Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Monitoring organisation	Habitat	Sampling strategy		Population of which sample is representative	Field method	Quadrat/plot size
85	Arable Stewardship	ADAS	arable	Sites were selected using proportionate random sampling of sub-options on all 75 farms with agreements in year 1 in the 2 Pilot Areas. Total of 20 sites per sub-option (max) in each Pilot Area.	**Main survey:** Quadrats were distributed randomly in 100m long sampling zone in field margins (Options 3, 4 & 5). In fields or blocks (Options 1 and 2) quadrats were located at random along six prescribed distance bands (1m, 2m, 4m, 8m, 16m and 32m), parallel to the field boundary.	Land under targeted options in year 1.	**Main survey**: Presence of all species in 30 nested quadrats, Vegetation height. **Targeted searches**: were undertaken immediately after the main surveys. 12m area was searched systematically for rare annual arable plants.	0.5m x 0.5m
86	Countryside Stewardship Scheme (CSS) (module II)	CEH, ADAS, Cheltenham & Gloucester HE College	various - but mostly grassland	Unstratified random sampling from all agreements (except boundary). 451 agreements in sample (8.7%).	Quadrats were randomly located. 1 quadrat per agreement + 1 quadrat per BAP Priority Habitat.	All land under agreement. BAP Priority Habitats under agreement.	Land was mapped in terms of UK BAP Broad & Priority Habitats. % cover of species was recorded in 2mx2m nest, then presence of sp. in subsequent nests was recorded along with overall % cover (CS method). Presence of rare & scarce species.	200m2 quadrat with square nests centred on middle. Length of sides: 2, 5, 7.07, 10, 14.14m Quadrats in priority habitats sometimes smaller
132	Farm Woodland Scheme, Farm Woodland Premium Scheme	Cranfield University, BTO, Peter Kirby	woodland	6 arable farms and 6 grass/mixed farms were randomly selected from the participating farms in counties in a 80 miles radius from Silsoe.	Each site was confirmed to be homogenous. A transect was located starting from an easily relocatable origin (eg telegraph pole). 5 quadrats were placed at 10m intervals.	Woodland in the scheme within 80 miles of Silsoe.	The method followed those used for NVC assessments i.e. DOMIN values were recorded for all species. Any planted trees within or shading the quadrat, were recorded.	2m x 2m
80	Habitat Scheme Former Set-aside	ADAS	grassland, scrub	30 out of 129 holdings in scheme were selected randomly, a further 10 holdings were selected subjectively. Total 39 holdings - considered to be 'broadly representative'. One field per holding was selected on merit.	Quadrats in field were arranged in a grid.	(Former set-aside land in the scheme).	Nested quadrats - presence of additional species in each subsequent nest.	1m x 1m
79, 137	Habitat Scheme Saltmarsh	ADAS & HR Wallingford	saltmarsh	All sites were selected, Abbots Hall, Orplands, Chalkdock Point, Bleadon and Orford Ness, were monitored by ADAS. Sites were divided into between 5 and 13 compartments with 12 quads in each (except Orford Ness which had 100 quadrats throughout site)	Quadrats were located at random within the compartments except at Orford where they weren't random. At Orford, 11 fixed transects were also set up, with points at every 0.5m.	Saltmarsh under agreement.	Vegetation maps were drawn based on NVC at Abbots Hall and orplands.. Nested quadrats: presence of additional species in each subsequent nest except at Orford Ness. Vegetation height. Orrford Ness: Domin in quads, ground cover at points along transects. Photos at Chalckdock, Bleadon and Orford.	1m x 1m

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Years sampled	Duration (years)	Fixed unit	Environmental data	QA on data collection	QA on data entry	Ease of relocation of sampling point relocation	Format of current data archive	Data classification
85	Arable Stewardship	Summer 1999 or 2000 (some overwintered stubble sites surveyed in Apr 99 or Feb 00)	0	Sampling zone (100m long or 50m x 32 m)	Soil Landscape structure (e.g. arable, grassland, semi-natural grazing)		All data manually checked.	Sampling zones relocatable?? Transient options (e.g. overwinter stubble, conservation headlands) might be in different locations each year.	MSAccess97	
86	Countryside Stewardship Scheme (CSS) (module II)	1998 or 1999	0	200m2 quadrat	Altitude Topography		Checks on digitised maps. Botanical data double entered.	Possible	ArcView MSAccess	NVC, CVS
132	Farm Woodland Scheme, Farm Woodland Premium Scheme	1999 (Spring and Summer)	0	2m x 2m quadrat				?		NVC on woodland sites.
80	Habitat Scheme Former Set-aside	1995 or 1996	0	1m x 1m quadrat				?	AEMA - not complete	TWINSPAN endgroups
79, 137	Habitat Scheme Saltmarsh	Abbots Hall, Orplands: 1997 (vegetation map) 1996, 97, 99, 00 Orford, Bleadon: 2000 Chalkdock: 2000, 01	ongoing	1m x 1m quadrats if fixed; if not compartments. (Not clear from report)	Unspecified physical & chemical parameters (work carried out by HR Wallingford)		Data checked manually.	Possible	AEMA - not complete	NVC (vegetation map)

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Monitoring organisation	Habitat	Sampling strategy		Population of which sample is representative	Field method	Quadrat/plot size
79	Habitat Scheme Saltmarsh	CEH	saltmarsh	All sites were selected, 1 (Saltram) was monitored by CEH.			Vegetation maps were drawn based on NVC. Frequency data were collected.	
140	Habitat Scheme Saltmarsh	ADAS	saltmarsh	At Abbots Hall 10 transects were subjectively selected to span the zones of vegetation from terrestrial, through halophytic to bare mud.	10 evenly spaced quadrats were located along each transect.	(Vegetation transitions at the single site.)	Nested quadrats with 4 cells were used. Additional species recorded in each subsequent cell. Bare ground, water & litter were recorded. Photographs were taken.	0.5m x 0.5m
410	Habitat Scheme Saltmarsh	ADAS	saltmarsh	At Abbots Hall 2 transects were set up over a larger area than previously monitored, to include new inundation areas and potential erosion sites.	Quadrats located at 0m, 1m, 2m, 3m and 5m from estuarine shore, then equidistant along the transect.	(Vegetation transitions at the site.)	Presence of all species, vegetation height, bare ground, open water and litter. Photographs were taken.	1m x 1m
411	Habitat Scheme Saltmarsh	ADAS (botanical) & HR Wallingford (environmental)	saltmarsh	At Bleadon 5 transects were subjectively selected between 5 pairs of creeks	Quadrats located at 0m, 1m, 2m, 3m and 5m from creek bank, then equidistant along the transect.	(Vegetation transitions between the creeks.)	Nested quadrats with 5 cells were used. Additional species recorded in each subsequent cell. Percent cover of vegetation, bare ground, water & litter were recorded. Photographs were taken.	1m x 1m
410	Habitat Scheme Saltmarsh	ADAS	saltmarsh	New entrants: Annery Kiln, Pillmouth and Watertown were all selected.		All three sites	Vegetation maps drawn. DAFOR on main plant species.	whole site
81	Habitat Scheme Water Fringe Areas (WFA)	ADAS	grassland, arable	The aim was to select 10 'sites' (field or bankside strip) from each of the 5 WFA areas for each of the grassland options, and 5 sites in each of the arable options. Fewer were available, therefore there were 90 sites in 1995 and 95 by 1996.	**Field sites:** Quadrats were evenly spaced along transects - quadrats in subsequent years were at different locations on the same transects. **Bankside sites:** Representative sections were chosen. 53 sites in 95, only 19 resurveyed.	Grassland and ex-arable land under agreement. (Banksides under agreement).	**Field sites:** Presence of all species, bare ground, vegetation height, presence tussocks. **Bankside sites:** Presence all species in each section.	**Field sites:** 0.5m x 0.5m **Bankside sites:** 20m strip divided into 4 sections

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Years sampled	Duration (years)	Fixed unit	Environmental data	QA on data collection	QA on data entry	Ease of relocation of sampling point relocation	Format of current data archive	Data classification
79	Habitat Scheme Saltmarsh	1997 (vegetation map) 1996 and 97	ongoing						AEMA - not complete	NVC (vegetation map
140	Habitat Scheme Saltmarsh	Oct-00	0	0.5m x 0.5m	Soil, soil redox potential, topography,		Data checked manually after entry onto computer.	?	AEMA - not complete	
410	Habitat Scheme Saltmarsh	2001	0	1m x 1m						
411	Habitat Scheme Saltmarsh	2001	0	1m x1m	Topographical data, Redox potential		All data checked.	Possible		
410	Habitat Scheme Saltmarsh	2001	0	site				Possible		
81	Habitat Scheme Water Fringe Areas (WFA)	1995 (or 96)1997 (some sites)	1 or 2	**Field sites:** site **Banksides:** 20m strip	Farm management			Possible	AEMA - not complete	**Field sites:** NVC on TWINSPAN endroups???

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Monitoring organisation	Habitat	Sampling strategy		Population of which sample is representative	Field method	Quadrat/plot size
84	Moorland Scheme	ADAS	heathland	Agreements were selected using stratified random sampling by year & location. 6 out of 18 sites were selected. On each site, 6 100m x 100m plots were located at random on the heather/grass interface. ADAS plots were located in the centre of plot.	Grazing assessments were carried out along transects radiating in random directions from points on ADAS plot.	Grass/heather interface on agreement land (NB few agreements in the scheme).	Grazing index/biomass utilisation. ADAS plot method.	8m x 4m
	Stage 1 Environmentally Sensitive Areas (ESAs)							
30	ESA Broads	ADAS	grassland	8 strata were identified - according to tier, grassland type, soil type and geographical location. In each stratum, up to 10 sample sites (fields) were subjectively selected. (Some sites were not resurveyed for various reasons).	A transect line was selected objectively at each site. 5, 2m x2m quadrats were positioned objectively along each transect.	Subjective selection so not necessarily representative of target grassland types in the ESA.	Domin of all species in 1m x 1m. Presence of species in 2m x 2m. Vegetation height. Unvegetated ground.	1m x 1m quadrats established within 2m x 2m quadrats
31	ESA Broads	ADAS	ditches (dykes)	3 strata were identified, (i. arable reseed, ii. Tier 2 peaty banks, iii. Tier 2 clay banks). In each stratum, 15 farms were subjectively selected.	186 dykes (20 of which added in 1988) subjectively selected and 1, 20m section of each dyke subjectively selected .	Subjective selection so not necessarily representative of dykes in the ESA.	Presence all species in 20m. DAFOR of all species in submerged, floating & emergent zones. Total % cover of vegetation in each zone in 20m section. Area shaded by other plants. Additional species on bank were also recorded.	20m section divided into 5, 4m sub-sections
32	ESA Pennine Dales	ADAS	grassland	**Indicative study** 8% of fields in the scheme were subjectively selected across 7strata [calcareous, acidic and neutral (of 4 ecological values) grassland, and moorland]. 64 non-agreement sites(fields) were also subjectively selected (many of these later entered into scheme agreements).	5 quadrats were located objectively in a 'W' pattern at each site.	(Target grassland types under agreement; agreement sample unlikely to be representative.)	DAFOR of all species. Vegetation height.	1m x 1m

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Years sampled	Duration (years)	Fixed unit	Environmental data	QA on data collection	QA on data entry	Ease of relocation of sampling point relocation	Format of current data archive	Data classification
84	Moorland Scheme	1997	0	100m x 100m (grazing assessments) ADAS plot (species)	Soil	Manual checking.	All data checked.	Possible	MS Access database	
	Stage 1 Envir									
30	ESA Broads	1987 (or'88), 1990, 1994	7	2m x 2m (or 1m x 1m)	Farm management Met data	Personnel given training, worked in pairs, experienced botanist supervised. Data checked prior to computer entry.	Automatic validation routines within software All entered data checked manually.	Possible	AEMA	NVC on TWINSPAN endroups
31	ESA Broads	All: 1987 90, 92, 93, 94 20%: 88, 89	7	20m dyke section	Water depth, width, conductivity. Farm management, met. data	Personnel given training, worked in pairs, experienced botanist supervised. Data checked prior to computer entry.	Automatic validation routines within software. All entered data checked manually.	Possible	AEMA	NCC classification
32	ESA Pennine Dales	1987, 90, 95(88,89,92 - partial resurveys)	8	1m x 1m quadrat	Farm management Slope Aspect Met data	Personnel given training, worked in pairs, experienced botanist supervised. Periodic calibration exercise. Data checked prior to computer entry.	All entered data checked manually or double entered.	Possibly - quadrats fixed only by pacing initially, but markers subsequently inserted.	AEMA	NVC on TWINSPAN endroups

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Monitoring organisation	Habitat	Sampling strategy		Population of which sample is representative	Field method	Quadrat/plot size
32	ESA Pennine Dales	ADAS	grassland	**Validation study** 6 neutral grassland strata were identified: agreement (MG3, MG5, MG6, MG7) and non-agreement (MG6, MG7). 10 fields per stratum targeted (subjective) - 98 fields surveyed - some lost as non-agreements entered scheme.	A transect line was selected objectively at each site. 5, 2m x2m quadrats were positioned objectively along each transect.	(Target grassland types under agreement; agreement sample unlikely to be representative.)	Domin of all species in 1m x 1m. Presence of species in 2m x 2m. Vegetation height. Unvegetated ground.	1m x 1m quadrats established within 2m x 2m quadrats
32	ESA Pennine Dales	ADAS	grassland	**Extension study** 3 strata were defined according to ESA tier (meadow Tiers 1 & 2, Pasture). The aim was to randomly select 60 sites per stratum but this wasn't achieved due to selected meadows not entering scheme and to meadows being cut prematurely.	A transect line was selected objectively at each site. 5 quadrats were positioned objectively along each transect. The Pasture sites were not resurveyed though the other sites were.	Target grassland types under agreement.	DAFOR of all species. Vegetation height.	1m x 1m
27	ESA Somerset Levels and Moors	ADAS	grassland	12 strata were identified - according to tier, grassland type & soil type. In each stratum, 10 sample sites (fields) were subjectively selected. 102 total sites (35 moors, 85 landowners - to give a wide geographical spread). 22 sites changed tier.	A transect line was selected objectively at each site. 5, 2m x2m quadrats were positioned objectively along each transect.	(Grasslands under scheme agreement.)	Domin of all species in 1m x 1m. Presence of species in 2m x 2m. Vegetation height. Unvegetated ground.	1m x 1m quadrats established within 2m x 2m quadrats
27, 133	ESA Somerset Levels and Moors (Raised water level areas)	ADAS	grassland	2 out of 5 RWLA's were selected (one peat one clay). 25 fields were chosen randomly (10 from 'Tealhan Moor' =46%,15 'Wet Moor' =15%).	A transect line was selected objectively. An ADAS plot was positioned objectively on the transect.	Grassland in 2 of the RWLAs.	ADAS plot method. Vegetation height.	8m x 4m

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Years sampled	Duration (years)	Fixed unit	Environmental data	QA on data collection	QA on data entry	Ease of relocation of sampling point relocation	Format of current data archive	Data classification
32	ESA Pennine Dales	1987, 90, 95(88,89,92 - partial resurveys)	8	2m x 2m (or 1m x 1m)	Farm management Met data	Data checked prior to computer entry.	Automatic validation routines within software All entered data checked manually.	Possible	AEMA	NVC on TWINSPAN endroups
32	ESA Pennine Dales	1992, 95 (not all fields resurveyed	3	1m x 1m	Farm management Met data	Personnel given training, worked in pairs, experienced botanist supervised. Periodic calibration exercise. Data checked prior to computer entry.	All entered data checked manually or double entered.	Possible	AEMA	NVC on TWINSPAN endroups
27	ESA Somerset Levels and Moors	1988,1989 (partial resurvey), 1990, 1995	7	2m x 2m (or 1m x 1m)	Farm management Met data	Personnel given training, worked in pairs, experienced botanist supervised. Data checked prior to computer entry.	Automatic validation routines within software. All entered data checked manually.	Possible	AEMA	NVC on TWINSPAN endroups
27, 133	ESA Somerset Levels and Moors (Raised water level areas)	1993, 1995, 1998	5	8m x 4m ADAS plot	Farm management Met data	Personnel given training, worked in pairs, experienced botanist supervised. Data checked prior to computer entry.	Automatic validation routines within software. All entered data checked manually.	Possible	AEMA	NVC on plots

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Monitoring organisation	Habitat	Sampling strategy		Population of which sample is representative	Field method	Quadrat/plot size
134	ESA Somerset Levels and Moors	ADAS	rhynes (ditches)	14 suitable rhynes on peaty and 6 on clay soil were subjectively selected.	Representative 20m section selected on each rhyne.	Subjective selection so not necessarily representative of rhynes in the ESA; also small sample.	Presence all species in 20m. DAFOR of all species in submerged, floating & emergent zones. Total % cover of vegetation in each zone in 20m section. Area shaded by other plants. Additional species on bank were also recorded.	20m section
28	ESA South Downs Arable reversion to chalk grassland	ADAS	grassland	**Field Scale Survey** 6 fields were selected subjectively (to ensure a wide geographical spread). The field containing the trial plots was also monitored.	A series of transects 50m apart was walked. 30 quadrats were placed at equal distances along the transects.	Subjective selection so not necessarily representative of arable reversion fields in the ESA; also small sample.	All the species within a 5m band of the transects were recorded using DAFOR scores. Presence of all species, and vegetation height recorded in quadrats.	0.5m x 0.5m
28	ESA South Downs (Permanent grassland and arable reversion to grass)	ADAS	grassland	7 strata were defined according to ESA Tier, soil type, agricultural improvement. The aim was to objectively select 10 agreement sites and 5 non-agreement sites from each stratum. Not achieved as some sites taken out of agreement & some transects lost.	A transect line was selected objectively at each site. 5, 2m x 2m quadrats were positioned objectively along each transect.	(Target grassland types.)	Domin of all species in 1m x 1m. Presence of species in 2m x 2m. Vegetation height. Unvegetated ground.	1m x 1m quadrats established within 2m x 2m quadrats
135	ESA South Downs	ADAS	ditches	10 ditches which were bordered on both sides by ESA land were randomly selected (5 on the River Cuckmere floodplain and 5 on the River Ouse).	A representative 20m section was selected.	Small sample and subjective selection of sections so not necessarily representative of ditches bordering agreement land.	Presence of all species in 20m. DAFOR of all species in submerged, floating, emergent zones. Total % cover in each zone in 20m. Area shaded by other plants. Additional species on bank were also recorded.	20m section
29	ESA West Penwith (Rough Land)	ADAS	heathland, grassland	2 strata were identified (heathland & grassland). 15 sites (fields) were randomly selected per stratum (though some sites were subjectively reallocated to other strata). Both agreement and non-agreement land were included.	An ADAS plot was randomly located at each site.	The relatively small number of sites make inferences from statistical analysis difficult, so not necessarily representative rough land in the ESA.	ADAS plot method. Vegetation height.	8m x 4m

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Years sampled	Duration (years)	Fixed unit	Environmental data	QA on data collection	QA on data entry	Ease of relocation of sampling point relocation	Format of current data archive	Data classification
134	ESA Somerset Levels and Moors	1987, 89, 90	3	20m rhyne section	Water depth, width, flow, bottom substrate.			?	AEMA	none
28	ESA South Downs Arable reversion to chalk grassland	1993, 94, 95	2	field	Farm management Life history			?	AEMA	
28	ESA South Downs (Permanent grassland and arable reversion to grass)	87 or 88, 94 (pg) or 95 (ar)	8	2m x 2m (or 1m x 1m)	Farm management Met data	Personnel given training, worked in pairs, experienced botanist supervised. Data checked prior to computer entry.	Automatic validation routines within software. All entered data checked manually.	Possible	AEMA	NVC on TWINSPAN endroups
135	ESA South Downs	1987, 89, 90	3	20m ditch section	Water depth, width, flow. Bottom substrate.				AEMA	
29	ESA West Penwith (Rough Land)	1993, 95	2	8m x 4m ADAS plot	Farm management Met data	Personnel given training, worked in pairs, experienced botanist supervised. Data checked prior to computer entry.	Automatic validation routines within software. All entered data checked manually.	Possible	AEMA	NVC on plots

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Monitoring organisation	Habitat	Sampling strategy		Population of which sample is representative	Field method	Quadrat/plot size
29	ESA West Penwith (Heathland grazing)	ADAS	heathland	2 sites which were H4 (*Ulex gallii-Agrostis curtisii* heath) communities were selected (no more were available).	At each site, 2 pairs of plots were randomly located; one of each pair fenced to exclude cattle. 15 quadrats were located randomly on a grid and fixed in each plot	Subjective selection so not necessarily representative of H4 heaths in the ESA.	Domin of all species. Presence of dwarf shrubs in 400 cells. Vegetation height. Unvegetated ground. Photograph.	Plots:20m x 20m. Quadrats: 2m x 2m
29	ESA West Penwith (Post burn regrowth heathland)	ADAS	heathland	3 sites which were H4 communities were subjectively selected.	4 permanent plots at each of 3 sites which were H4 communities were selected . (1 plot was mistakenly burnt). 50 quadrats were randomly located in each plot.	Subjective selection so not necessarily representative of H4 heaths in the ESA.	Presence all species + estimated percent cover. Presence all species in 50, 10cm x 10cm cells (frequency). Height dwarf shrubs. Unvegetated ground.	Plots: 50m x 50m or 100m x 25m Quadrats: 1m x 0.5m
	Stage 2 ESAs							
34	ESA Breckland (Lowland heath)	ADAS	heathland	**Monitoring heathland (Tier 1):** 5 key vegetation types were identified. 4 heaths were selected according to availability. Blocks of the vegetation types were randomly selected on the 4 heaths resulting in 2 blocks of each vegetation type where possible.	2 plots (fenced & unfenced) were randomly located within each block. 15 quadrats were randomly located on a grid in each plot.	Available heaths under agreement with target vegetation types.	Domin of all spp. in 1m x 1m. Presence of spp. in 2m x 2m. Vegetation height. Unvegetated ground. Presence of heather rooted in 10cm x 10cm cells (3 vegetation. types only). Heather growth phase. **Growth phase study** Heather growth phase recorded in 20cm x 20cm cells.	Plots: 20m x 20m Quadrats: 1m x 1m quadrats established within 2m x 2m quadrats
34	ESA Breckland (Lowland heath)	ADAS	heathland	**Heather distribution:** 4 heaths subjectively selected.		Subjective selection so not necessarily representative of heaths in the ESA.	True colour aerial photographs @ 1:5,680 were taken (1:5,000 on repeat survey). Percent heather cover for each of 20m x 20m grid squares was estimated and the square classified into one of four heathland land cover classes.	
34	ESA Breckland (Lowland heath)	ADAS	heathland	**Reversion of arable land to heathland:** (Tier2) All 17 fields (at 7 sites) in agreement in 1996 were selected.	A series of transects 50m apart was walked. 30 nested quadrats were randomly located.	Arable reversion fields under agreement.	All species within a 5m band of the transects were recorded using DAFOR scores. Within the quadrats, bare ground, presence of all species, and vegetation height were recorded.	0.5m x 0.5m

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Years sampled	Duration (years)	Fixed unit	Environmental data	QA on data collection	QA on data entry	Ease of relocation of sampling point relocation	Format of current data archive	Data classification
29	ESA West Penwith (Heathland grazing)	1988, 89 (1/3 only) 90, 91, 94	6	2m x 2m	Soil Farm management Met data	Experienced botanist supervised. Data checked prior to computer entry.	Automatic validation routines within software. All entered data checked manually.	Possible	AEMA	NVC on sites
29	ESA West Penwith (Post burn regrowth heathland)	1991, 94 (92 - one plot)	3	250 sq m plot	Soil Farm management Met data	Data checked prior to computer entry.	Automatic validation routines within software. All entered data checked manually.	?	AEMA	NVC on plots
	Stage 2 ESAs									
34	ESA Breckland (Lowland heath)	1988, 91, 93, 95(1992, 93, 94, 95 - growth phase study)	7	2m x 2m (or 1m x 1m)	Farm management Met data	Personnel , worked in pairs, experienced botanist supervised.	Automatic validation routines within software.	Possible.	AEMA	NVC plots
34	ESA Breckland (Lowland heath)	1992, 95	3	20m x 20m		Accuracy assessment was carried out using ground checking techniques on two of the heaths.	Automatic validation routines within software. All entered data checked manually.		AEMA	
34	ESA Breckland (Lowland heath)	1996	0	field	Farm management Soil Met data	Experienced botanist supervised.	Automatic validation routines within software. All entered data checked manually.	Possible	AEMA	

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Monitoring organisation	Habitat	Sampling strategy		Population of which sample is representative	Field method	Quadrat/plot size
33	ESA Breckland (Field margins)	ADAS	arable	**Uncropped Wildlife Strips** **Intensive survey:** 3 areas were subjectively selected, each containing 10 fields with UWS and 10 with normal cropping. In each area, 5 UWS sites and 5 normal sites were randomly selected. (Area 2 left the scheme).	At each site 2, 8m long, evenly spaced, fixed transects were objectively located perpendicular to field margin (in the cropped area and the margin). 40 quadrats were objectively located evenly along each transect.	Study areas subjectively selected so not necessarily representative of UWSs in the ESA.	All plant species present recorded. Biomass samples were taken from 3 quadrats objectively located on each transect.	10cm x 10cm
33	ESA Breckland (Field margins)	ADAS	arable	**Uncropped Wildlife Strips Extensive survey:** A proportionate (to prevent bias due to varying numbers of sites on farms) random sample of sites from holdings which had agreements for UWSs were selected, including 6m and 12m strips. Total of 125.	At 6 m sites, transects were located in the central 4m of the UWS. This was to avoid the edges of the UWS and the other field margin zones. At 12m sites, the 4m long transects were located in the centre of the outer 6m of the UWS. 20 quadrats as above.	UWSs under agreement.	All plant species present recorded.	10cm x 10cm. Biomass quadrats: 25 cm x 25 cm
33	ESA Breckland (Conservation headlands)	ADAS	arable	Of the farms/estates which had conservation headland management agreements, 9 also had normally sprayed headlands. Of these, 3 conservation and 1 sprayed headlands were randomly selected . Of the farms which had conservation headlands only, 17 headlands	Within each headland, a 100m long section was randomly selected. In each section, 3 quadrats were located along transects perpendicular to the boundary. 1, 3 & 5 m in 6m headlands and 3, 6 & 10m in 12m headlands.	Conservation headlands under agreement, and non-agreement land on farms with CHS.	The number of individuals of all plant species rooted in each quadrat was recorded (plant density). For grasses, the number of tillers was also counted.	0.5m x 0.5m
35	ESA Clun	ADAS	grassland	3 land cover classes were identified: i. species rich, semi-improved grassland, ii. unimproved grassland, iii. rough grazing. **Permanent grassland:** 30 fields within these classes were randomly selected. **Reversion to unimproved grassland and rough grazing:** 15 fields were randomly selected from agreement farms in tiers 2A and 2B (not more than 2 fields/farm).	1 ADAS plot located randomly on a transect in each field.	**Permanent grassland:** grassland in the 3 land cover classes, in the ESA. **Reversion:** agreement farms in Tiers 2A and 2B.	ADAS plot method.	**Permanent** 4m x 2m **Reversion**: 8m x 4m
No reports available	ESA North Peak	ADAS	grassland	35 fields were randomly selected, 30 from Tier 1B and 5 non-agreement. The sample was stratified by unimproved and semi-improved grassland type.	1 ADAS plot located randomly in each field.	Meadows in Tier 1B and non-agreement.	ADAS plot method.	8m x 4m

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Years sampled	Duration (years)	Fixed unit	Environmental data	QA on data collection	QA on data entry	Ease of relocation of sampling point relocation	Format of current data archive	Data classification
33	ESA Breckland (Field margins)	1989, 90, 91, 92, 93, 96	7	10cm x 10cm quadrat	Soil Farm management Met data Biomass	Personnel given training, experienced botanist supervised. Data checked prior to computer entry.	Automatic validation routines within software All entered data checked manually	Possible though many transect markers have already been lost	AEMA	
33	ESA Breckland (Field margins)	1996	0	10cm x 10cm quadrat	Farm management Met data	Personnel given training, experienced botanist supervised. Data checked prior to computer entry	All entered data fully validated.		AEMA	
33	ESA Breckland (Conservation headlands)	1993	0	0.5m x 0.5m	Soil	Data collected by experienced field botanists.			AEMA	
35	ESA Clun	Permanent: 1993, 1996 Reversion: 1994	Perm: 3, Reversion: 0	8m x 4m or 2m x 4m ADAS plot	Farm management			Possible	AEMA	NVC on ADAS plots
No reports available	ESA North Peak	1994	0	8m x 4m ADAS plot		Personnel given training, experienced botanist supervised.		?	AEMA	NVC on ADAS plots

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Monitoring organisation	Habitat	Sampling strategy		Population of which sample is representative	Field method	Quadrat/plot size
136	ESA North Peak	ADAS	heathland	**Heather grazing (1):** 107 permanent plots were located within 12 moorland grazing units. Selection method for plot location not specified.		Not clear from information in report.	Botanical composition and grazing intensity were monitored. The results of the analysis revealed that the method was insensitive to changes in grazing. The work was therefore modified.	
136	ESA North Peak	ADAS	heathland	**Heather grazing (2):** 97 of the 1988 plots in the 12 moorland grazing units were classified as burnt, continuous or discontinuous heather. 9 plots were randomly selected in each grazing unit to ensure there were at least 2 of each classification.	100 random quadrats in each plot.	Not clear from information in report.	Heather stems collected from each quadrat. Heather height, distance to grasses. Heather stems assessed for grazing and biomass utilisation.	Burnt plots: 50m x 100m Others; 100m x 200m Quadrats: 0.5m x 0.5m
36	ESA North Peak	ADAS	heathland	**Heather grazing (3):** 10 agreement and 1 non-agreement grazing units (with more than 25 ha heather) were randomly selected from a population of 34 units. 2 strata were identified, (>75% heather & < 75%heather).	Within each unit, 100 random, partially weighted, stratified quadrats were located. (40 in each strata, the remainder being determined by the relative areas of the 2 strata).	Grazing units with more than 25ha of heather.	4 heather stems were collected from each quadrat corner. GI/BU method. Also recorded: distance to palatable grasses, bilberry, Calluna cover, age, height, burning info.	1m x 0.5m
36	ESA North Peak	ADAS	heathland	**Heather burning:** Whole of ESA included.		All heathland in ESA.	Aerial photos taken.	Whole of ESA
36	ESA North Peak	ADAS	heathland	**Heather regeneration:** 12 exclosures subjectively located on 3 habitats (eroding moor, heather grass mosaic, bracken control.) on different soil types. 2 sites were lost so 4 added in 1994. Grazed sites adjacent and similar to exclosures were identified.	2 plots were marked out within and without fenced area. 400 random quadrats in each plot & various numbers of subjectively selected, fixed quadrats located at vegetation and/or bare ground interfaces.	Areas subjectively selected so not necessarily representative of heather regeneration areas in the ESA.	In each 0.5m x 0.5m quadrat, a pin hit was taken, presence all species, other non vegetation categories. In bracken quadrats, species as well as bracken recorded as pin hit. In each 1m x 1m quadrat, top cover for all species was estimated. Photos taken.	Plots: either 100m x 200m or 75m x 150m Random quadrats: 0.5m x 0.5m Fixed quadrats: 1m x 1m
37	ESA Suffolk River Valleys	ADAS	grassland	10 sites (fields) were subjectively selected on each of 2 vegetation types (dry grassland, abandoned wet pasture). One site lost.	A transect line was selected objectively at each site. 5, 2m x2m quadrats were positioned objectively along each transect.	Sites selected subjectively so not necessarily representative of target grassland types.	Domin of all species in 1m x 1m. Presence of species in 2m x 2m. Vegetation height. Unvegetated ground.	1m x 1m quadrats established within 2m x 2m quadrats

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Years sampled	Duration (years)	Fixed unit	Environmental data	QA on data collection	QA on data entry	Ease of relocation of sampling point relocation	Format of current data archive	Data classification
136	ESA North Peak	1988	0	Not clear from information in report.				?		
136	ESA North Peak	1990	0	100m x 50m or 200m plot				?	AEMA	
36	ESA North Peak	1993, (94, 95 partial resurvey - 5 units), 1996	3	grazing unit	Various including: Farm management, soil, slope, aspect,			Possible	AEMA	
36	ESA North Peak	1988, 89, 91, 95	7	Whole ESA	Habitat type	Ground checking at 8 sites where photos indistinct or burns complex.		Possible	AEMA	
36	ESA North Peak	1990, 91, 92, 96	6	1m x 1m quadrat				?	AEMA	
37	ESA Suffolk River Valleys	1988, 91, 93, 96	8	2m x 2m (or 1m x 1m)	Farm management Met data	Personnel given training, experienced botanist supervised. Data checked prior to computer entry.	Automatic validation routines within software. All entered data checked manually.	Possible	AEMA	NVC on TWINSPAN endroups

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Monitoring organisation	Habitat	Sampling strategy		Population of which sample is representative	Field method	Quadrat/plot size
38	ESA Test Valley	ADAS	grassland	3 strata were defined according to agricultural improvement. The aim was to subjectively select 10 agreement sites (fields) and 5 non-agreement sites from each stratum. Not achieved (though wide geographical spread was achieved). Some sites were lost so in so in 1993, 11 new baseline sites were selected.	A transect line was selected objectively at each site. 5, 2m x2m quadrats were positioned objectively along each transect.	Sites selected subjectively so not necessarily representative of target grassland types.	Domin of all species in 1m x 1m. Presence of species in 2m x 2m. Vegetation height. Unvegetated ground.	1m x 1m quadrats established within 2m x 2m quadrats
	Stage 3 ESAs							
39	ESA Avon Valley	ADAS	grassland	26 permanent grassland fields were randomly selected irrespective of agreement status, plus all Tier 2 option 1 (raised water level) fields.	1 ADAS plot was located by taking a random measurement along the longest diagonal in each field, 2 plots were located in each Tier 2 option 1 fields.	Permanent grassland in the ESA, and raised water level sites.	ADAS plot method. Vegetation height.	8m x 4m
40	ESA Exmoor	ADAS	grassland	All 4 agreement sites were selected plus 2 which met the heather moorland criteria, but which had large blocks of grass moorland. [8% all Exmoor grass moorland grazing units (GU) 12% eligible grass moor].	4 ADAS plots were randomly located in each GU using grid co-ordinates.	Grass moorland under agreement.	ADAS plot method. Vegetation height.	8m x 4m
40	ESA Exmoor	ADAS	heathland	2 strata were identified, (coastal heath and inland moor). A random sample of 10 grazing units (GU) (out of 67) agreement and non-agreement was selected (2 coastal, 8 inland) (excluding local authority or crown estate ownership). These cut across and Tiers. Also, 3 sites were subjectively selected, 2 of these in 1996.	On each GU, 5 transects were selected between pairs of random co-ordinates. Quadrat sample points were randomly located along transects to give a total of 40 heathery quadrats per site.	Inland moorland and coastal heathland excluding local authority or crown estate ownership.	4 heather stems collected from each quadrat corner. GI/BU method. Domin on all species. Also recorded: distance to palatable grasses, paths, linear features. Heather cover, age, height, burning info.	1m x 0.5m
41	ESA North Kent Marshes	ADAS	grassland	In all the eight areas which contained permanent grassland, 40 out of a possible 150 fields were chosen randomly, irrespective of agreement status.	Within each field an ADAS plot was located by taking a random measurement along the longest diagonal.	Grassland in the ESA.	ADAS plot method. Vegetation height.	4m x 2m
41	ESA North Kent Marshes	ADAS	ditches	5 sites expected to enter Tier 1a were selected. Within each site, ditches were selected at random. Total of 44 ditches.	A representative 20m section was selected.	Ditches selected subjectively so not necessarily representative of those in the ESA; also small sample.	Frequency/dominance score for each species in water in each 4m. These were summed to give overall frequency/dominance score. (Alcock & Palmer 1985, Morris et al 1993)	20m section divided into 5, 4m sub-sections.
No reports available	ESA Lake District		grassland	12 unenclosed grass dominated moors, irrespective of agreement status, were randomly sampled.	10 ADAS plots were randomly located on each moor.	Unenclosed grass dominated moor in the ESA	ADAS plot method.	8m x 4m

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Years sampled	Duration (years)	Fixed unit	Environmental data	QA on data collection	QA on data entry	Ease of relocation of sampling point relocation	Format of current data archive	Data classification
38	ESA Test Valley	1988, 91, 95.and1993, 95 (new sites)	7 and 2	2m x 2m (or 1m x 1m)	Farm management Met data	Personnel given training, experienced botanist supervised. Data checked prior to computer entry.	Automatic validation routines within software. All entered data checked manually.	Possible	AEMA	NVC on TWINSPAN endroups
	Stage 3 ESAs									
39	ESA Avon Valley	1993	0	8m x 4m ADAS plot				Possible	AEMA	NVC on ADAS plots.
40	ESA Exmoor	1993, 96	3	8m x 4m ADAS plot	Farm management			Possible	AEMA	NVC on ADAS plots
40	ESA Exmoor	1993, 96	3	grazing unit	Various including: Farm management, soil, slope, aspect,			Possible	AEMA	[NVC on?] TWINSPAN endgroups
41	ESA North Kent Marshes	1993	0	4m x 2m ADAS plot				Possible	AEMA	NVC on ADAS plots
41	ESA North Kent Marshes	1994	0	20m ditch section	Water conductivity			Possible	AEMA	EN/NRA endgroup classification. (TWINSPAN endgroup - not used)
No reports available	ESA Lake District	1993	0	moor		Personnel given training, experienced botanist supervised.		?	AEMA - not complete	

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Monitoring organisation	Habitat	Sampling strategy		Population of which sample is representative	Field method	Quadrat/plot size
42	ESA Lake District	ADAS	wetland	3 holdings were randomly selected.	2 ADAS plots were subjectively located in wetland vegetation of high quality and at risk of overgrazing & poaching.	Plots located subjectively in holdings so not necessarily representative of wetland in the ESA.	ADAS plot method.	8m x 4m (on one of the holdings - the stand was split into 2, 2m x 8m)
42	ESA Lake District	ADAS	heathland	**heather grazing:** 10 fells were randomly selected, 5 agreement, 5 non agreement.	On each fell, 30 clusters were located using random co-ordinates. At each cluster 5 quadrats/sampling points were randomly located in a 30m x 10m rectangle. These were independently drawn samples in each year.	Heather moorland in the ESA.	4 heather stems were collected from each quadrat corner. GI/BU method. Presence of all other species. Also recorded: distance to palatable grasses & bilberry, heather cover, age, height.	1m x 0.5m
42	ESA Lake District	ADAS	heathland	**heather burning:** Whole of ESA included.		All heathland in the ESA.	Aerial photos were acquired for 1988, 1992 (70% of area), 1993 (30%) & 1995.	
43	ESA South West Peak	ADAS	grassland	**rough grazing:** 15 sites randomly selected from Tier 1.3 and 15 from non-agreement land with similar vegetation. (Of non agreements, only 13 surveyed 7 of these joined ESA. **permanent grassland:** 31 sites randomly selected from Tier 1.2 and 9 from non-agreement.	On each site, a transect was objectively located and an ADAS plot objectively located along it.	Rough grazing and permanent grassland in the ESA.	ADAS plot method. Vegetation height (in 1993 grasses were only recorded up to cell 5).	8m x 4m
43	ESA South West Peak	ADAS	heathland	**grazing:** All 6 eligible moors with more than 25ha heather were selected. (2 moors were initially non-agreement but had joined by 1996).	On each moor 100 quadrats/sampling points were randomly located. (1993 points independent of 1996).	Heathland in the ESA.	4 heather stems were collected from each quadrat corner. GI/BU method. Also recorded: distance to palatable grasses & bilberry, heather cover, age, height, type, presence of droppings.	1m x 0.5m
43	ESA South West Peak	ADAS	heathland	**burning:** Areas within the ESA where burning might take place were identified.		Heathland in the ESA suitable for burning.	Aerial photos were obtained for 1992. Ground surveys were carried out in 93 and 95 Burnt areas and year of burn were mapped using photos, ground survey and consultation with local land managers	
44	ESA South Wessex Downs	ADAS	grassland	42 out of 400 downland sites were randomly selected. (1 was not resurveyed).	1 ADAS plot randomly located at each site.	Downland grassland in the ESA.	ADAS plot method. Vegetation height	8m x 4m

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Years sampled	Duration (years)	Fixed unit	Environmental data	QA on data collection	QA on data entry	Ease of relocation of sampling point relocation	Format of current data archive	Data classification
42	ESA Lake District	93, 96	4 years	8m x 4m ADAS plot (or 2m x 8m)				Possible	AEMA	NVC on ADAS plots
42	ESA Lake District	1993, 96	3	grazing unit	Various including stocking rate, soil, slope, aspect,			Possible	AEMA	
42	ESA Lake District	1988-95	7	whole ESA				Possible	AEMA	
43	ESA South West Peak	rough grazing: 1993, 96.Perm gland: 1994	Rough grazing: 3 Perm grass: 0	8m x 4m ADAS plot	Management data			Possible	AEMA	NVC on ADAS plots
43	ESA South West Peak	1993, 96	3	Moor	Management data Various including soil, slope, aspect, altitude			Possible	AEMA	
43	ESA South West Peak	1992, 93, 95	3	ESA					AEMA	
44	ESA South Wessex Downs	1993, 96	3	8m x 4m ADAS plot	Management			Possible	AEMA	NVC on ADAS plots

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Monitoring organisation	Habitat	Sampling strategy		Population of which sample is representative	Field method	Quadrat/plot size
45	ESA Blackdown Hills	ADAS	grassland, mire, heathland	32 (13%) sites were randomly selected from all the County Wildlife Sites (except woods). (16% of these 32 sites were in agreements compared with10% in population). In 1997, 5 Tier 1C sites were subjectively selected as case studies.	Within each field/compartment an ADAS plot was located at a random point along a transect between 2 selected features.	County Wildlife Sites in the ESA. Inclusion of the 5 subjectively selected sites might introduce bias to the sample.	ADAS plot method. Vegetation height.	8m x 4m
46	ESA Cotswold Hills	ADAS	grassland	4 strata were identified (unimproved, semi-improved, poor semi-improved and improved grassland). 10 sites in Tier 1C were subjectively selected per stratum - preference was given to sites of high botanical interest). 4 botanically equivalent non-agreement sites were also selected.	An ADAS plot was located randomly at each field site.	High value sites targeted and subjectively selected so not necessarily representative of grassland in the ESA.	ADAS plot method. Vegetation height.	4m x 2m
47	ESA Dartmoor	ADAS	grassland	Out of 40 Tier 2A agreements, 20 sites were selected at random.	Within each field an ADAS plot was located at a random point along a transect along the longest diagonal of field.	Grassland under Tier 2A agreement.	ADAS plot method. Vegetation height.	8m x 4m
47	ESA Dartmoor	ADAS	heathland	In 1994, 50 sites were randomly selected from those eligible. By 1997 only 2 of these sites had entered scheme so only 31/50 resurveyed. So a new baseline was established which included all land in Tier 1A or 2B. 1 site was selected in each moorland compartment bigger than 30ha.	An ADAS plot was located randomly at each site. 6 heather condition sampling points/quadrats were located at random points along 4 transects which were located at random bearings from the corner of the plot. 24 heathery quadrats was the initial aim - 12 was acceptable.	All heathland in the ESA; heathland under ESA agreement.	**Vegetation composition:** ADAS plot method. Vegetation height. Heather condition. 4 heather stems collected from each quadrat corner. GI/BU method. Presence of mire type spp., distance to palatable grasses & bilberry, heather cover & height etc.	**Vegetation composition** 8m x 4m **Heather condition** 1m x 1m
48	ESA Shropshire Hills	ADAS	grassland	32 fields were selected for survey (out of a random sample of 50, 20 of high botanical interest in Tiers 1B & 1C, 2 non agreement & 10 other were selected).	Within each field an ADAS plot was located at a random point along a transect.	Sites subjectively selected from initial sample, so not necessarily representative of grassland in the ESA.	ADAS plot method. Vegetation height.	8m x 4m
48	ESA Shropshire Hills	ADAS	heathland	11 grazing units (GUs) bigger than 30m x30m and having more than 15% heather cover were identified. A stratified random sampling procedure was adopted, with quadrats allocated to GUs in proportion to variability in BU recorded within GUs during an earlier pilot study.	Quadrats were located randomly.	Heathland in ESA with more than 15% heather cover.	4 heather stems were collected from each quadrat corner. GI/BU method. Also recorded: distance to palatable grasses & bilberry, Calluna cover, age, type, height, presence of droppings.	1m x 0.5m
49	ESA Upper Thames Tributaries	ADAS	grassland	The most north-easterly field of all 24 of the Tier 2 agreements and 16 out of 75 Tier 1B agreements was randomly selected.	Within each field one ADAS plot was located at a random point along a transect along the longest diagonal of the field.	Grassland under Tier 2 and Tier 1B agreements.	ADAS plot method. Vegetation height.	8m x 4m

Table 2.1: Review of methods used in English AE schemes

Endnote reference no.	Scheme	Years sampled	Duration (years)	Fixed unit	Environmental data	QA on data collection	QA on data entry	Ease of relocation of sampling point relocation	Format of current data archive	Data classification
45	ESA Blackdown Hills	1994, 1995 (baselines for main survey and Tier 1C, respectively)	0	8m x 4m ADAS plot				?	AEMA	NVC on ADAS plots
46	ESA Cotswold Hills	1995	0	4m x 2m ADAS plot				?	AEMA	NVC on ADAS plots
47	ESA Dartmoor	1995	0	8m x 4m ADAS plot				Possible	AEMA	NVC on ADAS plots
47	ESA Dartmoor	1994 (baseline), 1997 (resurvey) 1997 (new baseline)	3 and 0	8m x 4m ADAS plot				Possible with GPS	AEMA	NVC on ADAS plots
48	ESA Shropshire Hills	1995	0	8m x 4m ADAS plot	Management data			Possible	AEMA	NVC on ADAS plots
48	ESA Shropshire Hills	1995	0	Grazing unit	Management data Slope, aspect, altitude			Possible	AEMA	
49	ESA Upper Thames Tributaries	1995	0	8m x 4m ADAS plot				Possible	AEMA	NVC on ADAS plots