

Legally Protected & Notable/Rare Species Records

Gavray Drive 2km Search Area

Common Name	Scientific Name	Abundance/Stage/Record Type	Date	Grid Ref	Grid Ref Qualifier	Location	Further Location info
Round-fruited Rush	Juncus compressus		26/06/2003	SP612213		Meadows NW of Blackthorn Hill	Meadow C
Bluebell	Hyacinthoides non-scripta	locally abundant	28/04/1987	SP588204		Graven Hill	
Bluebell	Hyacinthoides non-scripta		14/06/2002	SP588204		Graven Hill	
Bluebell	Hyacinthoides non-scripta	Locally Frequent	14-Jul-11	SP588204		Graven Hill	Woodland
Tubular Water-dropwort	Oenanthe fistulosa		26/06/2003	SP612213		Meadows NW of Blackthorn Hill	Meadow C
Freshwater Crayfish	Austropotamobius pallipes		28/06/1994	SP58712148		A41 BICESTER (LANGFORD BROOK)	
beetle (Coleoptera)	Bembidion (Semicampa) gilvipes	Collection from 'grass-tussocks'	16/01/2003	SP5922	1 km record	Gavray Drive Meadows	field 12
beetle (Coleoptera)	Bembidion (Semicampa) gilvipes	Collection from 'grass-tussocks'	16/01/2003	SP598222		Gavray Drive Meadows	field 11
beetle (Coleoptera)	Sepedophilus pedicularius	Collection from 'grass-tussocks'	16/01/2003	SP598222		Gavray Drive Meadows	Field 11
beetle (Coleoptera)	Sepedophilus pedicularius	Collection from 'grass-tussocks'	16/01/2003	SP6022	1 km record	Gavray Drive Meadows	Field 5
beetle (Coleoptera)	Amidobia talpa	Collection from 'grass-tussocks'	16/01/2003	SP5922	1 km record	Gavray Drive Meadows	Field 6
beetle (Coleoptera)	Philonthus fumarius	Collection from 'grass-tussocks'	16/01/2003	SP5922	1 km record	Gavray Drive Meadows	Field no number
Grizzled Skipper	Pyrgus malvae	Adults	14/06/2002	SP588204		Graven Hill	
Wood White	Leptidea sinapis	10 to 29	1995	SP601245			
Wood White	Leptidea sinapis	10 to 29	1995	SP601245		Whitecross Green Wood	
Brown Hairstreak	Thecla betulae	1	27/10/2005	SP599219		Gavray Drive Meadows	field 1, middle of northern boundary
Brown Hairstreak	Thecla betulae	1	27/10/2005	SP599220		Gavray Drive Meadows	field 2, northern boundary
Brown Hairstreak	Thecla betulae	2	27/10/2005	SP599222		Gavray Drive Meadows	field 7, middle of northern boundary
Brown Hairstreak	Thecla betulae	2 eggs	27/10/2005	SP59942226		Gavray Drive Meadows	Middle of northern boundary of Field 7
Brown Hairstreak	Thecla betulae	1 egg	27/10/2005	SP5992199		Gavray Drive Meadows	Middle of northern boundary of Field 1
Brown Hairstreak	Thecla betulae	1 egg	27/10/2005	SP6002204		Gavray Drive Meadows	Northern boundary of Field 2
Brown Hairstreak	Thecla betulae	1	27/10/2005	SP600221		Gavray Drive Meadows	field 3, middle of northern boundary
Brown Hairstreak	Thecla betulae	4	27/10/2005	SP600222		Gavray Drive Meadows	field 5, NE corner
Brown Hairstreak	Thecla betulae	1 egg	27/10/2005	SP60052216		Gavray Drive Meadows	Middle of northern boundary of Field 3
Brown Hairstreak	Thecla betulae	4 eggs	27/10/2005	SP60092222		Gavray Drive Meadows	NE corner of Field 5
Brown Hairstreak	Thecla betulae	1	27/10/2005	SP601219		Gavray Drive Meadows	field 17, middle of western boundary
Brown Hairstreak	Thecla betulae	1 egg	27/10/2005	SP60132201		Gavray Drive Meadows	Middle of western boundary of Field 17
Brown Hairstreak	Thecla betulae	1	27/10/2005	SP602221		Gavray Drive Meadows	field 17, middle of northern boundary
Brown Hairstreak	Thecla betulae	1 egg	27/10/2005	SP60242206		Gavray Drive Meadows	Middle of northern boundary of Field 17
Black Hairstreak	Satyrrium pruni	2 Adults	15/06/2008	SP597222		Gavray Drive Meadows	
Black Hairstreak	Satyrrium pruni	2 Adults	15/06/2007	SP5979222256		Gavray Drive Meadows	
Black Hairstreak	Satyrrium pruni	1 Adult	22-Jun-10	SP598221		Gavray Drive Meadows	West
Black Hairstreak	Satyrrium pruni	2 Adults	15/06/2007	SP5983222084		Gavray Drive Meadows	
Black Hairstreak	Satyrrium pruni	3 Adults	27/06/2006	SP599221		Gavray Drive Meadows	Gavray Drive
Black Hairstreak	Satyrrium pruni	2 Adults	22/06/2006	SP599221		Gavray Drive Meadows	Gavray Drive
Marsh Fritillary	Euphydryas aurinia		Jun-06	SP599222		Gavray Drive Meadows	
Wall	Lasiommata megera		22/08/1990	SP580212			
Wall	Lasiommata megera	1 Adult	1994	SP601245		Whitecross Green Wood	
Small Heath	Coenonympha pamphilus	1 Adult	06/07/1997	SP5823	1 km record	Bicester N	
Small Heath	Coenonympha pamphilus	Adults	26/06/2002	SP598222		Gavray Drive Meadows	Gavray Drive western fields
Small Heath	Coenonympha pamphilus	1 to 9	05/07/1991	SP601219		Oxon tetrad 6020	
Small Heath	Coenonympha pamphilus	1 to 9	05/07/1991	SP601221		Oxon tetrad 6020	
Small Heath	Coenonympha pamphilus	2 to 9	1997	SP603228		Launton Churchyard	
Ghost Moth	Hepialus humuli		06/06/2004	SP600240		Bicester Airfield	explosives dump area
Oak Hook-tip	Watsonalla binaria		06/06/2004	SP600240		Bicester Airfield	explosives dump area
Small Phoenix	Ecliptopera silaceata		06/06/2004	SP600240		Bicester Airfield	explosives dump area
White Ermine	Spilosoma lubricipeda		06/06/2004	SP600240		Bicester Airfield	explosives dump area
Buff Ermine	Spilosoma luteum		06/06/2004	SP600240		Bicester Airfield	explosives dump area
Cinnabar	Tyria jacobaeae		06/06/2004	SP600240		Bicester Airfield	explosives dump area
Cinnabar	Tyria jacobaeae	Adults	24/06/2002	SP602220		Gavray Drive Meadows	Gavray Drive field 22 (renamed field 17)
Small Square-spot	Diarsia rubi		06/06/2004	SP600240		Bicester Airfield	explosives dump area
Broom Moth	Melanchra pisi		06/06/2004	SP600240		Bicester Airfield	explosives dump area
Shoulder-striped Wainscot	Mythimna comma		06/06/2004	SP600240		Bicester Airfield	explosives dump area
Knot Grass	Acronicta rumicis		06/06/2004	SP600240		Bicester Airfield	explosives dump area
Dusky Brocade	Apamea remissa		06/06/2004	SP600240		Bicester Airfield	explosives dump area
Large Nutmeg	Apamea anceps		06/06/2004	SP600240		Bicester Airfield	explosives dump area
Mottled Rustic	Caradrina morpheus		06/06/2004	SP600240		Bicester Airfield	explosives dump area
Smooth Newt	Lissotriton vulgaris	4 Adults	28/04/2003	SP601223		Bicester	
Smooth Newt	Lissotriton vulgaris	16 Adults	04/05/2003	SP601223		Bicester	
Smooth Newt	Lissotriton vulgaris	25 Adults	21/05/2003	SP601223		Bicester	
Smooth Newt	Lissotriton vulgaris	6 Adults	11/04/2003	SP601223		Bicester	
Smooth Newt	Lissotriton vulgaris	<4 Adults	Apr-02	SP60692255		Ditch, Sherwood Close, Launton	
Great Crested Newt	Triturus cristatus	26 Females	04/05/2003	SP601223		Bicester	

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Common Name	Scientific Name	Abundance/Stage/Record Type	Date	Grid Ref	Grid Ref Qualifier	Location	Further Location info
Great Crested Newt	Triturus cristatus	26 Males	21/05/2003	SP601223		Bicester	
Great Crested Newt	Triturus cristatus	15 Females	21/05/2003	SP601223		Bicester	
Great Crested Newt	Triturus cristatus	21 Males	11/04/2003	SP601223		Bicester	
Great Crested Newt	Triturus cristatus	14 Females	11/04/2003	SP601223		Bicester	
Great Crested Newt	Triturus cristatus	69 Males	28/04/2003	SP601223		Bicester	
Great Crested Newt	Triturus cristatus	29 Females	28/04/2003	SP601223		Bicester	
Great Crested Newt	Triturus cristatus	51 Male	04/05/2003	SP601223		Bicester	
Great Crested Newt	Triturus cristatus	egg	13/04/2004	SP61682248		Paddock adj. to Launton Brook	
Common Toad	Bufo bufo	15 Adults	28/04/2003	SP601223		Bicester	
Common Toad	Bufo bufo	11 Adult	04/05/2003	SP601223		Bicester	
Common Toad	Bufo bufo	6 Adults	21/05/2003	SP601223		Bicester	
Common Toad	Bufo bufo	9 Adults	11/04/2003	SP601223		Bicester	
Common Frog	Rana temporaria	11 Adult	28/04/2003	SP601223		Bicester	
Common Frog	Rana temporaria	18 Adults	04/05/2003	SP601223		Bicester	
Common Frog	Rana temporaria	22 Adults	21/05/2003	SP601223		Bicester	
Common Frog	Rana temporaria	6 Adults	11/04/2003	SP601223		Bicester	
Common Frog	Rana temporaria	1 Adult	Apr-02	SP60692255		Ditch and pond, Sherwood Close, Launton	
Common Kestrel	Falco tinnunculus	2	19/08/2002	SP59702225		Gavray Drive Meadows	field 9 (renamed field 11)
Common Kestrel	Falco tinnunculus	4 Juveniles	12/06/2005	SP615217		Launton	
Common Kestrel	Falco tinnunculus	5 Juveniles	28/06/2004	SP615222		Launton	
Northern Lapwing	Vanellus vanellus	300	23-Feb-01	SP578217		Bicester	
Common Swift	Apus apus	Pairs	01/05/2009- 30/07/2009	SP577225		Sites along and near Kingsclere Road/ Chalvey Road, Bicester	
Common Swift	Apus apus		01/05/2010- 30/07/2010	SP577225		Sites along and near Kingsclere Road/Chalvey Road and Aldbourne Cres, Bicester	
Common Swift	Apus apus		01/05/2010- 30/07/2010	SP578224		Colne Close, Bicester	
Common Swift	Apus apus		01/05/2010- 30/07/2010	SP578225		Evenlode Close, Bicester	
Common Swift	Apus apus	nest record	01/05/2008- 31/08/2008	SP580225		Kings End, Bicester	
Common Swift	Apus apus	Pairs	01/05/2009- 30/07/2009	SP580225		West side of Kings End, Bicester	
Common Swift	Apus apus		01/05/2010- 30/07/2010	SP580225		West side of Kings End, Bicester, victorian properties	
Common Swift	Apus apus	nest record	01/05/2008- 31/08/2008	SP58202231		7 Cemetery Road, Bicester	
Common Swift	Apus apus	Pairs, nest record	01/05/2009- 30/07/2009	SP58202231		7, Cemetery Road, Bicester	
Common Swift	Apus apus	nest	01/05/2010- 30/07/2010	SP58202231		7, Cemetery Road, Bicester	
Common Swift	Apus apus	Pairs	01/05/2009- 30/07/2009	SP582230		New Road, Bicester	
Common Swift	Apus apus		01/05/2010- 30/07/2010	SP582230		New Road, Bicester	
Common Swift	Apus apus	Pairs, nest record	01/05/2009- 30/07/2009	SP58232291		22, Field Street, Bicester	
Common Swift	Apus apus	nest	01/05/2010- 30/07/2010	SP58232291		22, Field Street, Bicester	
Common Swift	Apus apus	nest	01/05/2010- 30/07/2010	SP5838622327		Henley House, Causeway, Bicester	
Common Swift	Apus apus	nest record	01/05/2008- 31/08/2008	SP584223		Henley House, Causeway, Bicester	
Common Swift	Apus apus	Pairs, nest record	01/05/2009- 30/07/2009	SP584223		Henley House, Causeway, Bicester	
Common Swift	Apus apus		01/05/2010- 30/07/2010	SP586239		Southwold Estate, off of Buckingham Road, Banbury	
Common Kingfisher	Alcedo atthis		14/08/2003	SP60202345		Bicester Airfield	area 17 Stream
Hoopoe	Upupa epops		20/11/1980	SP588204		Graven Hill	Royal ordnance base, Graven Hill
Green Woodpecker	Picus viridis		28/04/1987	SP588204		Graven Hill	
Green Woodpecker	Picus viridis		16/01/2003	SP5922	1 km record	Gavray Drive Meadows	field 6
Sky Lark	Alauda arvensis	1	21/07/2009	SP608210		Meadows NW of Blackthorn Hill	Meadow NW of Blackthorn Hill South East Field
Sky Lark	Alauda arvensis		12/07/2004	SP611215		Meadows NW of Blackthorn Hill	Blackthorn Hill Extension Meadows 1,2 and 4
Sky Lark	Alauda arvensis	1	21/07/2009	SP612213		Meadows NW of Blackthorn Hill	Large Field
Sky Lark	Alauda arvensis	1	21/07/2009	SP612213		Meadows NW of Blackthorn Hill	Long thin field
Hedge Accentor	Prunella modularis		26/06/2002	SP598222		Gavray Drive Meadows	Gavray Drive western fields
Song Thrush	Turdus philomelos		26/06/2002	SP598222		Gavray Drive Meadows	Gavray Drive western fields
Common Grasshopper Warbler	Locustella naevia		28/04/1987	SP588204		Graven Hill	
Common Whitethroat	Sylvia communis		26/06/2002	SP598222		Gavray Drive Meadows	Gavray Drive western fields
Willow Warbler	Phylloscopus trochilus		28/04/1987	SP588204		Graven Hill	
Common Bullfinch	Pyrrhula pyrrhula		12/07/2004	SP607212		Meadows NW of Blackthorn Hill	Blackthorn Hill Extension Meadow 3
Common Bullfinch	Pyrrhula pyrrhula		12/07/2004	SP611215		Meadows NW of Blackthorn Hill	Blackthorn Hill Extension Meadows 1,2 and 4
Common Bullfinch	Pyrrhula pyrrhula	1	21/07/2009	SP612213		Meadows NW of Blackthorn Hill	Hedgerow
Common Bullfinch	Pyrrhula pyrrhula	1	21/07/2009	SP612213		Meadows NW of Blackthorn Hill	Small field (MG4)
Yellowhammer	Emberiza citrinella	1	07-Jul-99	SP605205		Bicester	
Yellowhammer	Emberiza citrinella		12/07/2004	SP607212		Meadows NW of Blackthorn Hill	Blackthorn Hill Extension Meadow 3
Yellowhammer	Emberiza citrinella	1	21/07/2009	SP608210		Meadows NW of Blackthorn Hill	Meadow NW of Blackthorn Hill South East Field
Yellowhammer	Emberiza citrinella	1	21/07/2009	SP612213		Meadows NW of Blackthorn Hill	Large Field
Yellowhammer	Emberiza citrinella		12/07/2004	SP614216		Meadows NW of Blackthorn Hill	Blackthorn Hill Proposed Extension Meadows, Meadow 5
European Water Vole	Arvicola amphibius		Jun-03	SP580230		Bicester	
European Water Vole	Arvicola amphibius		08/04/1999	SP580236		Ray Catchment	

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European Water Vole	Arvicola amphibius		Sep-03	SP581228		River Bure, Bicester	
European Water Vole	Arvicola amphibius		Feb-00	SP595226		Ray Catchment	
West European Hedgehog	Erinaceus europaeus	1	18/10/2006	SP582222		Bicester	
West European Hedgehog	Erinaceus europaeus	1	30/10/2006	SP582229		Bicester	
West European Hedgehog	Erinaceus europaeus	2	19/08/2006	SP585239		Bicester	
West European Hedgehog	Erinaceus europaeus	1	31/08/2007	SP587238		Bicester	
West European Hedgehog	Erinaceus europaeus	3	31/08/2007	SP587238		Bicester	
West European Hedgehog	Erinaceus europaeus	2	18/10/2006	SP587241		Bicester	
West European Hedgehog	Erinaceus europaeus	1	07/11/2006	SP591232		Churchill Road, Bicester	
West European Hedgehog	Erinaceus europaeus	1, dead on road	14/05/2006	SP592226		100m SW of bridge over Bicester Ring Rd, between Gavray Drive & Railway	
West European Hedgehog	Erinaceus europaeus	2	07/11/2006	SP596235		Bicester	
Pipistrelle Bat species	Pipistrellus		28-Jan-12	SP58812229		Bicester Town Council offices, Garth Park, Launton Road, Bicester, Oxon OX26 2PS	
Pipistrelle Bat species	Pipistrellus	94, Roost	24/07/1986	SP610225			
Pipistrelle Bat species	Pipistrellus	10 other	12/08/1987	SP612228			
Common Pipistrelle	Pipistrellus pipistrellus		13/01/1993	SP604228		Launton	
Brown Long-eared Bat	Plecotus auritus		28-Jan-12	SP58812229		Bicester Town Council offices, Garth Park, Launton Road, Bicester, Oxon OX26 2PS	
Polecat	Mustela putorius	1 dead on road	14/10/2006	SP596208		A41, nr.entrance to M.O.D. Bicester Graven Hill	

Legally Protected & Notable/Rare Species Records

Data Origin	UK Legislation	European Legislation	Global IUCN Red List	UK Red List	UK BAP Status 2007	NERC Act 2006	2009 BOCC Status	Easting	Northing	Taxon Code
OLWS				post2001:NT				461200	221300	2400008550
BBOWT	W&C Act 1981, Schedule 8, Section 13 Part 2							458800	220400	2400010280
OLWS	W&C Act 1981, Schedule 8, Section 13 Part 2							458800	220400	2400010280
TVERC	W&C Act 1981, Schedule 8, Section 13 Part 2							458800	220400	2400010280
OLWS				post2001:VU	Priority Sp.	Section 41 Sp.		461200	221300	2400026410
EA	Schedule 5, parts 1, 5(a) and (b) (W&C Act 1981)		post94:VU		Priority Sp.	Section 41 Sp.		458710	221480	5600000221
LN								459000	222000	7810351660
LN								459800	222200	7810351660
OBRC								459800	222200	7811001670
OBRC								460000	222000	7811001670
OBRC								459000	222000	7811003495
OBRC								459000	222000	7811008870
OLWS					Priority Sp.	Section 41 Sp.		458800	220400	8300002679
BBOWT	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		460100	224500	8300002702
UTBC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		460100	224500	8300002702
OLWS	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		459900	221900	8300002740
OLWS	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		459900	222000	8300002740
OLWS	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		459900	222200	8300002740
UTBC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		459940	222260	8300002740
UTBC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		459990	221990	8300002740
UTBC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		460000	222040	8300002740
OLWS	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		460000	222100	8300002740
OLWS	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		460000	222200	8300002740
UTBC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		460050	222160	8300002740
UTBC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		460090	222220	8300002740
OLWS	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		460100	221900	8300002740
UTBC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		460130	222010	8300002740
OLWS	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		460200	222100	8300002740
UTBC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		460240	222060	8300002740
UTBC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)			post2001:EN				459700	222200	8300002746
UTBC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)			post2001:EN				459792	222256	8300002746
UTBC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)			post2001:EN				459800	222100	8300002746
UTBC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)			post2001:EN				459832	222084	8300002746
UTBC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)			post2001:EN				459900	222100	8300002746
UTBC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)			post2001:EN				459900	222100	8300002746
TVERC					Priority Sp.	Section 41 Sp.		459900	222200	8300002857
UTBC					Priority Sp.	Section 41 Sp.		458000	221200	8300002871
UTBC					Priority Sp.	Section 41 Sp.		460100	224500	8300002871
UTBC					Priority Sp.	Section 41 Sp.		458000	223000	8300002906
OLWS					Priority Sp.	Section 41 Sp.		459800	222200	8300002906
UTBC					Priority Sp.	Section 41 Sp.		460100	221900	8300002906
UTBC					Priority Sp.	Section 41 Sp.		460100	222100	8300002906
UTBC					Priority Sp.	Section 41 Sp.		460300	222800	8300002906
LN					Priority Sp.	Section 41 Sp.		460000	224000	8400000026
LN					Priority Sp.	Section 41 Sp.		460000	224000	8400002958
LN					Priority Sp.	Section 41 Sp.		460000	224000	8400003161
LN					Priority Sp.	Section 41 Sp.		460000	224000	8400003731
LN					Priority Sp.	Section 41 Sp.		460000	224000	8400003732
LN					Priority Sp.	Section 41 Sp.		460000	224000	8400003748
OLWS					Priority Sp.	Section 41 Sp.		460200	222000	8400003748
LN					Priority Sp.	Section 41 Sp.		460000	224000	8400003852
LN					Priority Sp.	Section 41 Sp.		460000	224000	8400003911
LN					Priority Sp.	Section 41 Sp.		460000	224000	8400003985
LN					Priority Sp.	Section 41 Sp.		460000	224000	8400004125
LN					Priority Sp.	Section 41 Sp.		460000	224000	8400004203
LN					Priority Sp.	Section 41 Sp.		460000	224000	8400004205
LN					Priority Sp.	Section 41 Sp.		460000	224000	8400004304
OBRC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)							460100	222300	10400000036
OBRC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)							460100	222300	10400000036
OBRC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)							460100	222300	10400000036
OBRC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)							460100	222300	10400000036
ORAG	Schedule 5, parts 5(a) and (b) (W&C Act 1981)							460690	222550	10400000036
OBRC	Schedule 5 - all parts (W&C Act 1981)	H & S Dir (An 2)			Priority Sp.	Section 41 Sp.		460100	222300	10400000090

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Data Origin	UK Legislation	European Legislation	Global IUCN Red List	UK Red List	UK BAP Status 2007	NERC Act 2006	2009 BOCC Status	Easting	Northing	Taxon Code
OBRC	Schedule 5 - all parts (W&C Act 1981)	H & S Dir (An 2)			Priority Sp.	Section 41 Sp.		460100	222300	10400000090
OBRC	Schedule 5 - all parts (W&C Act 1981)	H & S Dir (An 2)			Priority Sp.	Section 41 Sp.		460100	222300	10400000090
OBRC	Schedule 5 - all parts (W&C Act 1981)	H & S Dir (An 2)			Priority Sp.	Section 41 Sp.		460100	222300	10400000090
OBRC	Schedule 5 - all parts (W&C Act 1981)	H & S Dir (An 2)			Priority Sp.	Section 41 Sp.		460100	222300	10400000090
OBRC	Schedule 5 - all parts (W&C Act 1981)	H & S Dir (An 2)			Priority Sp.	Section 41 Sp.		460100	222300	10400000090
OBRC	Schedule 5 - all parts (W&C Act 1981)	H & S Dir (An 2)			Priority Sp.	Section 41 Sp.		460100	222300	10400000090
OBRC	Schedule 5 - all parts (W&C Act 1981)	H & S Dir (An 2)			Priority Sp.	Section 41 Sp.		460100	222300	10400000090
OBRC	Schedule 5 - all parts (W&C Act 1981)	H & S Dir (An 2)			Priority Sp.	Section 41 Sp.		460100	222300	10400000090
OBRC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		460100	222300	10400000120
OBRC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		460100	222300	10400000120
OBRC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		460100	222300	10400000120
OBRC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)				Priority Sp.	Section 41 Sp.		460100	222300	10400000120
OBRC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)							460100	222300	10400000288
OBRC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)							460100	222300	10400000288
OBRC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)							460100	222300	10400000288
OBRC	Schedule 5, parts 5(a) and (b) (W&C Act 1981)							460100	222300	10400000288
ORAG	Schedule 5, parts 5(a) and (b) (W&C Act 1981)							460690	222550	10400000288
OLWS							Amber List	459700	222250	10600002240
LN							Amber List	461500	221700	10600002240
LN							Amber List	461500	222200	10600002240
OOS					Priority Sp.	Section 41 Sp.	Red List	457800	221700	10600003000
CDC							Amber List	457700	222500	10600005200
LN							Amber List	457700	222500	10600005200
LN							Amber List	457800	222400	10600005200
LN							Amber List	457800	222500	10600005200
CDC							Amber List	458000	222500	10600005200
CDC							Amber List	458000	222500	10600005200
LN							Amber List	458000	222500	10600005200
CDC							Amber List	458200	222310	10600005200
CDC							Amber List	458200	222310	10600005200
LN							Amber List	458200	222310	10600005200
CDC							Amber List	458200	223000	10600005200
LN							Amber List	458200	223000	10600005200
CDC							Amber List	458230	222910	10600005200
LN							Amber List	458230	222910	10600005200
LN							Amber List	458386	222327	10600005200
CDC							Amber List	458400	222300	10600005200
CDC							Amber List	458400	222300	10600005200
LN							Amber List	458600	223900	10600005200
OLWS	Schedule 1 (W&C Act 1981)	Birds Dir (An 1)					Amber List	460200	223450	10600005280
OBRC	Schedule 1 (W&C Act 1981)							458800	220400	10600005400
BBOWT							Amber List	458800	220400	10600005460
OBRC							Amber List	459000	222000	10600005460
OLWS					Priority Sp.	Section 41 Sp.	Red List	460800	221000	10600005700
OLWS					Priority Sp.	Section 41 Sp.	Red List	461100	221500	10600005700
OLWS					Priority Sp.	Section 41 Sp.	Red List	461200	221300	10600005700
OLWS					Priority Sp.	Section 41 Sp.	Red List	461200	221300	10600005700
OLWS					Priority Sp. (Research only)	Section 41 Sp.	Amber List	459800	222200	10600006300
OLWS					Priority Sp.	Section 41 Sp.	Red List	459800	222200	10600006830
BBOWT					Priority Sp.	Section 41 Sp.	Red List	458800	220400	10600006950
OLWS							Amber List	459800	222200	10600007200
BBOWT							Amber List	458800	220400	10600007400
OLWS					Priority Sp.	Section 41 Sp.	Amber List	460700	221200	10600008610
OLWS					Priority Sp.	Section 41 Sp.	Amber List	461100	221500	10600008610
OLWS					Priority Sp.	Section 41 Sp.	Amber List	461200	221300	10600008610
OLWS					Priority Sp.	Section 41 Sp.	Amber List	461200	221300	10600008610
OOS					Priority Sp.	Section 41 Sp.	Red List	460500	220500	10600009190
OLWS					Priority Sp.	Section 41 Sp.	Red List	460700	221200	10600009190
OLWS					Priority Sp.	Section 41 Sp.	Red List	460800	221000	10600009190
OLWS					Priority Sp.	Section 41 Sp.	Red List	461200	221300	10600009190
OLWS					Priority Sp.	Section 41 Sp.	Red List	461400	221600	10600009190
BBOWT	Schedule 5 - all parts (W&C Act 1981, amended)				Priority Sp.	Section 41 Sp.		458000	223000	10800000000
BBOWT	Schedule 5 - all parts (W&C Act 1981, amended)				Priority Sp.	Section 41 Sp.		458000	223600	10800000000

Legally Protected & Notable/Rare Species Records

Gavray Drive 2km Search Area

Data Origin	UK Legislation	European Legislation	Global IUCN Red List	UK Red List	UK BAP Status 2007	NERC Act 2006	2009 BOCC Status	Easting	Northing	Taxon Code
BBOWT	Schedule 5 - all parts (W&C Act 1981, amended)				Priority Sp.	Section 41 Sp.		458100	222800	10800000000
BBOWT	Schedule 5 - all parts (W&C Act 1981, amended)				Priority Sp.	Section 41 Sp.		459500	222600	10800000000
PTES					Priority Sp.	Section 41 Sp.		458200	222200	10800000090
PTES					Priority Sp.	Section 41 Sp.		458200	222900	10800000090
PTES					Priority Sp.	Section 41 Sp.		458500	223900	10800000090
PTES					Priority Sp.	Section 41 Sp.		458700	223800	10800000090
PTES					Priority Sp.	Section 41 Sp.		458700	223800	10800000090
PTES					Priority Sp.	Section 41 Sp.		458700	224100	10800000090
PTES					Priority Sp.	Section 41 Sp.		459100	223200	10800000090
LN					Priority Sp.	Section 41 Sp.		459200	222600	10800000090
PTES					Priority Sp.	Section 41 Sp.		459600	223500	10800000090
TVERC	Schedule 5 - all parts (W&C Act 1981)	H & S Dir (An 4,5)						458810	222290	10800000500
OBG	Schedule 5 - all parts (W&C Act 1981)	H & S Dir (An 4,5)						461000	222500	10800000500
OBG	Schedule 5 - all parts (W&C Act 1981)	H & S Dir (An 4,5)						461200	222800	10800000500
NE	Schedule 5 - all parts (W&C Act 1981)	H & S Dir (An 4,5)						460400	222800	10800000528
TVERC	Schedule 5 - all parts (W&C Act 1981)	H & S Dir (An 4,5)			Priority Sp.	Section 41 Sp.		458810	222290	10800000570
LN	Badger Act 1992							459400	224100	10800000770
TVERC	Badger Act 1992							459500	222200	10800000770
LN					Priority Sp.	Section 41 Sp.		459600	220800	10800000840

### Species records supplied to EDP by Patricia Clissold

	Common name	Latin name	No. records	Date	Comment	UK Legislation
Butterflies	Brown hairstreak	<i>Thecla betulae</i>	3	16/09/13	Laying eggs	Schedule 5, parts 5(a) and (b) (W&C Act 1981). NERC Act (2006) Section 41 species.
				22/09/13	Female	
				09/06/12	Caterpillar, confirmed by David Redhead of Butterfly Conservation	
	Small copper	<i>Lycaena phlaeus</i>	5	06/08/13		
				10/08/13	On devil's bit scabious	
				16/08/13		
				23/08/13		
				02/06/13		
	Small skipper	<i>Thymelicus sylvestris</i>	1	27/07/13		
	Large skipper	<i>Ochlodes sylvanus</i>	1	25/06/13		
	Grizzled skipper	<i>Pyrgus malvae</i>	1	19/06/13		NERC Act (2006) Section 41 species.
	Large white	<i>Pieris brassicae</i>	1	10/08/13	On devil's bit scabious	
	Common blue	<i>Polyommatus icarus</i>	3	16/08/13	On fleabane, male and female	
				23/08/13	Many	
				19/06/13		
Peacock butterfly	<i>Aglais io</i>	3	16/08/13	On teasle		
			23/08/13			
			27/07/13	Many		
Small tortoiseshell	<i>Aglais urticae</i>	2	23/08/13			
			27/06/13			
Painted lady	<i>Vanessa cardui</i>	1	23/08/13	On fleabane		

	Common name	Latin name	No. records	Date	Comment	UK Legislation
	Brimstone	<i>Gonepteryx rhamni</i>	3	23/08/13		
				27/07/13	Male and female	
				19/06/13		
	Gatekeeper	<i>Pyronia tithonus</i>	2	27/07/13		
				16/07/13		
	Speckled wood	<i>Pararge aegeria</i>	2	27/07/13		
				23/06/13		
	Comma	<i>Polygonia c-album</i>	2	27/07/13		
				15/07/13		
Marbled white	<i>Melanargia galathea</i>	2	27/07/13			
			15/07/13	many		
Meadow brown	<i>Maniola jurtina</i>	2	27/07/13			
			25/06/13	many		
Ringlet	<i>Aphantopus hyperantus</i>	1	27/07/13			
Small heath	<i>Coenonympha pamphilus</i>	1	25/06/13		NERC Act (2006) Section 41 species.	
Moths	Moth	<i>Phlyctaenia perlucidalis</i>	1	22/06/13		
	Latticed heath	<i>Chiasmia clathrata</i>	1	-		NERC Act (2006) Section 41 species.
	Feathered thorn	<i>Colotous pennaria</i>	1	-		
	Blood vein	<i>Timandra comae</i>	1	-		NERC Act (2006) Section 41 species.
	Six-spot burnet	<i>Zygaena filipendulae</i>	1	29/06/13		
	Silver Y	<i>Autographa gamma</i>	1	02/06/13		
	Hoverfly	<i>Volucella zonaria</i>	1	01/09/13	On devil's bit scabious	
	Speckled bush	<i>Leptophyes</i>	1	10/08/13	Male, one leg	



	Common name	Latin name	No. records	Date	Comment	UK Legislation
	cricket	<i>punctissima</i>			missing	
Dragonflies (Odonata)	Unknown species	Unknown species	1	16/08/13	9 individuals	
	Common darter	<i>Sympetrum striolatum</i>	1	23/08/13		
	Southern Hawker	<i>Aeshna cyanea</i>	1	23/08/13		
Reptiles	Common lizard	<i>Zootoca vivipara</i>	2	16/08/13	More than one individual	Schedule 5, part 5 (W&C Act 1981). NERC Act (2006) Section 41 species.
				02/06/13		
	Grass snake	<i>Natrix natrix</i>	1	02/06/13		Schedule 5, part 5 (W&C Act 1981). NERC Act (2006) Section 41 species.
Plants	Ragged robin	<i>Lychnis flos-cuculi</i>	1	Summer 2013		W&C Act 1981
	Fleabane	<i>Pulicaria dysenterica</i>	1	Summer 2013		W&C Act 1981
	Devil's bit scabious	<i>Succisa pratensis</i>	1	Summer 2013		W&C Act 1981
	Common spotted orchid	<i>Dactylorhiza fuchsia</i>	1	Summer 2013		W&C Act 1981
	Meadowsweet	<i>Filipendula ulmaria</i>	1	Summer 2013		W&C Act 1981
	Great burnet	<i>Sanguisorba officinalis</i>	1	Summer 2013		W&C Act 1981
	Sneezewort	<i>Achillea ptarmica</i>	1	Summer 2013		W&C Act 1981

**Annex EDP 2**  
**Analysis of grassland plant communities**  
**at Gavray Drive, Bicester**  
**(Broadview Ecological Consultants**  
**R-13-003 15 September 2013)**

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Broadview Ecological Consultants

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# **Analysis of grassland plant communities at Gavray Drive, Bicester**

**Dr Grace O'Donovan MCIEEM**

**Report for EDP**

**R-13-003**

**15<sup>th</sup> September 2013**

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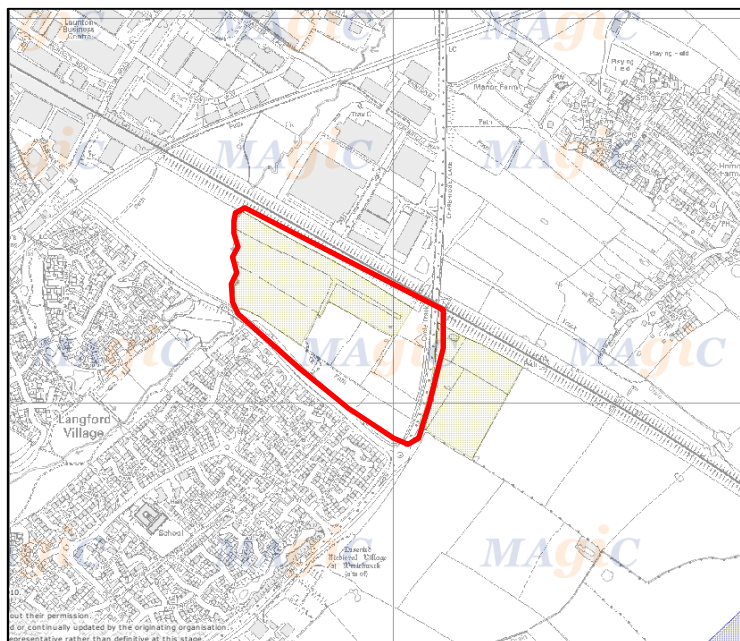
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# Botanical survey, Gavray Drive, Bicester

## 1. Introduction

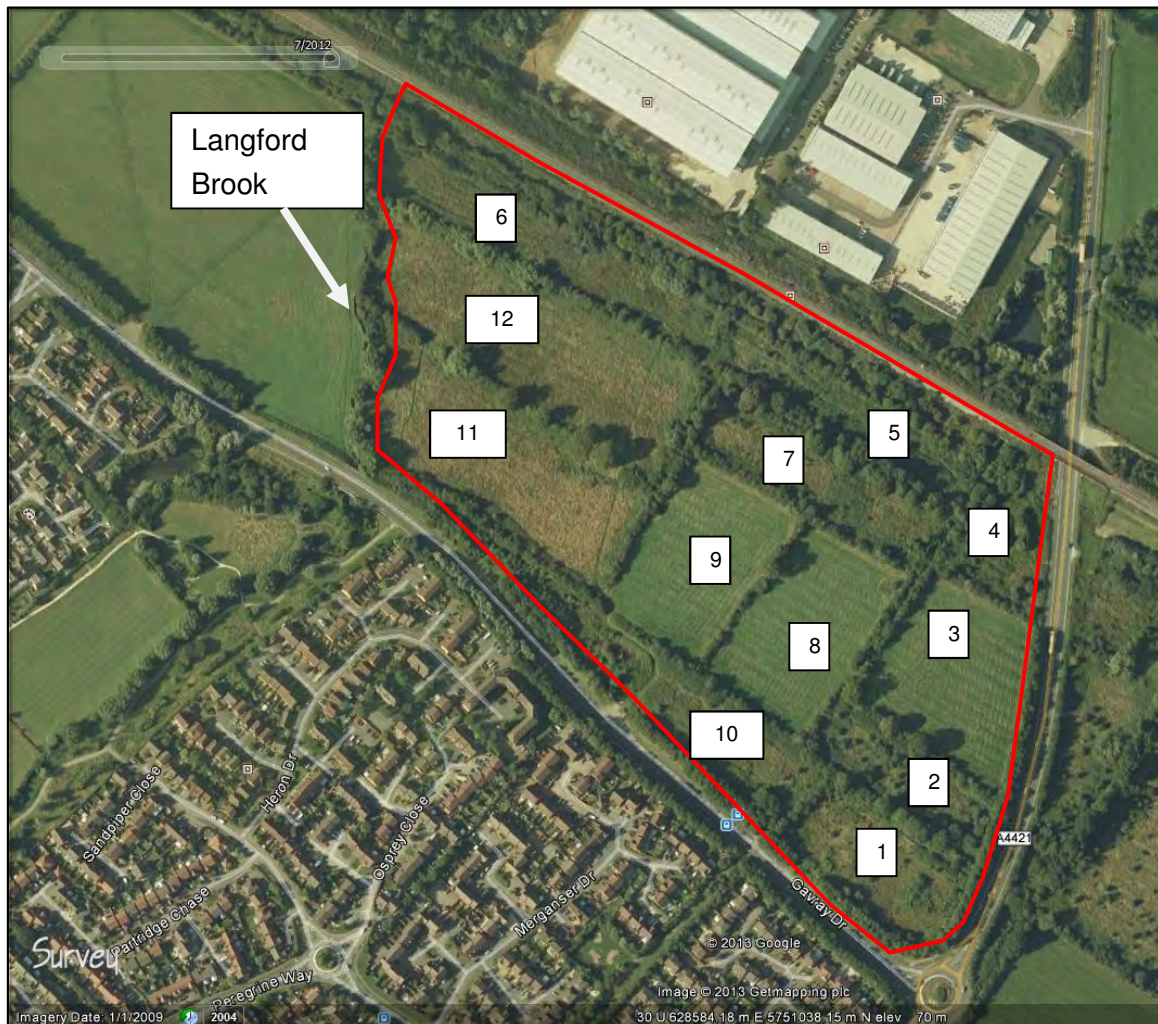
BEC was asked to conduct a National Vegetation Classification survey (NVC) at Gavray Drive, Bicester, to establish the nature of the grassland types present at a site c. 15.6ha in size (Grid. Ref. SP595226). The aim of the survey was also to assess the Wildlife Site eligibility (<http://www.tverc.org/cms/content/local-wildlife-sites>) and Local Biodiversity Action Plan (LBAP) status of the site (<http://www.oncf.org.uk/biodiversity/Lowland%20Meadows%20and%20Floodplain%20Grazing%20Marsh.pdf>). The location of the area sampled for botanical analysis is shown in Fig. 1. These meadows form a mosaic of damp fields with ponds, divided by thick hedges and old trees. Most of the fields are probably former hay meadows and grazing pasture over medieval ridge and furrow field patterns. An aerial view dated 2009 is shown in Fig. 2.



**Figure 1 Botanical survey area at Gavray Drive, Bicester – outlined in red. Green area denotes BAP habitat (MAGIC).**

The area to be surveyed was divided into fields labeled 1-12 (see Fig. 2). Fields 5, 6, 7, 11 and 12 have previously been designated as a Wildlife Site (Wildlife Site Citation (revised) 2003) and as an LBAP for Lowland Meadow (Fig. 1).

The aim of the survey was to establish if the Wildlife Site was still representative of designation as LBAP Lowland Grassland within the context of Oxfordshire County, and to investigate the adjacent fields within the site boundary for plant community structure.



**Figure 2** Aerial view of the grassland area surveyed (red outline) at Gavray Drive, Bicester. The 12 fields surveyed were named Areas 1-12 for mapping purposes (Google Earth 2009).

## 2. Methods

### 2.1 Field work

A grassland survey of this site was completed in 2002 by CPM (CPM 2002). This survey (2013) was carried out to provide an update on that survey and to determine the status of the grasslands present in relation to the National Vegetation Classification (NVC) for grasslands (Rodwell, British Plant Communities Volume 3., 1998). This grassland survey was restricted to the 12 fields east of Langford Brook (Fig. 2).

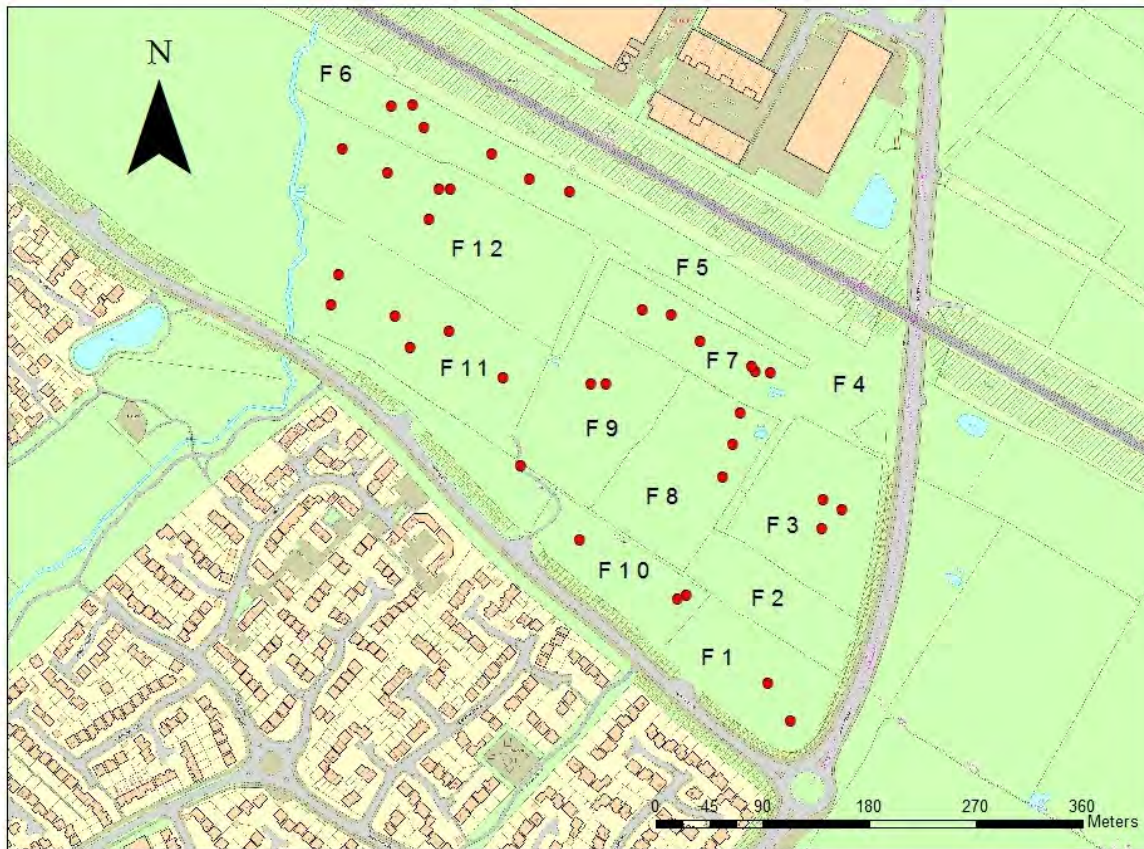
All 12 fields within the site boundary were visited and assessed for the presence of grassland areas for sampling. The field site was visited on a total of four days throughout the growing season; 9/6/2013, 10/6/2013, 7/8/2013 and 23/8/2013. This allowed for identification of late flowering species such as *Carex* spp..

Full species lists were created for each of the fields and abundance was noted using the DAFOR (D=dominant, A=abundant, F=frequent, O=occasional, R=rare) scale. Each field was walked in a zig-zag fashion to cover as much ground as possible. A full plant species list was taken to see if we could (i) pick up all the LBAP lowland grassland indicator species mentioned for the site and (ii) to ascertain their abundance and location.

Thirty-nine 2mX2m quadrats were then taken in total throughout the site for comparison with the National Vegetation Classification (NVC). Areas of differing grassland communities were identified if present in each field and mapped. If the area was large enough, >10m<sup>2</sup>, then at least three quadrats were taken in each community type recognised, for comparison with NVC. Information regarding the characteristics of the sward and any small-scale topographical information such as relationship to ridge and furrow were noted.

Quadrats were located within homogenous vegetation stands (Rodwell, British Plant Communities Volume 3., 1998). Photographs were taken of the general view in each field (Section 3.1) and of each quadrat (Appendix 1). Quadrat data are to be found in Appendix 2. Quadrats were located spatially using a Garmin 12X GPS. The GPS co-ordinates were entered into Excel and imported directly into ARC10.1 as a .CSV file (Appendix 3), using Mastermap as a backdrop (Fig. 3).





**Figure 3** Quadrat positions (red dots) in relation to Field Number (F1-F12). No quadrats were taken in Fields 5, 4 and 2.

Floristic comparisons were made with National Biodiversity Action Plans for Lowland Meadows (UK BAP) and the Local Biodiversity Action Plan for Lowland Meadows and Floodplain Grazing Marsh (Oxfordshire LBAP). Criteria for Wildlife Site status were checked against the Thames Valley Environmental Record Centre's (TVERC) descriptions for Lowland Grassland types. Comments on the grasslands' relative importance regionally and nationally are made.

## 2.2 Ordination techniques: Twinspan and Decorana

Quadrat data (Appendix 2), were entered into Excel. The quadrats were initially analysed using the ordination techniques Twinspan (Two-Way Indicator Species Analysis) and Decorana (Detrended Correspondence Analysis) within software called PCORD (<http://home.centurytel.net/~mjm/pcordwin.htm>).

Twinspan constructs a dichotomous classification of the quadrats and then uses this classification to classify the species according to their ecological preferences (Hill, 2005). This produces a two-way ordered table, expressing the species' synecological relations. This analysis was carried out to objectively define the major groupings within the data set. Six

levels of division were chosen within the software as the best cut-off point to describe the vegetation types present.

Detrended Correspondence Analysis is a multivariate technique which produces a scattergram of the quadrats and species in multivariate space. This analysis is less rigid than Twinspan and aids observation of any ecological trends in the data, based on species presence and abundance. It also helps to identify any subtle differences and transitions in the plant community composition.

### 2.3 MAVIS

MAVIS (Modular Analysis of Vegetation Information System; <http://www.ceh.ac.uk/products/software/CEHSoftware-MAVIS.htm>); software was designed by the Centre of Hydrology and Ecology (CEH). It was used in this context to match the groupings produced by TWINSpan to assign the vegetation stands objectively to NVC categories. A percentage similarity to NVC (sub)community types was produced. This allows for comments to be made on the closeness of the vegetation surveyed to true NVC classes.

## 3. Results

### 3.1 General Field descriptions

#### 3.1.1 Field 1

The eastern end of Field 1 was heavily scrubbed up with mature trees present including oak (*Quercus* sp.), grey willow (*Salix cinerea*) and blackthorn (*Prunus spinosa*). There were 45 species recorded. According to the report by CPM (2002), the consensus was that topsoil had been removed and the area had suffered much disturbance in the past. No quadrats were taken in this area, due to the lack of open, grassy sward. However, towards the east end of the field, it became much wetter and a large area of marshy inundated grassland was identified (Fig. 4).

It was dominated by floating sweet-grass (*Glyceria fluitans*), flag iris (*Iris pseudacorus*), false fox sedge (*Carex otrubae* locally frequent), lesser pond sedge (*Carex acutiformis*, locally dominant) and rush species (*Juncus* spp.). This area was sufficiently large to take two quadrats.



Figure 4 Field 1 looking East.

### 3.1.2 Field 2

Field 2 was heavily scrubbed up by blackthorn, oak, grey willow, bramble and nettles, all locally dominant. There were 42 species recorded. A closed canopy had formed of oak (*Quercus robur*), 2-5m tall (Fig. 5), showing a late stage of succession here.



Figure 5 Field 2 showing a well developed canopy of trees.

However, there were deep channels present in the field which were waterlogged during the survey and these provided opportunities for sedges (hairy sedge, *Carex hirta*), rushes (compact rush *Juncus conglomeratus* and soft rush *Juncus effusus*) and floating sweet-



grass (*Glyceria fluitans*). Due to the lack of open grassland areas big enough, it was not possible to take quadrats here.

### 3.1.3 Field 3

Field three is a hay meadow and is dry, but having strong ridge and furrow formation, the west end is dominated by tongues of wet grassland aligned from west to east, interdigitating with the dry grassland (Fig. 6).



Figure 6 Field 3 showing the tongues of wet marshy grassland in the furrows of the ridge and furrow.

This is presumably due to impeded drainage on the west side. There were 27 species recorded. The dry area is fairly uniform throughout with a good cover of grass species Meadow foxtail (*Alopecurus pratensis*), Sweet vernal grass (*Anthoxanthum odoratum*), Yorkshire fog (*Holcus lanatus*) and meadow grass (*Poa pratensis*). Hard heads (*Centaurea nigra*) was also locally abundant in places. The wet areas were dominated by tufted hair grass (*Deschampsia caespitosa*), soft rush (*Juncus effusus*) and marsh trefoil (*Lotus pedunculatus*). Three quadrats were taken in the wetter areas. No quadrats were taken in the drier areas as similar vegetation occurred in Fields 8 and 9, where six quadrats were taken in all.

### 3.1.4 Field 4

Field 4 occupies the most north-easterly part of the site and is a quite small field in comparison to the others. There were 52 species recorded. It is currently heavily scrubbed up with blackthorn, oak, sycamore, ash and bramble. There were two small open areas with grassland predominating (Fig. 7) and these were relatively species-rich with devil's bit scabious (*Succisa pratensis*), tormentil (*Potentilla erecta*) and hard heads (*Centaurea nigra*).



**Figure 7** An open grassy area in Field 4.

Wetter areas were populated by tufted hair grass (*Deschampsia cespitosa*), lesser pond sedge (*Carex acutiformis*), soft rush (*Juncus effusus*) and compact rush (*Juncus conglomeratus*). However, these were not uniform enough to take quadrats for NVC analysis.

### **3.1.5 Field 5**

Field 5 is a linear field along the north edge of the site. It is part of the LBAP for Lowland Meadow. There were 50 species recorded. This area has scrubbed up considerably, with bramble (*Rubus fruticosus* agg.), hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), sycamore (*Acer pseudoplatanus*) and oak (*Quercus robur*) (Fig. 8).

However, it is still quite species-rich with a mixture of wet grassland and marsh species (lesser pond sedge, hairy sedge, false fox sedge), rushes (soft rush, hard rush and compact rush), reedmace (*Typha latifolia*) and tufted hair grass. In more open grassy areas, devil's bit scabious (*Succisa pratensis*) was found along with tormentil (*Potentilla erecta*) and the grasses Yorkshire fog (*Holcus lanatus*), false oat grass (*Arrhenatherum elatius*), meadow foxtail (*Alopecurus pratensis*) and common bent (*Agrostis capillaris*). Despite the severe amount of scrub encroachment, the floristic diversity appears to be holding on. The herb species seemed to be more abundant close to the scrub edge, rather than in the rank grassland.





Figure 8 View of Field 5.

As a result of the severe scrub encroachment, there were no open grassy areas of sufficient size, quality or homogeneity to take quadrats for NVC analysis.

### 3.1.6 Field 6

Field 6 is part of the LBAP for Lowland Meadow. There were 45 species recorded. The north-west area was drier with large stands of false oat-grass dominating the vegetation (Fig. 9). Moving towards the south-east part, it became wetter with reed canary grass (*Phalaris arundinacea*) and lesser pond sedge (*Carex acutiformis*) dominating.



Figure 9 Field 6 looking south-east.

The site also became more species-rich towards the south-east end. There was scrub encroachment here, with bramble and grey willow. The field was divided into two sections and three quadrats were taken in each section (Fig. 3). Grass species found were meadow foxtail, false oat grass and Yorkshire fog and the only occurrence of meadow barley (*Hordium secalinum*). The wetter marshy grassland species predominated though, with four sedge species (hairy sedge, brown sedge, pond sedge and false fox sedge) and four rush species (soft rush, hard rush, compact rush and jointed rush (*Juncus articulatus*)). A single stand of common spotted orchid (*Dactylorhiza fuchsii*) was also found, and had been recorded in that field in a previous report (CPM 2002).

### 3.1.7 Field 7

Field 7 is part of the LBAP for Lowland Meadow. There were 48 species recorded. Six quadrats were taken in this field. This field suffers greatly from scrub encroachment but there are some open areas where it was possible to take quadrats (Fig. 10). Devil's bit scabious was found here and it was noted that it thrived better where the surrounding area had been grazed by rabbits. This had opened the sward sufficiently to allow the plant to spread.



Figure 10 General view of open area in field 7 where quadrats were taken.

This grassland type showed an emphasis towards an acid grassland with the presence of common bent (*Agrostis capillaris*), tormentil (*Potentilla erecta*), devil's bit scabious (*Succisa pratensis*) and sheep's bit (*Festuca ovina*). Other species present were betony (*Stachys officinalis*) and bird's foot trefoil (*Lotus corniculatus*). Parts of the area were also quite wet with three species of rush present (soft, jointed and compact rushes). Reed canary grass and tufted hair grass were locally abundant. Oak and ash saplings were noted in the open areas.



### 3.1.8 Field 8

Field 8 is a hay meadow and was relatively species poor with 24 species present. It is not part of the LBAP. Three quadrats were taken here. Meadow foxtail and Yorkshire fog are abundant, with occasional sheep's bit and smooth meadow grass. Perennial ryegrass (*Lolium perenne*) was occasional. Herb species locally abundant were meadow buttercup (*Ranunculus acris*), creeping buttercup (*Ranunculus repens*), with meadow vetchling (*Lathyrus pratensis*) occasional. No photograph was taken in Field 8 but it was very similar to Field 9 (Fig. 11).

### 3.1.9 Field 9

Field 9 is a hay meadow and was relatively species poor with 28 species present. It is not part of the LBAP. It is very similar in floristic composition to Field 8. Three quadrats were taken here.



Figure 11 View of Field 9.

### 3.1.10 Field 10

Field 10 is located on the south side of the site. It is not part of the LBAP. There were 39 species recorded. It is split by a public path and is linear in shape, tapering to the west. It is bordered by dense, mature hedgerows on all sides. Being close to the path and narrow in configuration, it has scrubbed up quite considerably with brambles (*Rubus fruticosus* agg.), particularly at the west end. Other invasive scrub species present were sycamore (*Acer campestre*) and blackthorn (*Prunus spinosa*) (Fig. 12). It is also quite disturbed, evidenced by the presence of nettle (*Urtica dioica*) and creeping thistle (*Cirsium arvense*). A wet grassland area was identified at the west end, dominated by floating sweet-grass (*Glyceria fluitans*), rushes (*Juncus* spp.) and Iris (*Iris pseudacorus*). Three quadrats were taken in this field.



Figure 12 Field 10 looking west.

### 3.1.11 Field 11

Field 11 is part of the LBAP Lowland Meadow and has 38 species recorded. Parts of Field 11 were highly disturbed with locally dominant stands of hairy willowherb (*Epilobium hirsutum*). This may have reflected the comments of there having been a fire here in an earlier survey (CPM 2002). There was a steady encroachment from the north of a line of oak saplings and rose (*Rosa canina*). Bramble growth dominated the southern boundary. The grassland in the middle was rank throughout due to lack of management and had meadow foxtail, Yorkshire fog, sweet vernal grass, cocksfoot (*Dactylis glomerata*) and red fescue (*Festuca rubra*) in moderate amounts. Great burnet (*Sanguisorba officinalis*) was also present. The field was roughly divided into a drier grassy area to the east and a wetter grassy area to the west (Fig. 13). Three quadrats were taken in each area.



Figure 13 Field 11 facing west.

### 3.1.12 Field 12

Field 12 is part of the LBAP for Lowland Meadow and has 33 species recorded. It is very similar to Field 11 in the vegetation type present, but there was a predominantly wet area roughly half way along on the north side (Fig. 14). As this field is also ridge and furrow, some of the furrows have become extremely wet, dominated by reed sweet grass (*Glyceria maxima*) and reed canary grass (*Phalaris arundinacea*). Five quadrats were taken in this field, three in the drier area, and two quadrats taken in the very wet area, although this is strictly more of a swamp vegetation community than a grassland community.



Figure 14 Field 12 in the wetter furrow areas.

## 3.2 DAFOR

DAFOR results for Gavray Drive site are shown in Table 1. A total of 154 grassland species (with some invading scrub saplings) were found. Additional species were found in this field season that were not recorded in 2002 (CPM, 2002); these are highlighted in green in Table 1. Others not found this season, compared to 2002, were highlighted in yellow. Some of the discrepancy is due to more scrub species being indentified this year, such as viburnum (*Viburnum opulus*) and elder (*Sambucus nigra*). By contrast, two sedge species were not found this season; glaucous sedge (*Carex flacca*) and spiked sedge (*Carex spicata*). Great burnet, a hay meadow indicator, was found in all of the LBAP fields except Field 5, and was missing from the non-LBAP fields. This was found in one more field than the 2002 survey. Two other hay meadow indicators, sneezewort (*Achillea ptarmica*) and pepper saxifrage (*Silaum silaus*), identified in the revised Wildlife Site Citation in 2003, were not found during this survey or in the CPM survey in 2002. Common spotted orchid (*Dactylorhiza* cf. *fuchsii*) was only found in Field 6 this year, having been found in Fields 5 and 6 in 2002. Sheep's

fescue (*Festuca ovina*) was identified in Field 7 this year. This can be difficult to tell apart from red fescue, so may have been overlooked before.

Total number of species present in each field varied from 24 in Field 8, to 52 in Field 4. The LBAP fields 5, 6 and 7 identified for Lowland Meadow in the wildlife site citation had higher total species numbers than some of the non-LBAP fields, ranging from 45 species to 50 species (Table 2). However, two of the non-LBAP fields; Field 4 and Field 2, reached equivalent total species numbers, with 52 and 42 respectively. These were also relatively smaller fields but were heavily scrub-encroached with wet areas, which may have accounted for the higher species number overall.

In general there was not much difference in the species composition and number between the 2002 and the 2013 survey, despite the passage of time.

**Table 1 Full species list for Fields 1-12 at Gavray Drive, Bicester. The DAFOR scale was used for abundance (D=dominant, A=abundant, F=frequent, O=occasional, R=rare. A prefix of L was used for 'locally') Species highlighted in yellow were found in a survey dated 2002 (CPM, 2002) but not found in this survey, and those highlighted in green are additional species identified in this survey.**

Species/Field number	1	2	3	4	5	6	7	8	9	10	11	12
<i>Acer campestre</i>		O		R	R					LD		
<i>Achillea millefolium</i>											R	
<i>Aegopodium podagraria</i>												
<i>Agrostis capillaris</i>				F	F	F	A					
<i>Agrostis stolonifera</i>	LF	O										
<i>Ajuga reptans</i>			R								R	
<i>Alopecurus geniculatus</i>												
<i>Alopecurus myosuroides</i>		R										
<i>Alopecurus pratensis</i>	O	F	LA			R	A	LA	LA	LF	F	D
<i>Angelica sylvestris</i>					O	R					R	R
<i>Anisantha sterilis</i>					R				O	O		
<i>Anthriscus sylvestris</i>	O						O	O	LA	O	R	
<i>Anthoxanthum odoratum</i>			LA					O	LA	F	O	O
<i>Arrhenatherum elatius</i>	LA	F	O			F		F	LA	F		
<i>Artemisia vulgaris</i>	O			O						R		
<i>Barbarea vulgaris</i>					R							
<i>Bromus hordeaceus</i>									F	LA		
<i>Calliergonella cuspidata</i>	LD											
<i>Calystegia sepium</i>				O								
<i>Cardamine flexuosa</i>					R							
<i>Cardamine pratensis</i>			O				O		O			R
<i>Carex acuta</i>												
<i>Carex acutiformis</i>	LD			O		O						
<i>Carex disticha</i>						LA						
<i>Carex flacca</i>												
<i>Carex hirta</i>	O	O		O		O	F					O
<i>Carex otrubae</i>	LF				R	O				R		
<i>Carex ovalis</i>							O					
<i>Carex spicata</i>												
<i>Centaurea nigra</i>	O		LA	R						R	R	
<i>Cerastium fontanum</i>	O		O					O	O		R	R
<i>Cirsium arvense</i>	O	F	O	R	O	O	O	O	O	O	R	R
<i>Cirsium palustre</i>	O	F	R	F	F	F	F				R	O
<i>Cirsium vulgare</i>	O	R		O	O		O				R	
<i>Convolvulus arvensis</i>		O										
<i>Crataegus monogyna</i>					O							
<i>Cynosurus cristatus</i>	R											



<i>Dactylis glomerata</i>		b	o				o		b	F	F	R
<i>Dactylorhiza sp.</i>						R						
<i>Daucus carota</i>				o								
<i>Deschampsia cespitosa</i>	o	F	LA	F	F	LD	LA		o		F	F
<i>Dipsacus fullonum</i>				o								
<i>Elytrigia repens</i>		R										
<i>Epilobium ciliatum</i>		o		R	F	F	o					
<i>Epilobium hirsutum</i>	F	LD		F	o	F	o	R	LA		A	A
<i>Epilobium CF. montanum</i>	F						o		o	F	R	F
<i>Equisetum arvense</i>				R								
<i>Festuca arundinacea</i>		o				R						
<i>Festuca pratensis</i>												
<i>Festuca ovina</i>							LA					
<i>Festuca rubra</i>		o	o	o	F	o	F		o	LA	F	o
<i>Filipendula ulmaria</i>		o				F					R	F
<i>Fragaria vesca</i>												
<i>Fraxinus excelsior</i>				F	F	o				F	R	
<i>Galium aparine</i>	o				o				R			R
<i>Galium palustre</i>		R					F					R
<i>Galium verum</i>		R										
<i>Geranium dissectum</i>	R						R					
<i>Glechoma hederacea</i>	R						o					R
<i>Glyceria fluitans</i>		D								LD		
<i>Glyceria maxima</i>												LD
<i>Heracleum sphondylium</i>			R		o	o				o	o	
<i>Hieracium agg.</i>					R							
<i>Holcus lanatus</i>			F	F	F	F	o	LF	LF	LA	F	o
<i>Hordeum secalinum</i>						R						
<i>Humulus lupulus</i>											R	R
<i>Hypericum hirsutum</i>												
<i>Hypericum perforatum</i>				o	R							
<i>Hypochaeris radicata</i>												
<i>Iris pseudacorus</i>										R		
<i>Juncus articulatus</i>						R	o					
<i>Juncus conglomeratus</i>	LA	o		LF	o	R	LD					
<i>Juncus effusus</i>		R	LA		R	R	o			LF	R	
<i>Juncus inflexus</i>				LF	R	F			LA			R
<i>Lactuca virosa</i>											R	R
<i>Lamium album</i>											R	
<i>Lathyrus pratensis</i>	LF							o		R	o	
<i>Leontodon cf. autumnalis</i>	R											
<i>Leucanthemum vulgare</i>	LF		R	R								
<i>Lolium perenne</i>								o	o			
<i>Lotus corniculatus</i>							R					
<i>Lotus pedunculatus</i>	LA	o	LA		R	R	o				o	
<i>Luzula campestris</i>			R				F	o				
<i>Lychnis flos-cuculi</i>												R
<i>Lycopus europaeus</i>		o		R								
<i>Lythrum salicaria</i>												
<i>Medicago lupulina</i>												
<i>Melilotus officinalis</i>				o								
<i>Mentha aquatica</i>				R		R						
<i>Myosotis arvensis</i>												R
<i>Myosotis scorpioides</i>				R		R	R					
<i>Persicaria maculosa</i>				R								
<i>Phalaris arundinacea</i>						o	LD					LD
<i>Pheum pratense</i>		o				o	R					
<i>Phleum bertolonii</i>												
<i>Picris echioides</i>	R	R		R	R							
<i>Plantago lanceolata</i>						R						
<i>Plantago major</i>												
<i>Poa pratensis</i>	o	LA	LA		F		F	F	o	F		
<i>Poa trivialis</i>							o		o			
<i>Polygonum persicaria</i>				R						R		
<i>Potentilla anserina</i>						R						

<i>Potentilla erecta</i>				O	R		LA					
<i>Potentilla reptans</i>	LA		R	O	R	R	F	O		O	O	
<i>Prunella vulgaris</i>				R	R		R					
<i>Prunus spinosa</i>	LD	LD		O	O	R				O		
<i>Pulicaria dysenterica</i>				O								
<i>Quercus robur</i>	F	LD		O	O						O	R
<i>Ranunculus acris</i>		F	A					LA	O	F	R	R
<i>Ranunculus ficaria</i>	O										R	
<i>Ranunculus repens</i>			O	O	O	R	F	LA	O	F		
<i>Rosa arvensis</i>												
<i>Rosa canina</i>	O			O	R	F	R				R	R
<i>Rubus fruticosus agg</i>	LD	LD	R	F	LA	F	LA			LD	R	
<i>Rumex acetosa</i>	O		F			O	O	LA	F	O	O	
<i>Rumex crispus</i>	O		O						O	O	R	R
<i>Rumex obtusifolius</i>		O	R	R	R		R			O		
<i>Rumex sanguineus</i>		O		O	O	O	R					
<i>Salix sp.</i>				O	O							
<i>Salix cinerea</i>	LD	LD		O		O						
<i>Sambucus nigra</i>				R								
<i>Sambucus nigra</i>												
<i>Sanguisorba officinalis</i>		R		R		R	R	O			R	R
<i>Scleropodium purum</i>							LA					
<i>Scrophularia auriculata</i>	O	LD		R	R					R		
<i>Senecio erucifolius</i>		R										
<i>Senecio jacobaea</i>		O		F	R	O						
<i>Silene latifolia</i>												
<i>Solanum dulcamara</i>		O			R			O				
<i>Sonchus arvensis</i>												
<i>Sonchus asper</i>					R	O						
<i>Stachys officinalis</i>							F					
<i>Stachys sylvatica</i>					R					R	R	
<i>Stellaria graminea</i>					R		R		LF			
<i>Succisa pratensis</i>				O	R		LF					
<i>Taraxacum agg.</i>								R		O		
<i>Torilis japonica</i>				R	O							
<i>Trifolium campestre</i>											R	
<i>Trifolium dubium</i>	R											
<i>Trifolium medium</i>					R	R						
<i>Trifolium pratense</i>	O							LA	LA	F	R	
<i>Trifolium repens</i>	O				O	O				O		
<i>Trisetum flavescens</i>												
<i>Tussilago farfara</i>	LA			R								
<i>Typha latifolia</i>					R							
<i>Ulmus sp</i>												
<i>Urtica dioica</i>		LD	O	O	F		R	O	O	LD	F	O
<i>Veronica chamaedrys</i>							LA	R				R
<i>Viburnum opulus</i>	O											
<i>Vicia cracca</i>	O	R		R	R		R	R				R
<i>Vicia hirsuta</i>	R											
<i>Vicia sativa ssp. nigra</i>										O		
<i>Vicia tetrasperma</i>												
x <i>Festulolium loliaceum</i>									O	LA		

Table 2 Total number of species recorded in Fields 1-12 in Gavray Drive. LBAP fields are highlighted in green.

Field number	1	2	3	4	5	6	7	8	9	10	11	12
Total species number	45	42	27	52	50	45	48	24	28	39	38	33



### 3.3 Ordination techniques

#### 3.3.1 *Detrended Correspondence Analysis*

Detrended Correspondence Analysis (DCA) was conducted on the quadrat data set to detect any ecological trends such as wetness or dryness, or changes in soil pH reflected by the presence of neutral grassland- or acid grassland communities. It was also used to express the species- and quadrat data visually in multivariate space. This was useful for assigning the Twinspan groupings and NVC classifications in terms of multivariate analysis. The vegetation quadrats Q8A12 and Q10A12, taken in Field 12, were not included in the analysis as they were not strictly speaking a grassland community type but more of a fen community type. As a result, 37 quadrats were included in the analysis out of an original 39 quadrats.

The scattergram produced (Fig. 15) represents two dimensionless axes (1 and 2) which reflect the most variation explained by the data. These axes are orthogonal to each other (95.4%) and are therefore not co-correlated. The data presented in Fig. 15 are for the quadrat data only. Each triangle in the scattergram represents the quadrat number, followed by the field number (e.g. Quadrat 33 in Field 5 = 33A5).

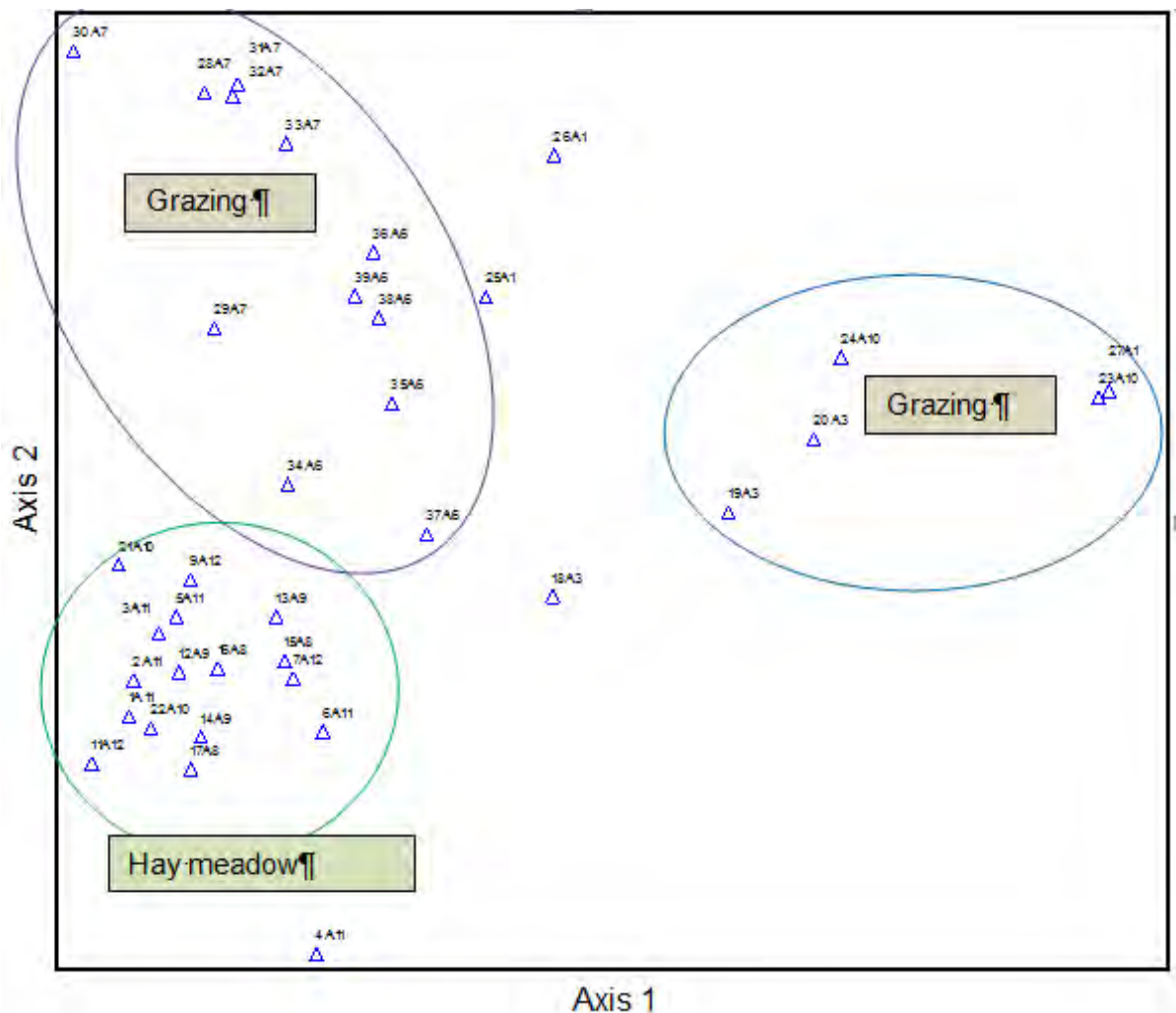


Figure 15 Detrended Correspondence Analysis quadrat scattergram. Coloured boxes suggest suitable management.

Axis 1 appears to represent a relatively dry to wet gradient from left to right, with quadrats of drier vegetation (e.g. Fields 8 and 9) on the left hand side of the scatter and wetter vegetation on the right hand side (e.g. wetter quadrats in Fields 3, 10 and 1). Axis 2 seems to reflect a change in pH in the vegetation, with neutral grassland quadrats situated in the lower left part of the quadrant (Fields 10 (dry end), 11, 12) and more acid grassland types on the upper left part of the quadrant (Fields 6 and 7).

The species scatter (Fig. 16) shows the species best associated with the quadrat data in Fig 15. Acid indicators such as tormentil (*Potentilla erecta*) and devil's bit scabious (*Succisa pratensis*) are situated in the top left hand corner, while more neutral grassland species are found in the bottom left hand corner e.g. meadow foxtail (*Alopecurus pratensis*), meadow vetchling (*Lathyrus pratensis*), false oat grass (*Arrhenatherum elatius*), and Great burnet (*Sanguisorba officinalis*). Wet indicator species are to be found on the right hand side of the scatter e.g. floating sweet grass (*Glyceria fluitans*), flag iris (*Iris pseudacorus*), soft rush (*Juncus effusus*) and marsh trefoil (*Lotus pedunculatus*).

The scatter on Axis 2 also reflects differences in past management as species in the top left hand corner are most usually found in grazed areas, and species in the bottom left hand corner are associated with hay meadows as stated in the Wildlife Site citation (Lambrick, 2003).

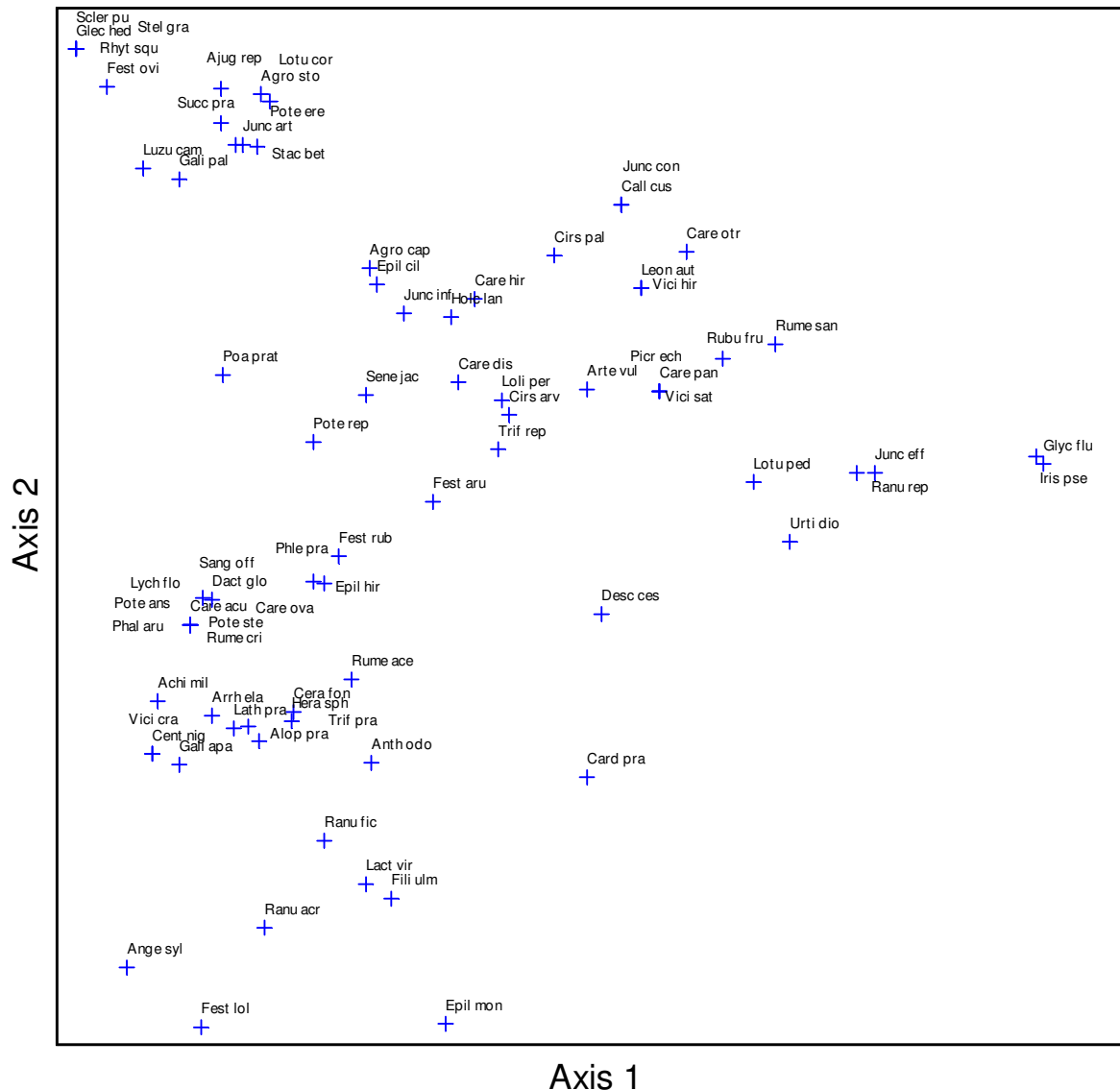


Figure 16 Species ordination along Axis 1 and Axis 2 (latin names shortened to 8 letters for the analysis).

Species abundances can also be shown separately in Decorana, whereby higher abundance is shown by larger triangle symbols in the quadrat scattergram.

For example, the distribution of devil's bit scabious (*Succisa pratensis*) can be seen in Fig. 17, where it is more abundant, e.g. Field 7 in the top left hand quadrant of the scatter. This is also true of the other acid indicator species' cover and abundance, such as common bent in Fig. 18.

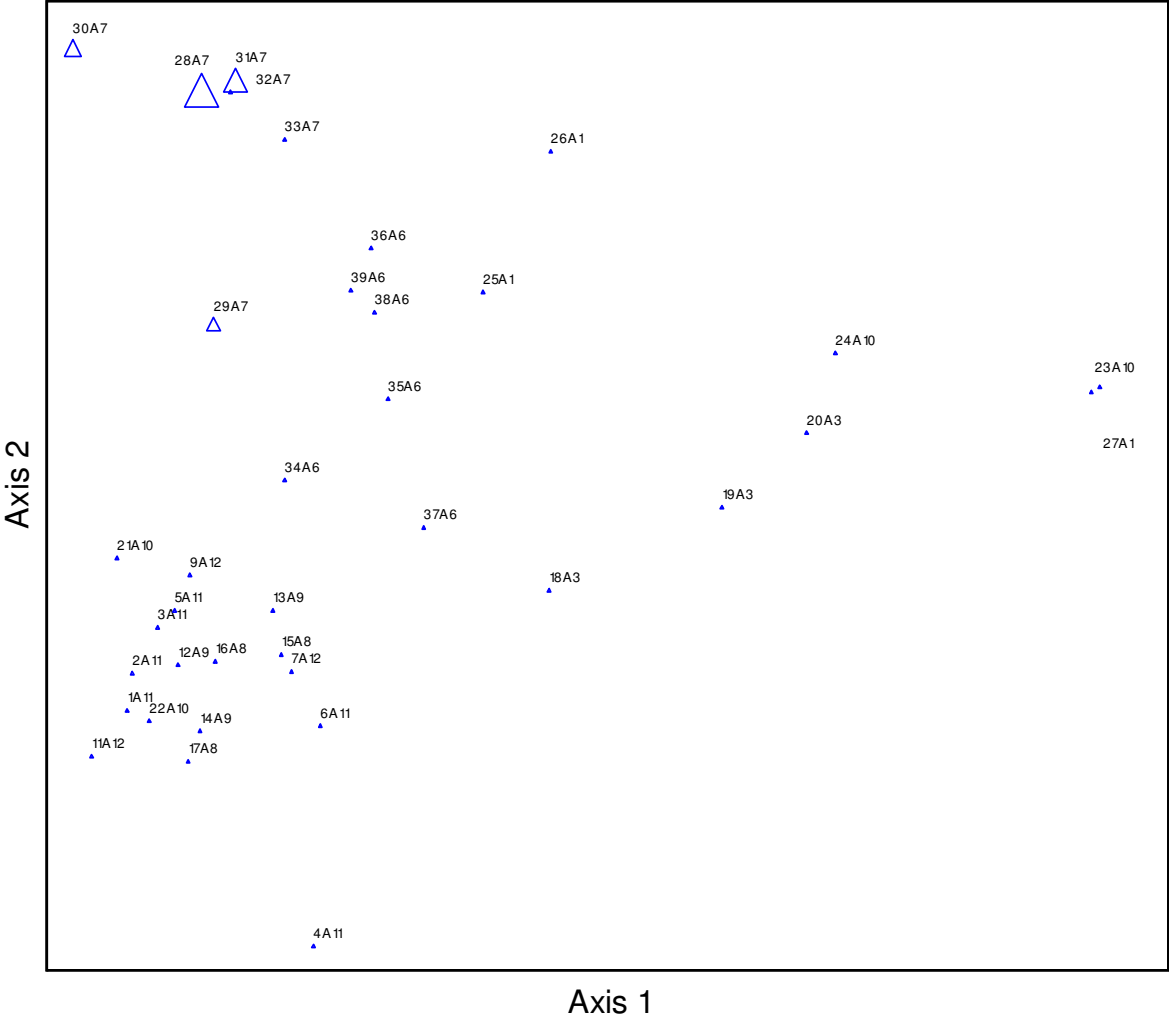
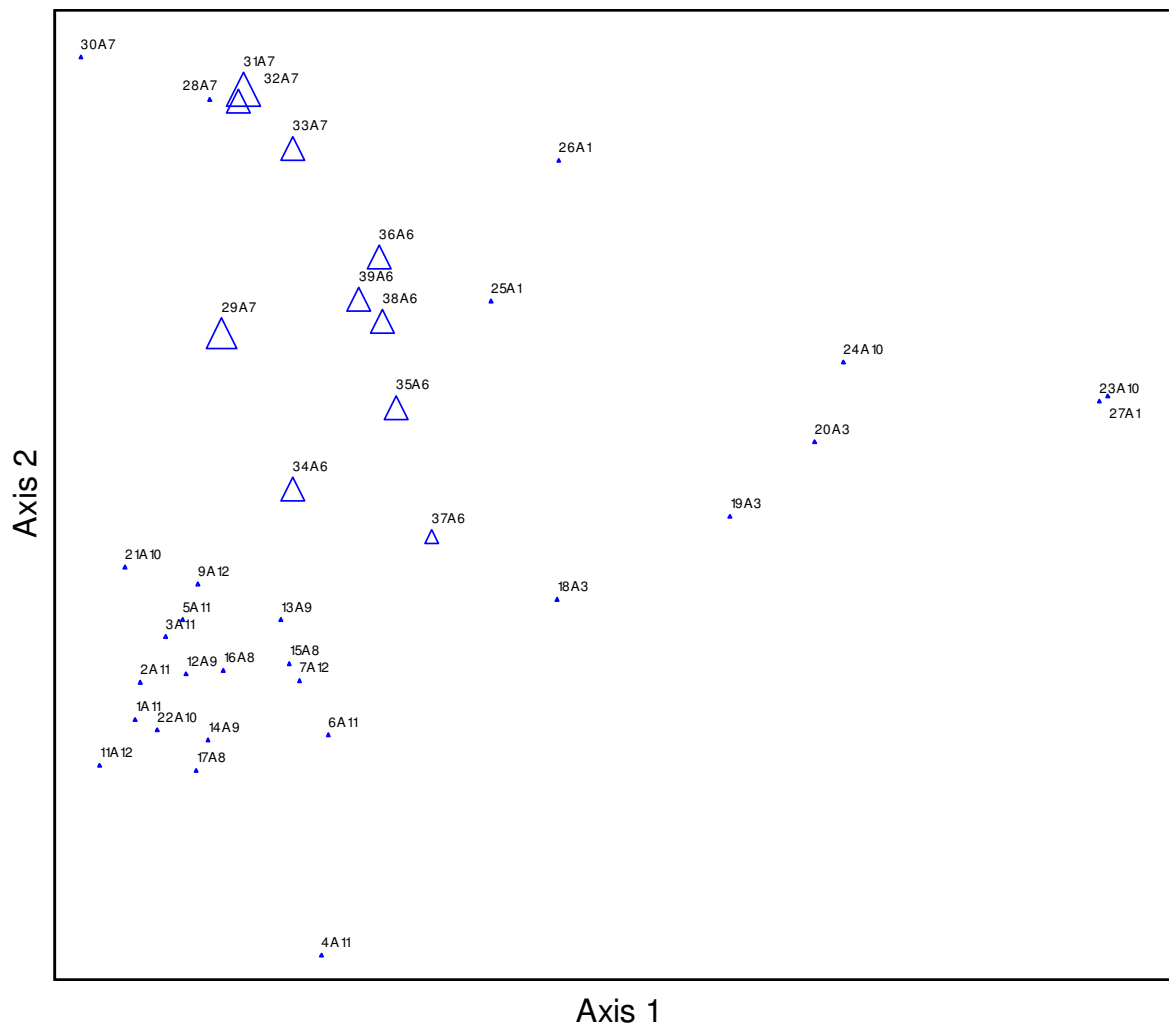


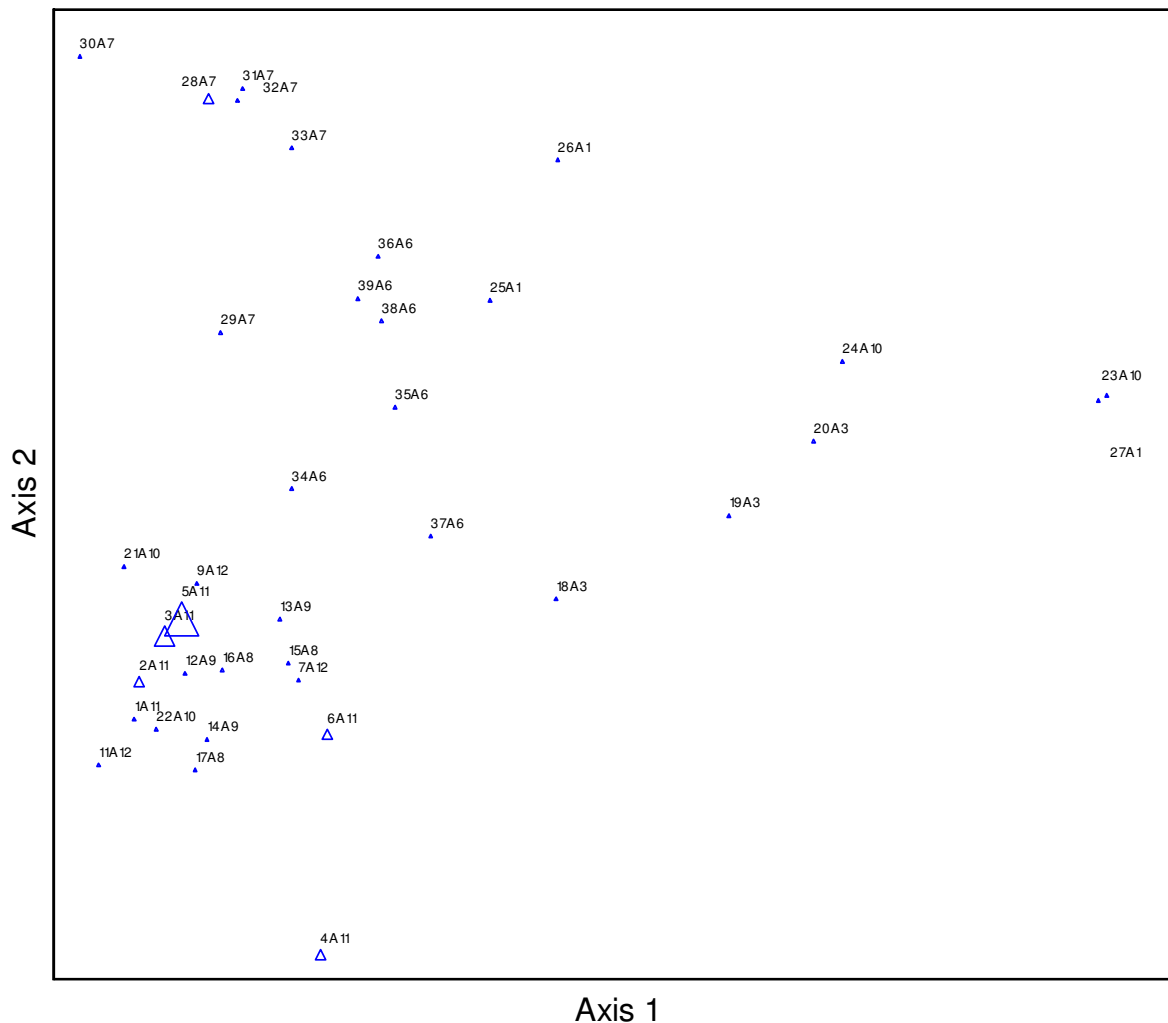
Figure 17 Devil's bit scabious *Succisa pratensis* scattergram



**Figure 18 Common bent *Agrostis capillaris* scattergram**

Common bent (*Agrostis capillaris*) another acid indicator, shows a more wide distribution, being predominantly abundant in Fields 6 and 7 (Fig. 18). There is also a trend in the size of the triangles, with smaller triangles towards the bottom end of the scatter and larger ones towards the top, showing a cline present. This is reflecting the transitional nature of this site, with one habitat type grading into another. This type of more acidic grassland has a very limited distribution on site but is in the LBAP and fits in with the description of the more acidic end of the Lowland Meadow habitat rather than acid grassland *per se* (TVERC, 2009).

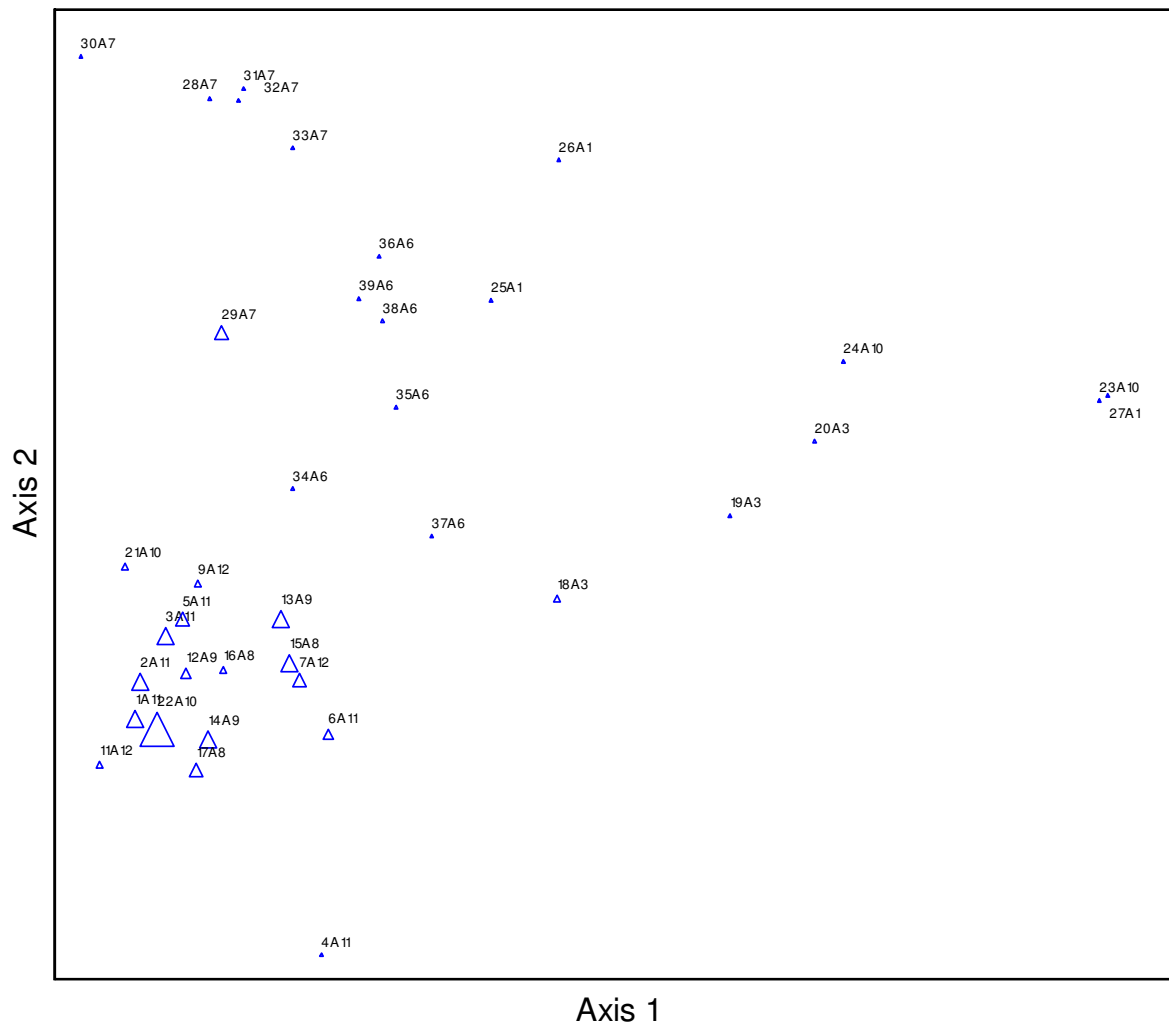
Not all of the acid indicators are shown here due to limitations on space.



**Figure 19 Great Burnet *Sanguisorba officinalis* scattergram**

By contrast, great burnet (*Sanguisorba officinalis*), a hay meadow species, is to be found in the lower left hand of the quadrant in the quadrats taken in Field 11 (Fig. 19). This is an indicator of hay meadow and is a characteristic species of the MG4 NVC community type. It is quite widespread throughout the site however when considering the DAFOR lists (Table 1). It was found in Fields 2, 4, 6, 7, 8, 11 and 12. Fields 2 and 4 are not in the LBAP.

Another neutral grassland indicator, meadow foxtail (*Alopecurus pratensis*), is to be found in the same part of the quadrant but in a greater number of fields: F3, F8, F9, F10, F11 and F12 (Fig. 20). This is also a hay meadow indicator and one of the characteristic species of MG4 also.



**Figure 20 Meadow foxtail *Alopecurus pratensis* scattergram**

In general, the scattergram shows the relationship between the plant communities on site, giving us three clearly different community types in the spread. These are the wet grassland type to the far right of the quadrant, the hay meadow species to the bottom left of the quadrant, and the more acidic grazing grasslands in the top left quadrant. There are trends in the scatter from drier to wetter grassland types, from left to right on Axis 1, and from neutral to more acidic grasslands from bottom to top on the left side of the quadrant relating to Axis 2. This approach shows the underlying ecological drivers on the site, determining the plant community types in a realistic way. There are other neutral hay meadow indicators predominantly in this quadrant but have been left out due to space limitations.

### 3.3.2 Twinspan

Two-way Indicator Species Analysis (Twinspan) was carried out within PCORD. The analysis was carried out on the same data set used for Decorana. Twinspan allows for a splitting of the data into two groups at each level, based on similarity within the quadrats. The end groups were then used to enter into MAVIS for comparison with NVC community

types (Fig. 21). As Twinspan is an artificial system, the divisions are not always as clear cut as they are shown. Provision for false positives and false negatives are given within the output of the program. It is a useful way for clustering the quadrats for further objective analysis within MAVIS. Eigenvalues are given within each division, showing how reliable the results are. These are dimensionless values between 0 and 1. The closer to 1, the more reliable the division is in terms of the data presented. A cut-off in the levels is chosen subjectively, based on the eigenvalues and the number of quadrats in the groups. The latter can be specified in the analysis. This was limited to greater than or equal to 5, as this is standard for NVC quadrat comparisons.

The results of the Twinspan analysis are presented in Fig. 21. The first division separates the 37 original quadrats into two groups, containing 32 quadrats and 5 quadrats respectively. The eigenvalue for this split is 0.49, which is considered to be acceptable. The five quadrat group is defined by the indicator species of soft rush (*Juncus effusus*). This corresponds to a marshy grassland type.

The remaining 32 quadrats are further divided into two groups – one with 12 quadrats and one with 20 quadrats. The 12 quadrat group are defined by the indicator species common bent (*Agrostis capillaris*). The eigenvalue is again 4.9. This reflects a somewhat acid grassland type. A further and final division of this group separates out a part of Field 7 (3 quadrats) where devil's bit scabious (*Succisa pratensis*) is an indicator species.

The 20 quadrats are divided into 1 quadrat and 19 quadrats. The eigenvalue is 0.52. The one quadrat relates to Quadrat 26 in Field 1, which doesn't fit well into any group. The remaining 16 quadrats are divided into two groups; one of three quadrats and one of 13 quadrats. The latter group is identified by the species indicator false oat-grass (*Arrhenatherum elatius*). This group contains neutral grassland species found in Fields 8, 9 and 11.

### 3.3.3 Comment

The Twinspan groupings reflect well the quadrat scatter diagram for Decorana (Fig. 15). It splits off the marshy grassland first with soft rush as an indicator species. The next split gives us the acid grassland group with common bent as the indicator species. This was further divided to give us the devil's bit scabious group within it. The last group outlined was the false-oat grass group which defined the hay meadow type. These correlations with the Decorana quadrat scatter are not surprising, but the extra bit of useful information is the eigenvalue, which can give one confidence in the results. All the eigenvalues were acceptable in the analysis. Secondly it will 'discard' some of the quadrats which do not fit easily into the groupings, allowing one to concentrate on the quadrats which are more likely to be useful for analysis in the NVC.



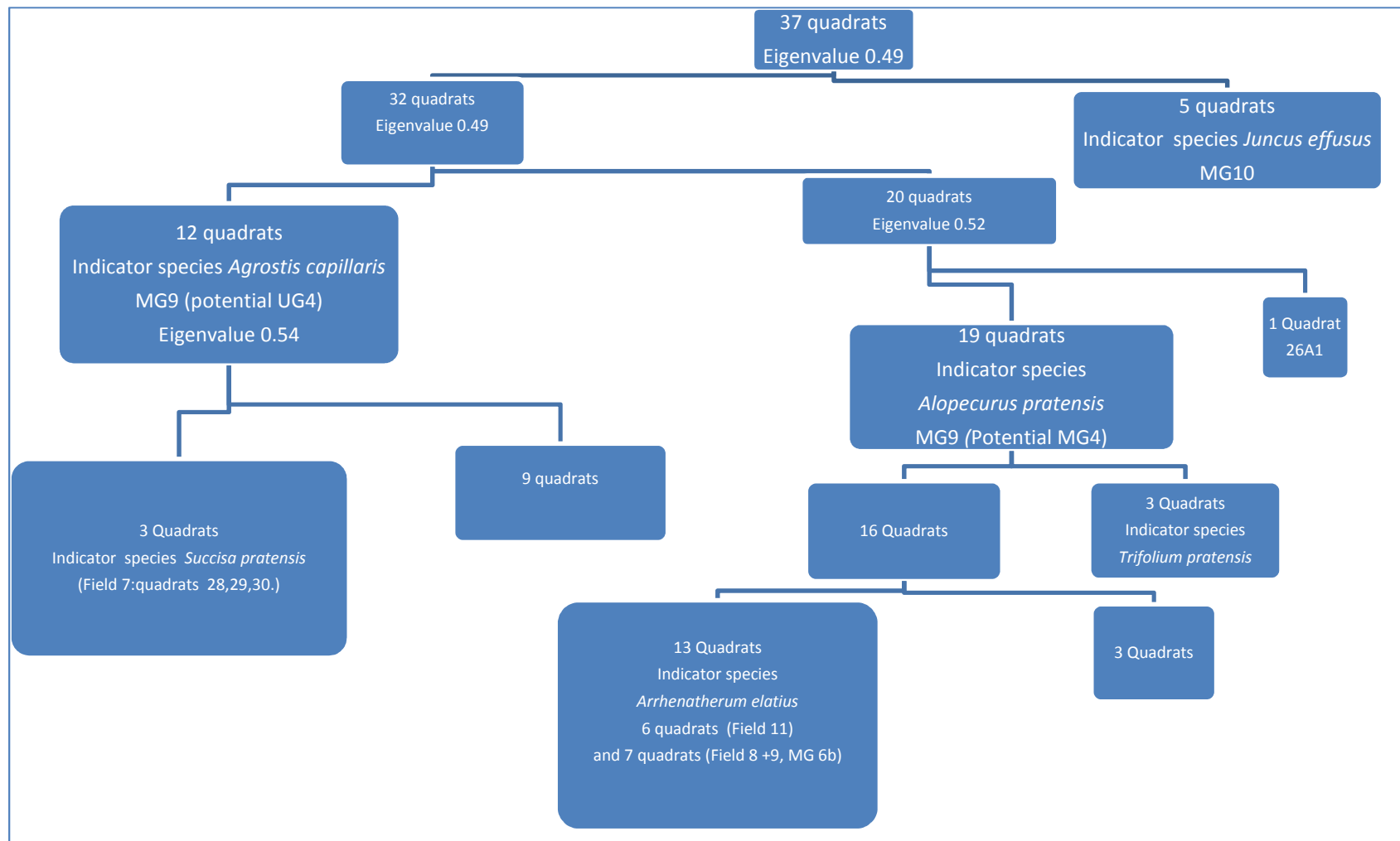


Figure 21 Twinspan groups based on quadrats analysed in PCORD. Indicator species are shown for each level of division.

### 3.4 MAVIS

The Twinspan groups of quadrats (Fig. 21) were then entered into MAVIS for comparison with NVC. As the Twinspan dichotomous groups are somewhat artificial and may not reflect accurately real vegetation communities in the field, a flexible approach was taken. The smallest similar quadrat groups were entered first into MAVIS and then the groups were merged to see if this improved the match with NVC communities in MAVIS. Results are shown in Table 3.

**Table 3 NVC classes of Fields 1-12, determined by MAVIS.**

Sites	NVC class(es)	Percentage similarity	Level of precision with NVC	NVC name
Fields 1, 3 and 10 (wet grassland)	MG10	50.99	Poor	MG10= <i>Holcus lanatus</i> – <i>Juncus effusus</i> rush-pasture.
	MG10a	49.94		
Field 6 only	MG9	59.23	Poor -Fair	MG9 = <i>Holcus lanatus</i> – <i>Deschampsia cespitosa</i> grassland
	MG9b	54.44		
	MG9a	53.16		
Field 7 only	MG9	48.64	Very poor - poor	MG9 = <i>Holcus lanatus</i> – <i>Deschampsia cespitosa</i> grassland
	MG9b	47.48		
	MG9a	44.81		U4 = <i>Festuca ovina</i> – <i>Agrostis capillaris</i> - <i>Galium saxatile</i> grassland
	U4b	42.79		
Fields 6 and 7 together	MG9b	53.31	Poor	MG9 = <i>Holcus lanatus</i> – <i>Deschampsia cespitosa</i> grassland  MG9b <i>Arrhenatherum elatius</i> sub-community
	MG9	51.97		
Fields 8 and 9 only	MG6b	53.76	Poor	MG6 <i>Lolium perenne</i> – <i>Cynosurus cristatus</i> grassland.  MG6b <i>Alopecurus pratensis</i> variant.
	MG6	53.22		
Fields 8, 9, 10, 11 and 12	MG9b	57.02	Poor	MG9 = <i>Holcus lanatus</i> – <i>Deschampsia cespitosa</i> grassland
	MG1c	55.67		
	MG9	54.29		MG9b = <i>Arrhenatherum elatius</i> sub-community.  MG4 = <i>Alopecurus pratensis</i> - <i>Sanguisorba officinalis</i> grassland
	MG4	44.10		
Field 12 only	S28	40.63	Very poor	S28 = <i>Phalaris arundinacea</i> tall-herb fen

#### 3.4.1 Comment

The reliability of percentage similarity with NVC communities outputted by MAVIS has been graded (Morris & Therivel, 2009). Similarity is from 0-100%, from which similarity ranges are graded 0-49% = very poor, 50-59% = poor, 60-69% = fair, 70-79% = good and 80-100% =

very good. All values >60% are generally acceptable. Similarities <60% may reflect an unusual variant which has not been identified by NVC, as it is not totally comprehensive.

From Table 3, it can be seen that none of the NVC plant communities identified by the analyses used in this report (Twinspan and MAVIS) are 'good'.

Starting with the marshy grassland quadrats at the top of the Table, five quadrats were grouped by Twinspan (Fig. 21) from three fields F1, F10 and F3. The percentage similarity to MG10 (*Holcus lanatus* – *Juncus effusus* rush-pasture) came out at 51%, which is considered to be 'poor'.

The rest of the quadrats as a whole group fell into MG9 (*Holcus lanatus* – *Deschampsia cespitosa* grassland) with varying percentages of similarity (see the ordination diagram Fig. 15 and Table 3). However, when the quadrats were analysed by Field number, better % similarities were sometimes achieved. For instance, Fields 6 and 7 were analysed together as reflected by the 12-quadrat group in Twinspan (Fig. 21). They produced a similarity with MG9b (*Arrhenatherum elatius* sub-community) of 53.31% which is 'poor'.

When the fields were split up for separate analysis, all six quadrats in Field 6 came out nearly 'fair' for MG9 at 59.23% (Table 3). Field 6 is included in the LBAP. In contrast, when quadrats in Field 7 were analysed together, the % similarity to MG9 was 'very poor – poor'. However, it did show a slight affinity to U4b (42.79%), which is an acid grassland community (*Festuca ovina* – *Agrostis capillaris* - *Galium saxatile* grassland). This is due to the presence of more acid indicator species such as common bent, tormentil, sheep's fescue and devil's bit scabious. Field 7 is also in the LBAP.

The six quadrats taken in the hay meadows Fields 8 and 9 were analysed together in MAVIS and came out close to MG6b (59.23%; 'poor'), which is a more improved grassland type - MG6 *Lolium perenne* – *Cynosurus cristatus* grassland with the MG6b *Alopecurus pratensis* variant coming out closest. These fields are not in the LBAP.

However, when these two Fields were analysed together with Fields 11 and 12 (as shown by the grouping in the quadrat ordination scattergram (Fig. 15), and the 13-quadrat group in Twinspan (Fig. 21), the comparison yielded a higher similarity with MG9 of 57.02%, which is better than that achieved alone for fields 8 and 9 with MG6b. This suggests that these four fields (two LBAP and two not LBAP) are quite closely related in terms of species composition, despite their very different appearance and management on site.

Finally, the two quadrats in Field 12 which represented swamp vegetation reached a 'poor' similarity (40.63%) with S28 (*Phalaris arundinacea* tall-herb fen). This is due to too few quadrats taken in this community type. These were left out of the main ordination analysis as they are not strictly grasslands but fen.

### 3.5 NVC communities in Gavray Drive

The NVC communities as described by MAVIS can now be superimposed on the Decorana scatter shown earlier (Fig. 15). This allows for comparison of the NVC communities with the quadrat scatter in 2D space (Fig. 22).

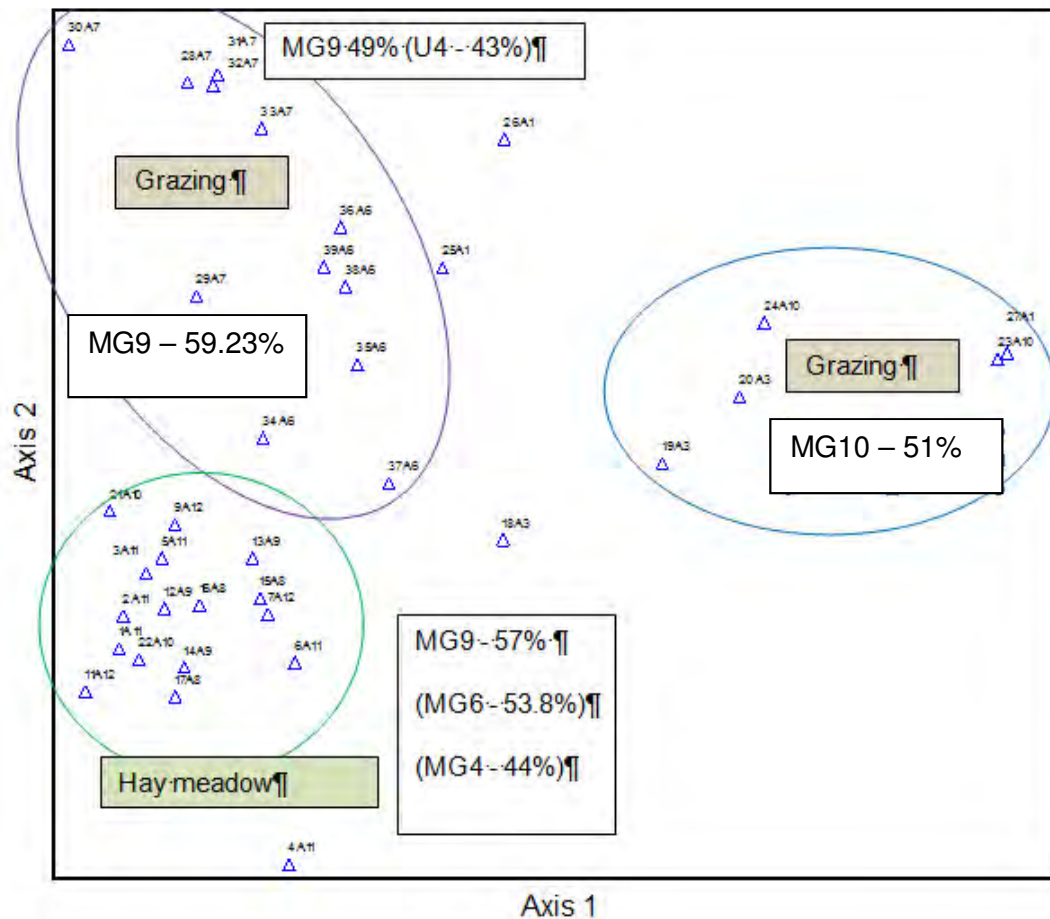


Figure 22 Superimposition of NVC communities on the quadrat scattergram.

This shows the spread of the NVC communities within the scatter. MG10 clearly separates from the rest of the scatter, emphasising the wet nature of those quadrats in Fields 1, 3 and 10. All the other quadrats are positioned on the other side of Axis 1 but have spread out considerably. All the ordination clusters come out predominantly MG9, but when analysed more closely, using Twinspan and MAVIS, more differences emerge, with elements of MG6 and MG4 being seen in the Hay Meadow group, and an acid component towards the top of the quadrant, showing a weak similarity with U4.

### 3.6 Field by field NVC analysis

This section aims to describe the individual fields in terms of their size, species diversity, NVC classification and LBAP status. Table 4 shows the comparison of total area of each field, the relative areas of NVC grassland communities within each field, species diversity and LBAP status. Most of the NVC areas are approximate. This is because the fields were generally very mixed in terms of vegetation structure due to scrub encroachment, and heterogeneous vegetation cover. This was due to succession occurring within the unmanaged grasslands, including those of the LBAP. The exception to this was Fields 3, 8 and 9, which are regularly managed and easy to define in terms of area and NVC coverage.

**Table 4. Overview of Fields 1-12 in terms of NVC, species diversity, area and existing LBAP status (Coloured rows show weak associations with UK BAP Priority habitats).**

Field number	Total area (ha)	NVC community present	% NVC similarity	Approx. total area of NVC (ha)	LBAP	Species number
1	0.69	MG10	50.99%	0.26	No	45
2	0.38	None identified (DAFOR only)			No	42
3	1.02	MG 10	50.99%	0.15	No	27
		MG6b	53.22%	0.87	No	
4	0.42	None identified (DAFOR only)		None	No	52
5	0.49	None identified (DAFOR only)		None	Yes	50
6	0.78	MG9	59.23%	0.78	Yes	45
7	0.61	MG9	48.64%	0.56	Yes	48
		(U4b)	42.79%	0.56		
8	1.18	MG9	57.02%	1.04	No	24
		(MG6b)	(53.76%)	1.04		
9	1.05	MG9	57.02%	1.05	No	28
		(MG6b)	(53.76%)	1.05		
10	1.09	MG10	50.90%	0.12	Yes	39
		MG9b	57.02%	0.45		
11	1.34	MG10	50.90%	0.17	Yes	38
		MG9b	57.02%	0.58		
		(MG4)	(44.10%)	0.58		
12	1.74	MG9b	50.90%	1.02	Yes	33
		S28	57.02%	0.26		
		(MG4)	(44.10%)	1.02		



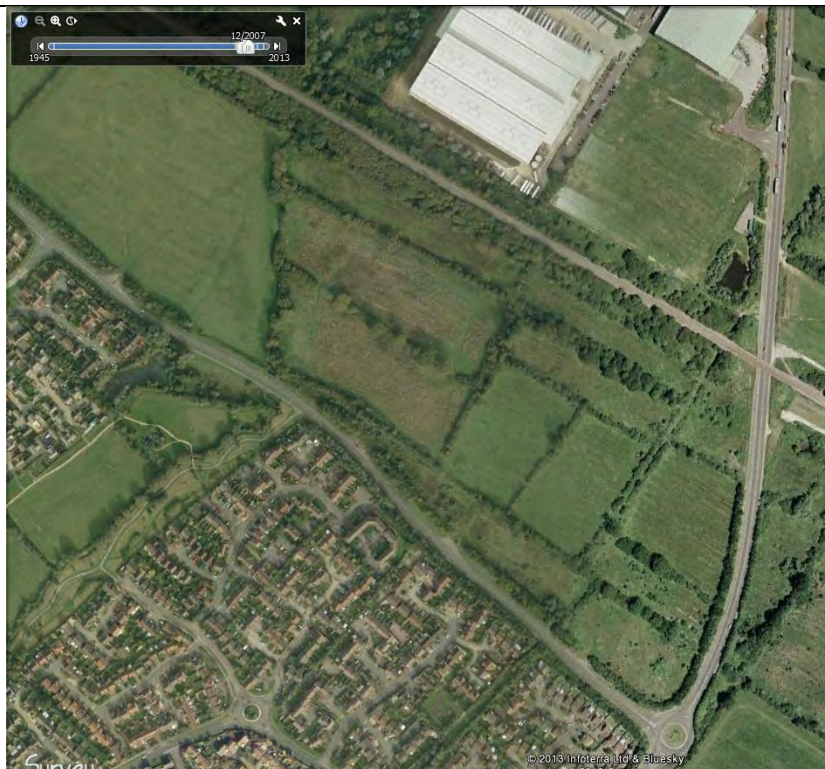
Change in vegetation structure has occurred over a relatively short timescale at Gavray Drive. Table 5 shows a range of images from Google Earth from 1945-2009. These images show that scrub encroachment was not really a problem until after 2006, and that the fields had a relatively open structure up to that. The most recent image of the site on Google earth is 2009 and this shows that scrub invasion has advanced dramatically since 2006. This can only be worse in 2013 when this survey was conducted.

**Table 5 Change in vegetation structure on Gavray Drive between 1945 and 2009 (Google Earth).**

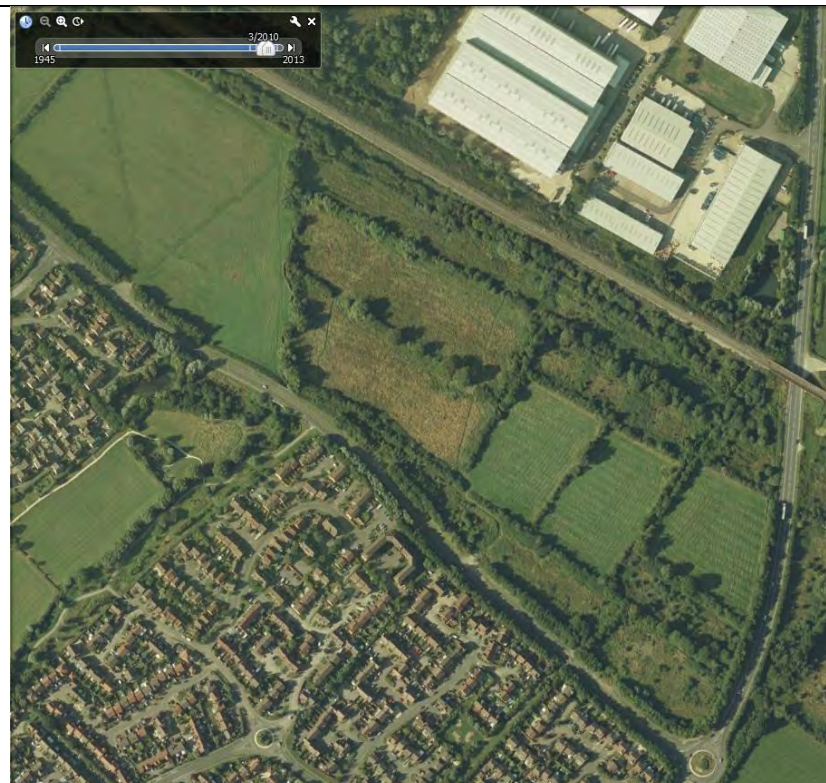




1945



2004



2006

2009

### ***3.6.1 Field map of NVC communities***

The NVC map for Gavray Drive is found in Fig. 23. These NVC location maps are not to be taken as definitive or accurate. They give a general sense of where the NVC is located as far as was possible from the field visit. This is because the nature of the unmanaged fields 1, 2, 4, 5, 6, 7, 10, 11 and 12. Most of them had scrub encroachment, sometimes severely, and the grassland vegetation was highly mixed due to transition through to rank vegetation and scrub.

Because of the ridge and furrow structure of the fields, it was difficult to assign NVC easily spatially as the ridges and furrows interdigitated throughout. This resulted in NVC 'mixtures' within fields. It was difficult to find areas for quadrats suitable for NVC analysis in most fields and in some it was not possible at all i.e. fields 2, 4 and 5. This was due to lack of homogeneity, size and quality within the grasslands.

Despite best efforts, the quadrats taken did not match NVC community types very well, despite having at least six quadrats to test for an individual NVC category. All matches ranged from 'very poor' to nearly 'fair' (Table 3).





Figure 23 Approximate area of NVC classes applied to Gavray Drive vegetation. NVC classes in brackets relate to relevant classes with lower percentage similarity.

### 3.7 UK BAP priority habitats and species

There is one UK BAP priority habitat relevant to this study; Lowland Meadow. In terms of National Vegetation Classification (NVC) plant communities, the Lowland Meadow BAP primarily embraces each type of *Cynosurus cristatus* - *Centaurea nigra* grassland (MG5), *Alopecurus pratensis* - *Sanguisorba officinalis* floodplain meadow (MG4) and *Cynosurus cristatus* - *Caltha palustris* flood-pasture (MG8). The category is not restricted to grasslands cut for hay, but also takes into account unimproved neutral pastures where livestock grazing is the main land use (Maddock A. , 2008).

In relation to the site surveyed, Fields 8, 9, 11 and 12 taken together, had a low similarity to MG4 of 44.10% (Table 3). This is a 'very poor' similarity to MG4, but does suggest some affinity with it and one which may be improved with correct management.

Only the Lowland Meadow UK BAP has been cited at Gavray Drive, although many of the species and habitats found there are representative of Floodplain Grazing Marsh. The latter has no NVC classification associated with it as it is representative of a landscape type than a plant community type.

No UK BAP priority plant species (<http://jncc.defra.gov.uk/page-5171>) were found at Gavray Drive.

### 3.8 Oxfordshire LBAP

The Oxfordshire LBAP habitats are managed by the Oxfordshire Nature Conservation Forum (<http://www.oncf.org.uk/biodiversity/biodiversity.html>). The LBAP specifically covers Lowland Meadows and Floodplain Grazing Marsh which is relevant to this study.

The relationship of the LBAP with UK Priority BAP habitats is shown in the Table 4 below, taken directly from the LBAP document. From this Table, it is clear that much of the site at Gavray drive resembles the Floodplain Grazing Marsh community, expressing affinity with MG9, MG10 and MG6, the predominant NVC communities identified by MAVIS.

However, under the Lowland Meadow categories, the site as a whole most closely resembles the Wet Grassland sub-group with MG9 and MG10 present, noted as found in a number of sites outside Floodplain Grazing Marsh *sensu stricto*.

So, while not meeting exactly the UK BAP Priority habitat of Lowland Meadow due to the poor affinity in this study to MG4 (the only Lowland Meadow NVC community type recognised, somewhat poorly, on this site), it is still classed within the Oxford LBAP as Lowland Meadow with the inclusion of Wet Grassland and, to a lesser extent, as Seasonally Flooded Neutral Grassland (Table 6).

Table 6 The relationship between UK BAP Priority habitats and LBAP habitats in Oxfordshire (Source; Oxford LBAP).

UK BAP Priority habitat	Specific habitat	Definition
Coastal and Floodplain Grazing Marsh	-	Mosaic of grassland and wetland bounded by managed ditches. The grassland can range from wet grassland (NVC communities MG9 and MG10), inundation grasslands such as NVC community MG13, to improved grassland (NVC community MG5) and may include lowland meadow grassland types.
Lowland meadows	Seasonally flooded neutral grassland	Unimproved or semi-improved hay meadows or pasture in the floodplain. NVC communities MG4 and MG8.
	Dry neutral grassland	Unimproved or semi-improved hay meadows or pasture within and outside the floodplain that tend not to be flooded in the winter. NVC community MG5
	Rough grassland	NVC community MG1. Grassland dominated by false oat grass, which occurs anywhere where management is relaxed or sporadic. It is the principal community on road verges.
	Wet grassland	Wet grassland (NVC communities MG9 and MG10) is found in a number of sites outside grazing marsh

### 3.9 Local Wildlife Site status

Fields 11, 12, 5, 6, and 7 of the Gavray Drive site are identified as a Local Wildlife Site (LWS) for Lowland Meadow. Lowland meadow is distinguished from lowland dry acid grassland by the absence of acid indicator species such as sheep's sorrel (*Rumex acetosella*), tormentil, and heath bedstraw (*Galium saxatile*). However, the criteria for selection of Wildlife Sites (TVERC, 2009) states that care should be taken in North Oxfordshire with the more acidic lowland meadow habitat, specifically the U4 acid grassland community, which includes bitter vetch, betony, tormentil, pignut (*Conopodium majus*) and devil's bit scabious. This bears out well with this study as there is a weak correlation with U4 in Field 7, where devil's bit scabious is to be found in association with other acid indicators such as common bent, tormentil, sheep's fescue and betony.

Gavray Drive is contained within the Ray Conservation Target Area (Fig. 24). The Target Area is concentrating on management, restoration and creation of Lowland Meadow (with a focus on MG4 hay meadows) and Floodplain Grazing Marsh (with a focus on breeding