates						1	ns	Ns
LOI							1	-2.2*
SSSI	ns	ns	ns	ns	ns	ns	ns	ns

**Table 7.14: Results from correlations of plot/square level variables by Broad Habitat, stock in 2007, Arable**

	Total taxon richness of plant species in CS main plots	Appropriate diversity	Soil invertebrate diversity	Bee Pollinator	Butterflies	Average score per taxon for macro-invertebrates	LOI	SLA
Plant species richness	1	17.9***	ns	18.8***	16.6***	ns	ns	Ns
Appropriate diversity		1	ns	20.3***	18.6***	ns	ns	-2.3*
Soil invertebrate diversity			1	ns	ns	ns	ns	Ns
Bee food plants				1	24***	ns	ns	-2.4*
Butterfly food plants					1	ns	ns	-2*
ASPT freshwater macro-invertebrates						1	ns	Ns
LOI							1	ns
ELS	ns	ns	ns	ns	ns	ns	ns	ns

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

**Table 7.15: Results from correlations of plot/square level variables by Broad Habitat, stock in 2007, Improved Grassland**

	Total taxon richness of plant species in CS main plots	Soil invertebrate diversity	Bee Pollinator plants	Butterfly food plants	Average score per taxon for macro-invertebrates	LOI	SLA
Plant species richness	1	ns	17.5***	18.6***	ns	2.5*	-4.8***
Soil invertebrate diversity		1	ns	ns	ns	ns	Ns
Bee food plants			1	23.6***	3.5***	ns	-2.2*
Butterfly food plants				1	2.9**	ns	-2.5*
ASPT freshwater macro-invertebrates					1	ns	Ns
LOI						1	-2.3*

**Table 7.16: Results from correlations of plot/square level variables by Broad Habitat, stock in 2007, Neutral Grassland**

	Total taxon richness of plant species in CS main plots	Appropriate diversity	Soil invertebrate diversity	Bee Pollinator plants	Butterfly food plants	Average score per taxon for macro-invertebrates	LOI	SLA
Plant species richness	1	6***	ns	8.6***	13.2***	ns	ns	-5.3***
Appropriate diversity		1	ns	3.9***	7.2***	ns	ns	Ns
Soil invertebrate diversity			1	2.7**	3.2**	ns	ns	Ns
Bee food plants				1	15.9***	ns	-3.9***	Ns
Butterfly food plants					1	ns	ns	-3.1**
ASPT freshwater macro-invertebrates						1	ns	Ns
LOI							1	-6.1***
SSSI	ns	ns	4.3***	ns	ns		ns	ns
ELS	-2.1*	ns	ns	-2.8**	ns		ns	ns

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

**Table 7.17: Results from correlations of plot/square level variables by Broad Habitat, stock in 2007, Acid Grassland**

	Total taxon richness of plant species in CS main plots	Appropriate diversity	Soil invertebrate diversity	Bee Pollinator plants	Butterfly food plants	Average score per taxon for macro-invertebrates	LOI	SLA
Plant species richness	1	ns	2.6*	12.2***	11.8***	ns	-4.3***	4.7***
Appropriate diversity		1	ns	ns	ns	ns	ns	ns
Soil invertebrate diversity			1	2.5*	2.9**	ns	ns	Ns
Bee food plants				1	17.5***	ns	-4.6***	7.4***
Butterfly food plants					1	ns	-3.3**	4.2***
ASPT freshwater macro-invertebrates						1	ns	Ns
LOI							1	-6.8***
SSSI	ns	ns	ns	ns	ns		ns	ns

**Table 7.18: Results from correlations of plot/square level variables by Broad Habitat, stock in 2007, Dwarf Shrub Heath**

	Total taxon richness of plant species in CS main plots	Appropriate diversity	Soil invertebrate diversity	Bee Pollinator plants	Butterfly food plants	Average score per taxon for macro-invertebrates	LOI	SLA
Plant species richness	1	4.4***	ns	5***	6.2***	ns	ns	3.4***
Appropriate diversity		1	ns	ns	4.5***	ns	ns	ns
Soil invertebrate diversity			1	ns	Ns	ns	ns	ns
Bee food plants				1	14.7***	ns	ns	ns
Butterfly food plants					1	ns	ns	2.1*
ASPT freshwater macro-invertebrates						1	ns	ns
LOI							1	-4.5***
SSSI	-3.6***	-2*	2.6*	-3**	-3.8***		ns	ns

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

**Table 7.19: Results from correlations of plot/square level variables by Broad Habitat, stock in 2007, Fen, Marsh, Swamp**

	Total taxon richness of plant species in CS main plots	Appropriate diversity	Soil invertebrate diversity	Bee Pollinator plants	Butterfly food plants	Average score per taxon for macro-invertebrates	LOI	SLA
Plant species richness	1	ns	ns	9***	10.3***	ns	-2.3*	ns
Appropriate diversity		1	ns	ns	ns	ns	ns	ns
Soil invertebrate diversity			1	-9.2*	ns	ns	ns	-3*
Bee food plants				1	10.2***	ns	-4.2***	2.6*
Butterfly food plants					1	ns	ns	Ns
ASPT freshwater macro-invertebrates						1	ns	Ns
LOI							1	-3.3**
SSSI	ns	ns	4.3*	-2.1*	ns		ns	-2.1*

**Table 7.20: Results from correlations of plot/square level variables by Broad Habitat, stock in 2007, Bog**

	Total taxon richness of plant species in CS main plots	Appropriate diversity	Soil invertebrate diversity	Bee Pollinator plants	Butterfly food plants	Average score per taxon for macro-invertebrates	LOI	SLA
Plant species richness	1	ns	ns	5.5***	7.8***	ns	-4.3***	4.9***
Appropriate diversity		1	ns	ns	2.1*	ns	ns	ns
Soil invertebrate diversity			1	ns	ns	ns	ns	2.5*
Bee food plants				1	17.2***	ns	ns	Ns
Butterfly food plants					1	ns	ns	2.2*
ASPT freshwater macro-invertebrates						1	ns	Ns
LOI							1	-7.5***
SSSI	-3.1**	ns	ns	ns	ns		ns	ns

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

**Table 7.21: Results from correlations of plot/square level variables by Broad Habitat, change between 1998 and 2007, Broadleaved Woodland**

N=181	Change in plant species richness	Change in Appropriate diversity	Change in Soil invertebrate diversity	Change in Bee Food plants	Change in Butterfly Food plants	Change in ASPT freshwater macro-invertebrates	Change in LOI	Change in SLA
Change in Plant species richness	1	3**	ns	5.1***	4.6***	ns	ns	2.4*
Change in Appropriate diversity		1	-2 p=0.054	ns	ns	ns	ns	2.1*
Change in Soil invertebrate diversity			1	ns	ns	ns	ns	-2.4*
Change in Bee Food plants				1	11.4***	2.1*	ns	ns
Change in Butterfly Food plants					1	2.7**	ns	ns
Change in ASPT freshwater macro-invertebrates						1	ns	ns
Change in LOI							1	ns

**Table 7.22: Results from correlations of plot/square level variables by Broad Habitat, change between 1998 and 2007, Arable**

	Change in plant species richness	Change in Appropriate diversity	Change in Soil invertebrate diversity	Change in Bee Food plants	Change in Butterfly Food plants	Change in ASPT freshwater macro-invertebrates	Change in LOI	Change in SLA
Change in Plant species richness	1	21.7***	1.9, p=0.06	20.8***	22.6***	ns	2.3*	-4.1***
Change in Appropriate diversity		1	ns	17.5***	18***	ns	ns	-4.3***
Change in Soil invertebrate diversity			1	ns	ns	ns	ns	-2, p=0.051
Change in Bee Food plants				1	37.3***	ns	ns	-2.3*
Change in Butterfly Food plants					1	ns	ns	-3**
Change in ASPT freshwater macro-invertebrates						1	ns	ns
Change in LOI							1	ns

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001



**Table 7.23: Results from correlations of plot/square level variables by Broad Habitat, change between 1998 and 2007, Improved Grassland**

	Change in plant species richness	Change in Soil invertebrate diversity	Change in Bee Food plants	Change in Butterfly Food plants	Change in ASPT freshwater macro-invertebrates	Change in LOI	Change in SLA
Change in Plant species richness	1	ns	11.7***	10.1***	ns	ns	ns
Change in Soil invertebrate diversity		1	ns	1.9, p=0.06	ns	ns	ns
Change in Bee Food plants			1	19.1***	ns	ns	ns
Change in Butterfly Food plants				1	ns	ns	ns
Change in ASPT freshwater macro-invertebrates					1	ns	ns
Change in LOI						1	ns

**Table 7.24: Results from correlations of plot/square level variables by Broad Habitat, change between 1998 and 2007, Neutral Grassland**

	Change in plant species richness	Change in Appropriate diversity	Change in Soil invertebrate diversity	Change in Bee Food plants	Change in Butterfly Food plants	Change in ASPT freshwater macro-invertebrates	Change in LOI	Change in SLA
Change in Plant species richness	1	4.4***	ns	7.8***	8.5***	ns	-2.2*	ns
Change in Appropriate diversity		1	ns	2.3*	4.4***	ns	ns	ns
Change in Soil invertebrate diversity			1	ns	ns	ns	ns	ns
Change in Bee Food plants				1	12.9***	ns	ns	ns
Change in Butterfly Food plants					1	ns	ns	ns
Change in ASPT freshwater macro-invertebrates						1	ns	ns
Change in LOI							1	ns

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

**Table 7.25: Results from correlations of plot/square level variables by Broad Habitat, change between 1998 and 2007, Acid grassland**

	Change in plant species richness	Change in Appropriate diversity	Change in Soil invertebrate diversity	Change in Bee Food plants	Change in Butterfly Food plants	Change in ASPT freshwater macro-invertebrates	Change in LOI	Change in SLA
Change in Plant species richness	1	4.2***	ns	6.5***	6.8***	ns	ns	ns
Change in Appropriate diversity		1	ns	3.9***	6.2***	ns	ns	ns
Change in Soil invertebrate diversity			1	ns	ns	ns	2.2*	ns
Change in Bee Food plants				1	12.9***	ns	ns	3.2**
Change in Butterfly Food plants					1	ns	ns	2*
Change in ASPT freshwater macro-invertebrates						1	ns	ns
Change in LOI							1	ns

**Table 7.26: Results from correlations of plot/square level variables by Broad Habitat, change between 1998 and 2007, Dwarf Shrub Heath**

	Change in plant species richness	Change in Appropriate diversity	Change in Soil invertebrate diversity	Change in Bee Food plants	Change in Butterfly Food plants	Change in ASPT freshwater macro-invertebrates	Change in LOI	Change in SLA
Change in Plant species richness	1	3.1**	ns	2.5*	2*	-2.2*	ns	ns
Change in Appropriate diversity		1	ns	3.3**	5.7***	ns	ns	ns
Change in Soil invertebrate diversity			1	ns	ns	ns	2.2*	ns
Change in Bee Food plants				1	12.5***	ns	ns	ns
Change in Butterfly Food plants					1	ns	ns	ns
Change in ASPT freshwater macro-invertebrates						1	ns	ns
Change in LOI							1	ns

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

**Table 7.27: Results from correlations of plot/square level variables by Broad Habitat, change between 1998 and 2007, Fen, Marsh, Swamp**

	Change in plant species richness	Change in Appropriate diversity	Change in Soil invertebrate diversity	Change in Bee Food plants	Change in Butterfly Food plants	Change in ASPT freshwater macro-invertebrates	Change in LOI	Change in SLA
Change in Plant species richness	1	3.6**	ns	4.9***	2.5*	ns	ns	ns
Change in Appropriate diversity		1	ns	2.8**	ns	ns	ns	ns
Change in Soil invertebrate diversity			1	ns	ns	ns	ns	ns
Change in Bee Food plants				1	5.6***	ns	ns	ns
Change in Butterfly Food plants					1	ns	ns	ns
Change in ASPT freshwater macro-invertebrates						1	ns	ns
Change in LOI							1	ns

**Table 7.28: Results from correlations of plot/square level variables by Broad Habitat, change between 1998 and 2007, Bog**

	Change in plant species richness	Change in Appropriate diversity	Change in Soil invertebrate diversity	Change in Bee Food plants	Change in Butterfly Food plants	Change in ASPT freshwater macro-invertebrates	Change in LOI	Change in SLA
Change in Plant species richness	1	ns	ns	5.7***	4.2***	ns	ns	2.9**
Change in Appropriate diversity		1	ns	ns	ns	ns	ns	ns
Change in Soil invertebrate diversity			1	ns	-2.8**	ns	ns	ns
Change in Bee Food plants				1	15.2***	ns	ns	ns
Change in Butterfly Food plants					1	ns	3.1**	ns
Change in ASPT freshwater macro-invertebrates						1	ns	ns
Change in LOI							1	ns

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001