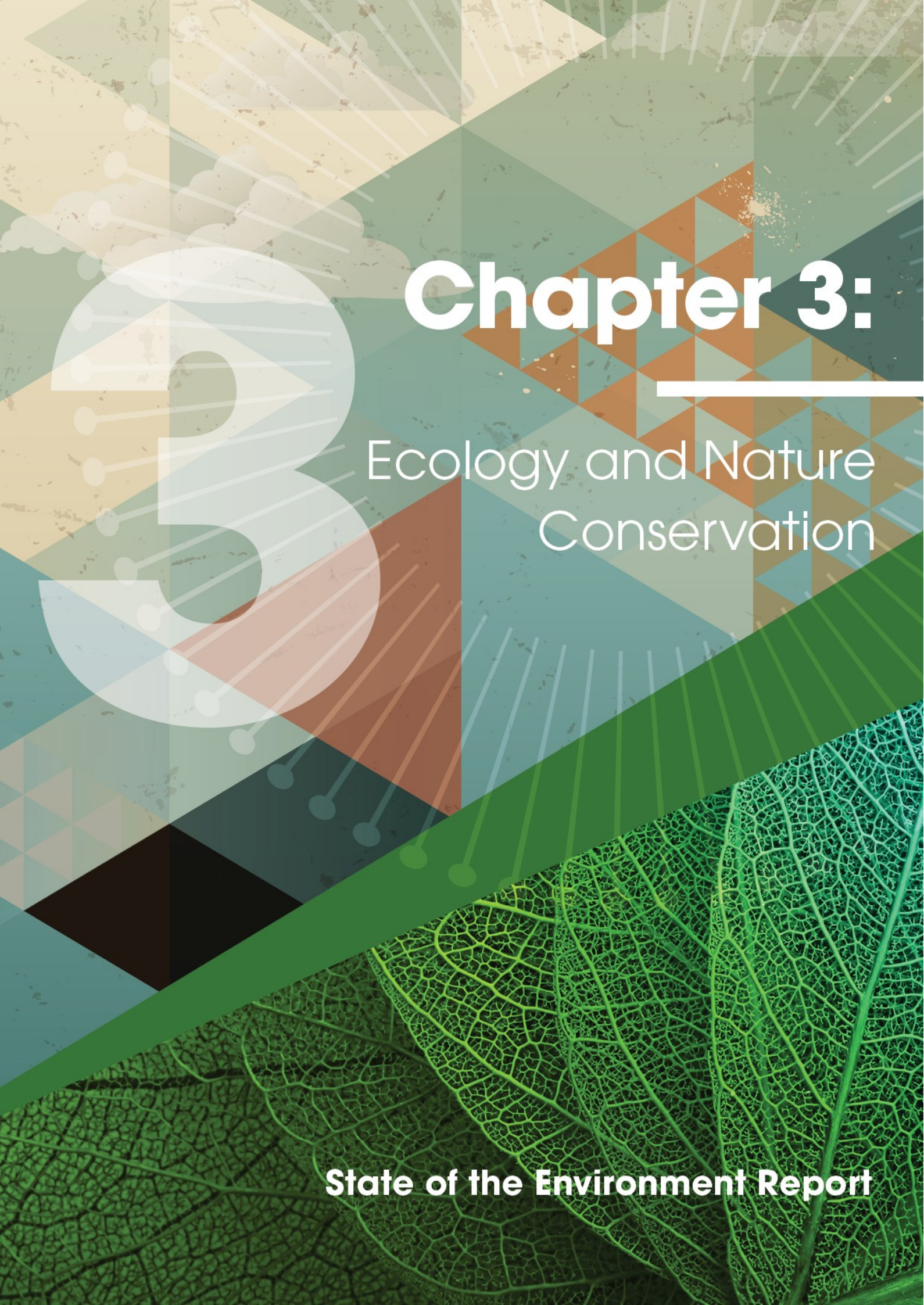
Chapter 3:

Ecology and Nature Conservation



State of the Environment Report

EAST AYRSHIRE COUNCIL
STATE OF THE ENVIRONMENT REPORT
CHAPTER 3 – ECOLOGY and NATURE CONSERVATION

SUMMARY

Key Messages

Statutory and Non-Statutory Sites

- Four internationally important designated nature conservation sites are present in East Ayrshire (EA). Namely, Airds Moss and Merrick Kells Special Areas of Conservation and the Muirkirk and North Lowther Uplands Special Protection Area. Total area of land covered by these European deignations is 18,042.56ha (14.2% of EA) protecting 17 qualifying habitats and species. Nine are in a favourable condition whilst 8 remain unfavourable. In the latter category, biological features are most highly represented.
- There are 20 Sites of Special Scientific Interest (SSSI) - Geological features are clearly an important notifying feature with 14 in total including geology and 10 of which have geology as the sole feature. Bog types are a notifying feature of 5 SSSI.
- There is one Local Nature Reserve - Catrine Voes and Woodlands which includes a series of reservoirs, broad leaved woodland and scrubland as well as archaeological and cultural interest.
- Local Nature Conservation Sites (LNCS) are a non-statutory designation identifying locally important areas for nature and landscapes, primarily for the purpose of alerting planners and developers. East Ayrshire Council have identified 128 individual sites in their key planning documents whilst Scottish Wildlife Trust in their listing, as a primary source, holds 123 sites.
- Ancient Woodland Inventory (AWI) sites are well represented with 458 listed covering total of 2674ha, whilst the Scottish Native and Ancient Woodland Inventory (SNAWI) lists 221 sites, some of which overlap with AWI.
- Scottish Wildlife Trust (SWT) manages 15 reserves in Ayrshire, of which 2 are in East Ayrshire- Knockshinnoch and Dalmellington Moss

Availability of Baseline Information

- Baseline data for statutory and non-statutory sites is complete and up to date.
- There is a full set of habitat maps for the whole of East Ayrshire, which are still credible as a basic resource, but would benefit from updating.
- Habitat data that is 25 years old does not reflect the recent acceleration of agricultural intensification, urbanisation, afforestation or the impacts of mineral extraction and windfarm development.
- Species level data is fairly complete for European and UK protected species and birds are well covered due to highly active local recorders and to the recent publication of the BTO Bird Atlas (2007-11) of breeding and wintering birds of Britain and Ireland.
- Botanical data for higher plants is available and up-to date with a current review of rare plants in Ayrshire due to be reported in 2015.
- Not unexpectedly, the status of taxa in specialist groups like invertebrates, excluding butterflies, and lower plants is poorly studied and less well known.

Status of Key Habitats and Species

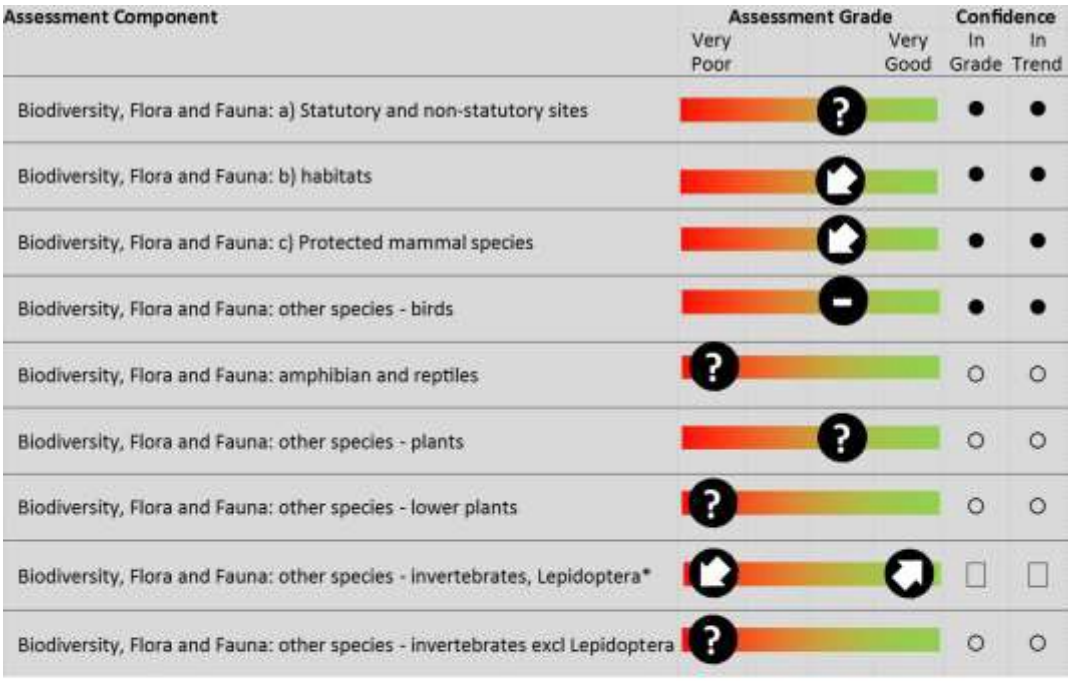
- Available habitat data (25 years old) provides an overview of coverage in East Ayrshire: 33.40% of the land is improved pasture, with significant contributions by planted coniferous woodland (18.40%) and planted broad-leaved woodland (11.04%). The latter is a significant wildlife resource and unexpectedly large. Upland habitats also make a substantial contribution with dry and wet heaths (2.53%), bogs (18.08%) and acid grassland (12.81%) cumulatively representing 33.55%. Cultivated land contributed 4.55% with poor, semi-improved grassland a further 2.02%. At this time, quarries of all types and associated spoil, past and present, covered only 90.40ha, approximately 0.079% which clearly does not reflect accelerated minerals extraction. A notable omission from the available digitised data are hedgerow habitats.
- Trees of particular amenity, cultural or heritage interest are protected by Tree Preservation Orders (TPOs) and there are 234 such orders in force in East Ayrshire.

- Bats - In East Ayrshire, common and soprano pipistrelles are probably the most abundant followed by brown long-eared, Daubenton's and Natterer's bats. Other species have been less frequently recorded and this may be due to lack of survey coverage. New Leisler breeding colonies have been located at Culzean Castle and may be present in East Ayrshire. Noctules were also recently discovered roosting in a bat box at Dean Castle Country Park, Kilmarnock.
- Otter – the latest survey for Scotland covered 1376 sites with positive otter evidence recorded in 92.08%. Strathclyde and Ayrshire were reported together as having a lower level of evidence (83.10%) but still suggesting a widespread recovery from the 23.94% reported in the first survey in 1978-79.
- Badgers are widespread in Ayrshire with East Ayrshire holding a moderate population, perhaps 100 social groups, mainly dispersed over lowland eastern farmland and woodland, Ian Hutchinson/Scottish Badgers (*pers. comm*)
- Red Squirrel - Scottish population is estimated as 120,000, approximately 75% of the UK population. This species has a significant presence in East Ayrshire.
- Water Vole - The most recent national survey (2003) found no evidence of water vole in East Ayrshire, however sampling was sparse and current status is unknown. A re-introduction programme is being implemented by Ayrshire Rivers Trust and, if successful, may provide donor animals for introduction to other suitable local sites.
- The Muirkirk and North Lowther Uplands SPA is the most important site for the conservation of endangered breeding and wintering bird species.
- Birds - Key European and UK protected species and Red List Species of Conservation Concern species for East Ayrshire includes: black grouse, bullfinch, common starling, cuckoo, curlew, tree sparrow, grey partridge, dunnock, hen harrier, herring gull, house sparrow, lesser redpoll, lesser whitethroat, lapwing, red grouse, reed bunting, ring ouzel, sky lark, song thrush, spotted flycatcher, yellowhammer and wood warbler.
- Great crested newt - The national survey for the great crested newt (GCN) in 1997 did not identify any breeding sites with great crested newt. There is no obvious reason why new GCN metapopulations may not be confirmed in East Ayrshire with special survey effort. However, on the basis of the available information it may have always been absent, or have become locally extinct.
- Fish - Loch Doon holds the last naturally occurring population of Arctic Charr in south west Scotland, which are now thought to be genetically distinct from their nearest neighbours in Argyll and Cumbria.
- Butterflies and Moths - In the south west of Scotland 32 species of butterfly are regularly recorded and 26 are likely to be found in Ayrshire.
- Invertebrates of Ayrshire have been the subject of limited study and records are sparse, excepting Coleoptera, particularly water beetles. Freshwater pearl mussel (*Maragaritifera margaritifera*) along with several species of beetle and dragonflies and damselflies are of key importance.

Trends

Trends in key species of flora and fauna are broadly negative, excepting bats, otter, a few species of bird and several common butterflies e.g. peacock and orange-tip. There have been some gains such as Buzzard, Raven and Nuthatch. The extent and quality of natural bird resources for breeding and wintering has decreased in extent over the last 25 years in East Ayrshire. Some bird species do buck the national trends e.g. yellowhammer, but, overall the picture is one of diminishing populations and alarmingly two woodland bird specialists, the pied flycatcher and wood warbler, may follow corn bunting, corncrake and water vole as local breeding extinctions. Hen harrier and black grouse are two upland species with locally fragile populations.

Status and Trends



* Moths Very Poor Butterflies Very Good

Overview

East Ayrshire covers an area of approximately 1,270km^2 or 127,033ha and is landlocked having no direct connection with the sea. It shares boundaries with Dumfries and Galloway, East Renfrewshire, North Ayrshire, South Ayrshire and South Lanarkshire. The highest point is Blackcraig Hill (700m) just to the east of Craigdarroch, near Cumnock. The eastern uplands are used for sheep and cattle farming and in these uplands there are significant areas of semi-mature non-native conifer plantations, particularly to the north, east and south. These Ayrshire uplands drain east through its two longest rivers, the Doon and Ayr, Loch Doon being the largest freshwater feature in East Ayrshire. The western lowlands have a rich agriculture, predominantly improved pasture, and within which the main towns of Kilmarnock and Cumnock are located. Other large centres of population include Mauchline and the Irvine valley settlements. The population is relatively low, 122,440 persons in 2013. Opencast coal mining is a significant land use, as is commercial forestry. Wind farms are increasingly adding a different dimension to the landscape.

Format

Where appropriate, and mainly at species level, the data is presented under the following headings.

- Status, distribution and importance
- Trends and influential factors
- Conservation status

1.1 Sites of Nature Conservation Interest

This overview follows a simple hierarchy, dealing first with statutory sites of European importance, followed by UK importance and then importance at local level. A short section then deals with non-statutory sites protecting nature conservation interests.

1.1.1 Statutory Designated European Nature Conservation Sites

Natura 2000 sites were first identified under this common name in the 1992 EC Habitats Directive and they comprise a network of areas which protect natural habitats and species of plant and animal that are rare, endangered or vulnerable in the European Community. There are two types of site designation according to special interest. Special Protection Areas (SPAs) protect birds and are classified under the 1979 EC Wild Birds Directive[1] whilst the Special Area of Conservation (SACs) are classified under the Habitats Directive[2] to protect natural habitats and species (excluding birds). In Scotland there are 63 species and 52 habitats of which 14 are priority habitats for conservation action. In an East Ayrshire (EA) context there are three Natura 2000[3] sites, see Appendix 1 for details.

Table 1 – East Ayrshire Summary of Special Areas of Conservation (SAC)

Site	Qualifying features at the time of classification	Condition of qualifying feature	Total site area(ha)/	Area within EA (ha)	% of area within EA
AIRDS MOSS SAC **(NS 605 245)**	Blanket bog*	Unfavourable recovering	1,359.33	1,359.33	100
MERRICK KELLS SAC **(NX 439 848)**	**HABITATS** Blanket bogs*	 Unfavourable recovering	8,698.3	3,499.34	40.23

[1] http://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm
[2] http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm
[3] http://ec.europa.eu/environment/nature/natura2000/index_en.htm

Site	Qualifying features at the time of classification	Condition of qualifying feature	Total site area(ha)/	Area within EA (ha)	% of area within EA
	Depressions on peat substrates of Rhynchospoion	Favourable maintained			
	European dry heaths	Unfavourable no change			
	Natural dystrophic lakes and ponds	Favourable maintained			
	North Atlantic wet heaths and *Erica tetralix*	Unfavourable recovering			
	Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or Isoeto-Nanojuncetea	Favourable maintained			
	Siliceous alpine and boreal grasslands	Unfavourable declining			
	Siliceous rocky slopes	Favourable maintained			
	Siliceous scree of the montane to snow levels (*Andosacetalia alpinae* and *Galeopsietalia ladani*)	Favourable maintained			
	SPECIES				
	Lutra lutra (otter)	Favourable maintained			

**Annex 1 Priority habitat*

Airds Moss qualifies on one feature, blanket bog whilst Merrick Kells qualifies on 10 features. Notably only 40.23% of the Merrick Kells SAC lies within East Ayrshire.

Table 2 - SPA summary

Site	Qualifying features and population level at the time of classification/current condition	Condition of qualifying feature	Total area (ha)	area within EA (ha)	% of area within EA
	Under Article 4.1 breeding				
MUIRKIRK AND NORTH LOWTHER UPLANDS SPA* **(Site NGRs: NS 640 310; NS 620 255; NS 685 215; NS 800 200)**	Hen harrier (6% GB)	Unfavourable declining	26,330	16,643	63.21
	Short-eared owl (3% GB)	Favourable maintained			
	Merlin (0.7% GB)	Unfavourable, no change			
	Peregrine falcon (0.5% GB)	Unfavourable, no change			
	Golden plover (0,7% GB	Favourable, maintained			
	Under Article 4.1 wintering				
	Hen harrier (2% GB)	Unfavourable declining			

**Note: SPA overlaps with Airds Moss SAC*

Both SACs and SPAs are managed to maintain a common set of conservation objectives delivered in a site-specific management statement. Site Condition Monitoring is a legal requirement and undertaken by Scottish Natural Heritage (SNH). This monitoring is undertaken on a cycle of between 6 and 24 years according to the sensitivity of the site. Only one feature within the SAC shows a negative trend, that being siliceous alpine and boreal grasslands. The condition of the SPA features is less favourable with golden plover the only species not showing a negative trend, however not all qualifying interests have been recently monitored and there may be specific change as yet unrecorded.

1.1.2 UK Statutory Designated sites

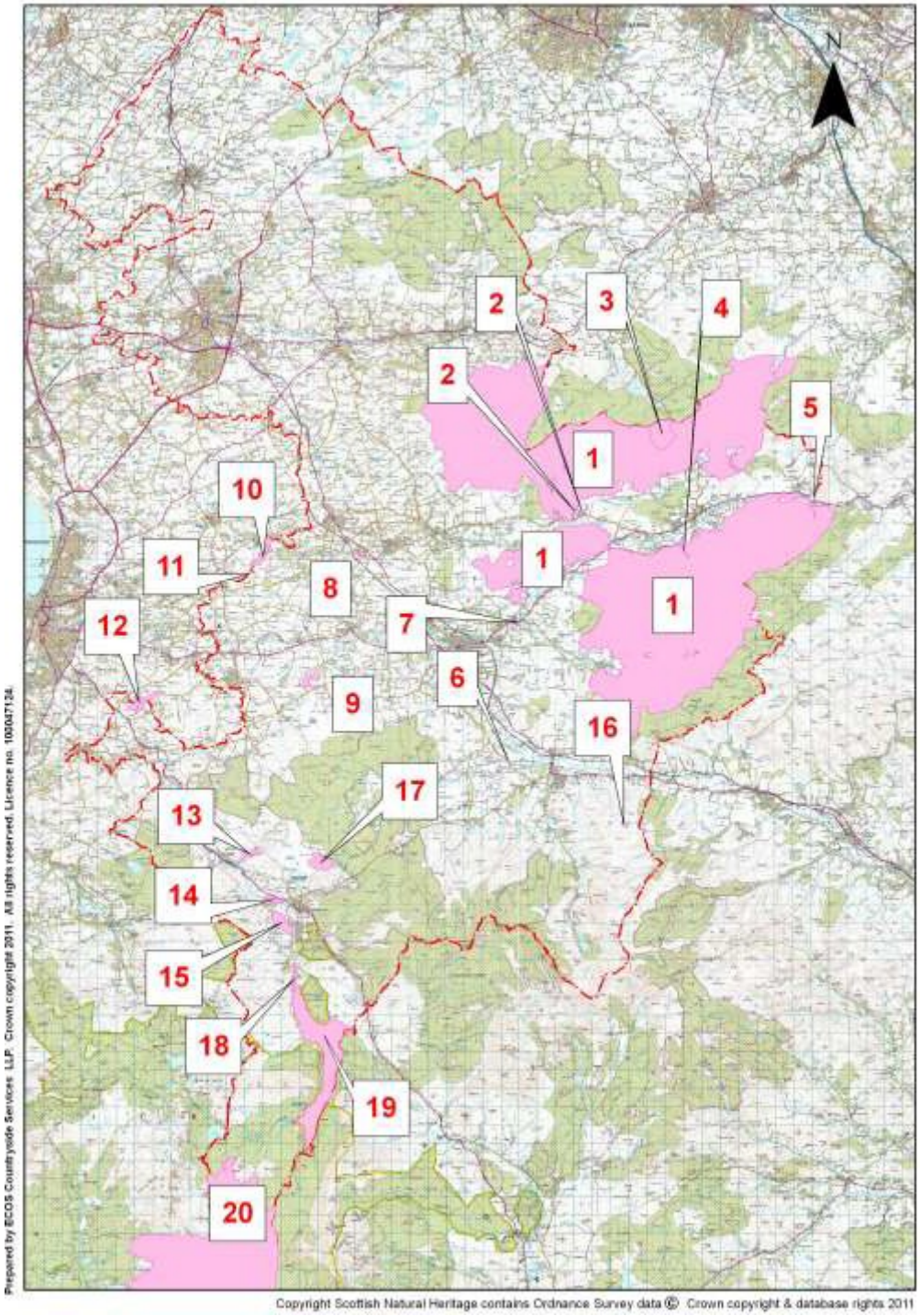
There are no National Nature Reserves in East Ayrshire, however there are 20 Sites of Special Scientific Interest (SSSI)[4] and one Local Nature Reserve (LNR)[5].

(a) SSSI

Locations of current SSSI are illustrated on Figure 2.

[4] http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/national-designations/sssis/sssi-location/
[5] http://www.snh.gov.uk/enjoying-the-outdoors/where-to-go/nature-reserves-and-parks/lnrs/

Figure 2 - Location and extent of SSSI in East Ayrshire



The condition of all geological notified features are either favourable maintained or favourable recovered whilst biological notified features include 11 in the unfavourable category (5 declining) and 11 in the favourable category, see Table 3.

Table 3 - Overall SSSI condition summary

Feature	Unfavourable No change	Unfavourable declining	Unfavourable recovering	Favourable maintained	Favourable recovered
Geological	0	0	0	14	2
Biological	5	5	1	11	0

Geological features are clearly an important notifying feature of these 20 SSSI, 14 in total, 10 of which have geology as the sole feature. Bog types are a notifying feature of 5 SSSI, see Tables 3 and 4.

Table 4 - SSSI Summary

Site	Ref. (See Figure 2)	NGR	Notified Natural Features	Site Condition	Total Site Area (ha)	Area within EA (ha)	% in EA
Barbosh Moss	9	NS 486 185	**Biological:** Fens: Hydrological mire range Bogs: Raised bog	Unfavourable declining Favourable maintained	36.6	36.6	100
Benbeoch	17	NS 492 085	**Geological**: Igneous Petrology: Carboniferous-Permian Igneous	Favourable maintained	83.34	83.34	100
Blood Moss and Slot Burn	3	NS 679 318	**Geological**: Palaeontology: Silurian -Devonian chordata & Arthropoda (excluding insects and trilobites) **Biological**: Bogs: Blanket bog	Favourable recovered Unfavourable no change	162.35	162.35	100
Bogton Loch	15	NS 470 052	**Biological**: Open water transition fen Breeding bird assemblage	Favourable maintained Unfavourable declining	76.61	76.61	100
Dalmellington Moss	14	NS 465 064	**Biological**: Raised bog	Unfavourable recovering	24.1	24.1	100
Danaskin Glen	13	NS 454 088	**Geological**: Upper Carboniferous (Namurian (Part)-Westphalian **Geological**: Palaeontology: Palaeozoic Palaeobotany	Favourable maintained Favourable maintained	26.13	26.13	100
Fountainhead	16	NS 657 104	**Geological**: Mineralogy: Mineralogy of Scotland	Favourable maintained	5.68	5.68	100
Garple Water	4	NS 690 255	**Geological**: Stratigraphy: Lower carboniferous (Dinatian-	Favourable	6.34	6.34	100

Site	Ref. (See Figure 2)	NGR	Notified Natural Features	Site Condition	Total Site Area (ha)	Area within EA (ha)	% in EA
			Namurian (part)	maintained			
Greenock Mains	2	NS 635 277	**Geological**: Quaternary geology and geomorphology: Quaternary of Scotland	Favourable maintained	9.06	9.06	100
Howford Bridge	8	NS 513 252	**Geological**: Igneous petrology: Carboniferous-Permian Igneous	Favourable maintained	6.13	6.13	100
Loch Doon	19	NS 497 975	**Biological:** Freshwater and estuarine Fish: Arctic charr *Salvelinus alpinus*	Unfavourable declining	821.89	821.89	100
Lugar Sill	7	NS 598 214	**Geological**: Igneous Petrology: Carboniferous-Permian Igneous	Favourable maintained	2.05	2.05	100
Martnaham Loch and Wood	12	NS 393 173	**Biological**: Freshwater habitats: Mesotrophic loch Woodlands: Upland oak woodland	Unfavourable no change Unfavourable no change	59.74	59.74	100
Merrick Kells	20	NS 459 840, NX 510 860	**Geological**: Quaternary geology and geomorphology: Quaternary of Scotland Igneous geology: Caledonian igneous **Biological**: Bogs: Blanket bog Upland habitats: Upland assemblage Birds: Breeding bird assemblage Dragonflies: Blue aeshna (*Aeshna caerulea*)	Favourable maintained Favourable maintained Unfavourable recovering Favourable maintained Favourable maintained	8,698.3	3,499.34	40.23

Site	Ref. (See Figure 2)	NGR	Notified Natural Features	Site Condition	Total Site Area (ha)	Area within EA (ha)	% in EA
			Invertebrates: beetles	Favourable maintained			
Muirkirk Uplands*	1	NS 632 264	**Geological**: Palaeontology: Silurian-Devonian chordata	Favourable maintained	26,330	16,643.70	63.21
			Biological: Upland habitats: Upland assemblage	Favourable maintained			
			Bogs: Blanket bog	Favourable maintained			
			Birds: Breeding bird assemblage	Favourable maintained			
			Birds: breeding hen harrier	Favourable maintained			
			Birds: non-breeding hen harrier	Unfavourable declining			
			Birds: Breeding short-eared owl	Favourable maintained			
Ness Glen	18	NS 477 021	**Biological**: Woodlands: Upland mixed ash woodland	Unfavourable declining	18.1	18.1	100
Nith Bridge	6	NS 593 140	**Geological**: Quaternary geology and geomorphology: Quaternary of Scotland	Favourable maintained	1.54	1.54	100
Ree Burn and Glenbuck Loch	5	NS 761 285 and NS 761 277	**Geological**: Stratigraphy: Wenlock	Favourable maintained	8.25	8.25	100
River Ayr Gorge	10	NS 46 0253	**Biological**: Woodlands: Upland oak woodland	Unfavourable no change	57.18	57.18	100

Site	Ref. (See Figure 2)	NGR	Notified Natural Features	Site Condition	Total Site Area (ha)	Area within EA (ha)	% in EA
			Biological: Invertebrates: Beetle assemblage	Favourable maintained			
Stairhill	11	NS 452 242	**Geological**: Palaeontology: Palaeozoic Palaeobotany	Favourable maintained	1.02	1.02	100

* Includes Airds Moss

(b) Local Nature Reserves (LNRs)

Local Nature Reserves (LNRs) are declared under National Parks and Access to the Countryside Act 1949. These sites are managed for educational and recreational interest as well as local nature conservation interest and only one has been declared in East Ayrshire to date, see Figure 3.3

Figure 3 - Location of Catrine Voes LNR

Catrine Voes LNR (NGR NS 53200 26009) is a network of reservoirs (voes), formerly associated with a cotton works and woodland. It was declared in 2006, protecting its 6.9ha of woodland, reservoirs, water features and scrub in addition to archaeological and cultural interest. At species level it is noted for its locally scarce breeding birds that include grey wagtail, dipper and spotted flycatcher. The spotted flycatcher is a Red List SoCC.

1.1.3 Non-statutory designated sites

Throughout Scotland local sites of importance for nature conservation have been identified by different descriptions and acronyms e.g. Listed Wildlife Sites (LWS), Sites of Interest to Natural Science (SINS), Sites of Interest for Nature Conservation (SINC) or Regionally Important Geological Sites (RIGS). Recent guidance from SNH, to local authorities, is to group them all under one acronym LNCS (Local Nature Conservation Sites).

LNCS are a non-statutory designation identifying locally important areas for nature and landscapes, primarily for the purpose of alerting planners and developers. EAC have identified 128 individual sites in their key planning documents.

1.1.4 Other Protected Sites

The Royal Society for the Protection of Birds (RSPB) has two reserves in Ayrshire, Bogside and Airds Moss, whilst, the Scottish Wildlife Trust (SWT) manages 15 reserves, of which two are in East Ayrshire and both are notified SSSI, see Figures 4a and 4b.

1. Knockshinnoch Lagoons – NS 608 137

Knockshinnoch Lagoons lie immediately to the west of New Cumnock and comprise open water, marshy grassland reedbeds willow carr. The Reserve is particularly noted for birdlife, especially on autumn migration. Common snipe, kestrel, spotted flycatcher, kingfisher and cuckoo are regulars whilst brown hare are resident.

Figure 4(a) - Location of Knockshinnoch

2. Dalmellington Moss - NS 465 064 - 27.41ha

Situated on the flood-plain of the River Doon, it is an SSSI notified for its raised bog and lagg fen. Rare plants include bog rosemary, great sundew, and white beaked sedge, but it also holds a wide range of associated wildlife, particularly insects with the large heath butterfly notable.

Figure 4(b) - Location of Dalmellington Moss

STATUS AND TRENDS – DETAILED ANALYSIS

2.1 Habitats

2.1.1 Phase 1 Habitats

Status – Phase 1 Habitats

Knowledge of the extent and distribution of habitats within a local authority boundary, or other defined area of land, is key to protecting flora and fauna and for managing this resource for its greatest biodiversity.

A Phase 1 Habitat Survey[6] was completed in 1990-91 for the districts of Cumnock and Doon Valley and Kilmarnock and Doon Valley, together they provide a survey of the whole of East Ayrshire, with small areas of overlap into adjacent Council areas. This field data was digitised by SNH in 2007. Copies of the original field maps are currently held in the SNH Ayr office with the GIS data held in SNH HQ in Inverness.

The SNH GIS shape-files were made available to this audit and have been reworked by ECOS, who are responsible for the tabulations of area, see Table 3.6. Phase 1 habitat survey target notes were not made available at the time of reporting and may now be of historical importance only.

The status of habitats mapped in East Ayrshire in 1990-91 is summarised in Table 3.6 and is based on calculation of the area of all habitat polygons that have mid-point in East Ayrshire, a total of 13,398 polygons, which also means that areas of habitat that are contiguous across a local authority boundary are included in East Ayrshire. Not all land within the 340km East Ayrshire boundary has been surveyed therefore the habitat mapping total area tabulated, 114, 008.74ha, is lower the total area of East Ayrshire, which is approximately 127,000ha. The reason for the discrepancy is the lack of surveying of urban sites and land not classified in the Phase 1 habitat handbook.

Table 6 - Summary of phase 1 habitat survey data, 1990-91

Alpha-numeric code	Habitat description	Area (ha)	Percentage of total mapped area (%)
A1.1.1	Woodland broad-leaved semi-natural	906.44	0.80
A1.1.2	Woodland broad-leaved plantation	1259.09	11.04
A1.2.1	Woodland coniferous semi-natural	13.92	0.01
A1.2.2	Woodland coniferous plantation	20977.10	18.40
A1.3.1	Woodland mixed semi-natural	25.07	0.02
A1.3.2	Woodland mixed plantation	512.63	0.45
A2.1	Scrub dense/continuous	106.32	0.09
A2.2	Scrub scattered	313.86	0.28
A3.1	Parkland/scattered trees broad-leaved	235.93	0.21
A3.2	Parkland/scattered trees coniferous	9.76	0.006
A3.3	Parkland/scattered trees mixed	2.29	0.002
A4.2	Recently-felled woodland coniferous	4.48	0.004
B1.1	Acid grassland unimproved	8765.14	7.69
B1.2	Acid grassland semi-improved	5837.73	5.12
B2.1	Neutral grassland unimproved	592.36	0.52
B2.2	Neutral grassland semi-improved	826.67	0.73
B3.1	Calcareous grassland unimproved	172.51	0.15
B3.2	Calcareous grassland semi-improved	1.18	0.001

[6] http://jncc.defra.gov.uk/page-4258

Alpha-numeric code	Habitat description	Area (ha)	Percentage of total mapped area (%)
B4	Improved grassland	38083.73	33.40
B5	Marsh/marshy grassland	1141.22	1.00
B6	Poor semi-improved grassland	2298.38	2.02
C1.1	Bracken continuous	18.29	0.02
C1.2	Bracken scattered	83.51	0.07
C3.1	Tall ruderal	142.26	0.12
C3.2	Other non-ruderal	0.36	0.0003
D1.1	Acid dry dwarf shrub heath	103.93	0.009
D2	Wet dwarf shrub heath	275.14	0.24
D3	Lichen/bryophyte heath	3.10	0.03
D4	Montane heath/dwarf herb	2128.71	1.87
D5	Dry heath/acid grassland mosaic	444.58	0.39
D6	Wet heath/acid grassland mosaic	25.23	0.02
E1.6.1	Bog, raised bog	2046.20	1.79
E1.6.2	Bog sphagnum bog blanket bog	8.61	0.008
E1.7	Bog wet modified bog	11728.95	10.29
E1.8	Bog dry modified bog	646.46	0.57
E2.1	Flush & spring acid/neutral flush	6181.95	5.42
E2.2	Flush & spring basic flush	31.02	0.03
E3	Fen basic	93.97	0.08
E4	Bare peat	24.61	0.02
F1	Swamp	940.97	0.83
F2.2	Marginal & inundation vegetation	81.74	0.07
G1	Standing water	241.48	0.21
G2	Running water	446.27	0.39
H2.6	Salt marsh dense/continuous	19.43	0.02
H6.5/A3.1	Sand dune/Dune grassland/Parkland/scattered trees broad-leaved	0.59	0.0005
I1.1.1	Natural inland cliff acid/neutral	0.35	0.0003
I1.2.1	Natural scree acid/neutral	6.28	0.006
I1.2.2	Natural scree basic	4.33	0.004
I1.3	Natural limestone pavement	2.36	0.002
I1.4.1	Natural other exposure acid/neutral	14.06	0.01
I1.4.2	Natural other exposure basic	8.22	0.007
I2.1	Artificial quarry	4.30	0.004
I2.2	Artificial spoil	28.05	0.02
I2.3/J4	Artificial mine/Bare ground	58.07	0.05
I2.4	Artificial refuse tip	6.21	0.0005
J1.1	Cultivated/disturbed land arable	5187.50	4.55
J1.2	Cultivated/disturbed land amenity grassland	560.02	0.29
J1.3	Cultivated/disturbed land ephemeral/short perennial	41.26	0.04
J1.4	Cultivated/disturbed land introduce shrub	0.43	0.0004
J3.4	Built up area caravan site	5.05	0.04
J3.6	Built up area buildings	81.77	0.07
J4	Bare ground	187.31	0.16
TOTAL		**114, 008.74**	

The data provides a baseline which is almost 25 years old and, whilst probably still broadly accurate, will underestimate the extent of mining activities and changes to grassland and upland habitats to afforestation and improvement, although the scale of change for most habitats is likely to be relatively

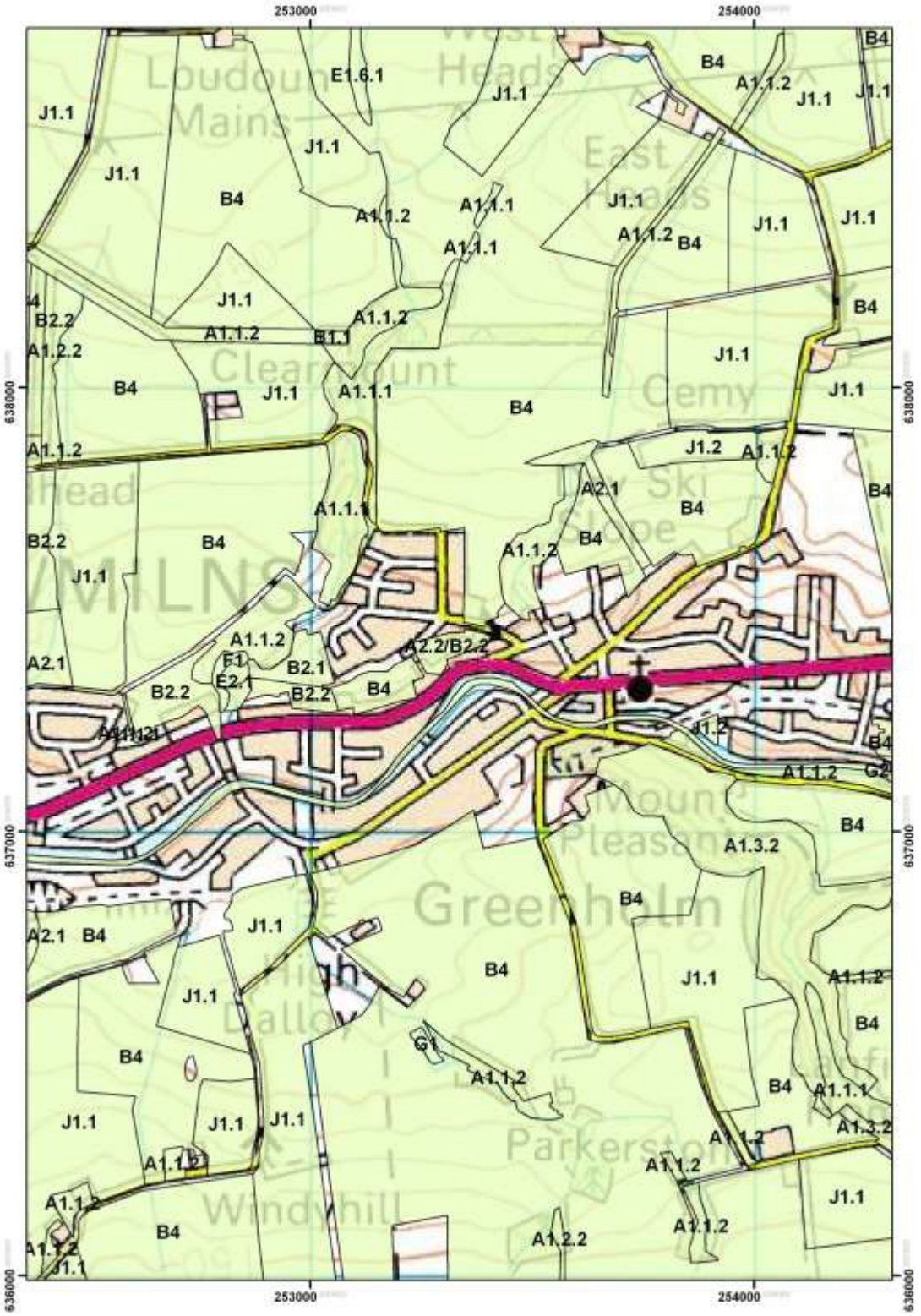
minor. Based on this survey 33.40% of the land is improved pasture, with significant contributions by planted coniferous woodland (18.40%) and planted broad-leaved woodland (11.04%). The latter is a significant wildlife resource and unexpectedly large. Upland habitats also make a substantial contribution with dry and wet heaths (2.53%), bogs (18.08%) and acid grassland (12.81%) cumulatively representing 33.55%. Cultivated land contributed 4.55% with poor, semi-improved grassland a further 2.02%. At this time, quarries of all types and associated spoil, past and present, covered only 90.40ha, approximately 0.079% and clearly out of date. A notable omission from the digitised data are hedgerow habitats.

The digitised habitat data has been uploaded to a full series of East Ayrshire 1:10, 000 OS bases and is provided to EAC as a standalone digital document with its own OS key, there being 298 maps and it would be inappropriate to include them as an annex in this report. A typical example of a single map is provided below, Figure 5, to illustrate the format. Polygons have been tagged with the standard phase 1 habitat survey alphanumeric code, which is a national standard, and not coloured. The number of habitats, and especially habitat mosaics, is so large that assigning individual colours would render a map incomprehensible. The first hierarchy level of code is provided below for basic interpretation of Figure 5, full codes can be viewed in the JNCC Handbook for Phase 1 Habitat Survey, Appendix 2 at the hyperlink below.

http://jncc.defra.gov.uk/pdf/JNCC%20A4%20Handbook%20for%20Phase%201%20habitat%20survey%20April%202008.pdf

Key: First level hierarchy key to the phase 1 habitat map, Figure 5.
A: Woodland and scrub
B: Grassland and marsh
C: Tall herb and fen
D: Heathland
E: Mire
F: Swamp, marginal and inundation
G: Open water
H: Coastland
I: Exposure and waste
J: Miscellaneous (incl. cultivated land (J1.1))

Figure 5 - Newmilns near Galston phase 1 habitat overlay, mid-point of map NS 53360 37420



2.1.2 Conservation status of habitats and key sites

The Ayrshire Biodiversity Action Plan (ALBAP) was written to deliver national (UKBAP[7]) objectives at local level and it prioritises habitats for action, as well as identifying key habitats and species, see Table 7. Since the current ALBAP was written in 2007 a number of very important Scottish biodiversity plans have been written including a special list of 100 species[8,9,10] and these documents, as well as the updated UKBAP, should be used to update the current ALBAP which ended in 2010. Biodiversity solutions, among others, have reviewed the status of Ayrshire's habitats and species and their data should be included in future updates.

Table 7 - ALBAP priority habitats and associated key sites and species

UKBAP broad habitat	ALBAP priority habitat	ALBAP priority habitat phase 1 alphanumeric)	ALBAP Key sites	ALBAP Key site species
Wetland	Rivers and streams	G2	River Ayr; River Doon	Water shrew; water vole; otter; Natterer's bat; Daubenton's bat; common and soprano pipistrelle; kingfisher; sand martin; dipper; goosander; Atlantic salmon; brown trout; saucer bug; mayfly; alternate-leaved water milfoil; water crowfoot; Killarney fern; river jelly lichen
	Fen, carr, marsh, swamp	F1;F2	Doon Valley SSSI; New Cumnock wetlands; Martnaham Loch SSSI; Barlosh Moss SSSI	Water shrew; water vole; otter; whooper swan; garganey; shoveler; hen harrier; spotted crake; water rail; snipe; curlew; short-eared owl; swallow; grasshopper warbler; sedge warbler; willow tit; reed bunting; common frog; common toad; palmate newt; smooth newt; adder; and *Acilius canaliculatus* (a beetle)
	Raised bog	E1.6.2	Dalmellington Moss	Curlew; snipe; short-eared owl; stonechat; common frog; common lizard; adder; black darter dragonfly; large heath butterfly; bog rosemary; bottle sedge; large-leaved sundew; bog asphodel; white-beaked sedge; cranberry; *Sphagnum magellanicum*; and *S. fuscum*.
	Standing open water	G1	Loch Doon SSSI; Bogton Loch;	Daubenton's bat; Natterer's bat; noctule bat; common

[7] http://jncc.defra.gov.uk/default.aspx?page=5155
[8] http://www.biodiversityscotland.gov.uk/
[9] https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list
[10] http://www.gov.scot/Resource/0042/00425276.pdf

UKBAP broad habitat	ALBAP priority habitat	ALBAP priority habitat phase 1 alphanumeric)	ALBAP Key sites	ALBAP Key site species
			Martnaham Loch SSSI	and soprano pipistrelle; otter; red-throated diver; black-throated diver; great crested grebe; whooper swan; greylag goose; common scoter; goosander; pochard; goldeneye; osprey; reed bunting; arctic charr; bladderwort; tufted loosestrife; water lobelia; water whorl-grass; reed sweet grass; gypsywort; cowbane; marestail; water sedge; lesser pond sedge; purple loosestrife; greater spearwort; common club-rush
	Floodplain grazing marsh	B5	New Cumnock wetlands and floodplain; Airds Moss; River Ayr floodplain at Muirkirk	Whooper swan; greylag goose; hen harrier; short-eared owl; redshank; snipe; curlew; lapwing; golden plover; grey partridge; teal; reed bunting; skylark; twite; linnet; stonechat
Farmland	All habitats of biodiversity interest esp. boundary features	Various	All farms with ESA/CPS/RSS and follow on plans according to scheme	Brown hare; water vole; brown long-eared bat, common pipistrelle; soprano pipistrelle; common snipe; curlew, grey partridge; linnet; yellowhammer; corncrake; sky lark; reed bunting; tree sparrow; barn owl; lapwing; redshank; orange-tip; whorled caraway; cornflower
Grassland	Acid grassland	B1.1; B1.2	Muirkirk Uplands SSSI;	Hen harrier; short-eared owl; meadow pipit; curlew; purple hairstreak; heath cudweed; mountain pansy; fairy club fungus; wax cap
	Purple moor grass and rush pasture	B5	No data on current extent	No current Ayrshire data. More widely the following can be associated with this habitat: curlew; lapwing; snipe; sky lark; marsh fritillary butterfly; heath spotted orchid; adder
	Base-rich grassland	B3.1; B3.2	To be identified for East Ayrshire	Dark green fritillary; northern brown argus; dingy skipper; common rock-rose; meadow oat; vernal sandwort; earth tongue; was cap fungus;

UKBAP broad habitat	ALBAP priority habitat	ALBAP priority habitat phase 1 alphanumeric)	ALBAP Key sites	ALBAP Key site species
				Russula persicina (a fungus)
	Un-improved neutral grassland	B2.1	To be identified for East Ayrshire	Spignel; green-winged orchid; small white orchid; frog orchid; greater butterfly orchid; lesser butterfly orchid; adders tongue; small pearl-bordered fritillary; large skipper; Scotch argus
Urban		Not classified	Key sites include: water corridors; urban parklands; older cemeteries, industrial areas and transport corridors; remnant habitats e.g. hedgerows, woodland in towns or villages; golf courses	Red squirrel; hedgehog; bats; house martin; song thrush; common frog; small tortoiseshell butterfly; common blue butterfly; common spotted orchid
Woodland	Native woodland	A1.1.1; A1.2.1	All AWI and SNAWI, see Appendices 3.3 and 3.4. To include any new plantations of upland oak/birch woodland; mixed ash woodland; wet woodland; scrub woodland	Red squirrel. badger, pied flycatcher and wood warbler
	Parkland and policy woodland	A3.1; A3.2; A3.3	To be added for East Ayrshire	
	Planted coniferous woodland	A1.2.2	Carrick Forest; Carsphairn Forest	Badger; red squirrel; black grouse; crossbill; goshawk; long-eared owl; merlin; nightjar; short-eared owl; sparrowhawk; broad-leaved helleborine; birds nest orchid; Scottish wood ant; common wintergreen; creeping ladies tresses
Upland	Upland heath (>300m)	D1.1; D1.2; D2; D3;D5; D6		Otter; mountain hare; brown hare; pine marten; water vole; water shrew
	Blanket bog	E1.6.1; E1.7; E1.8	Muirkirk and North Lowther Hills SSSI/SPA	Water vole; otter; water shrew; golden plover; hen harrier; merlin; peregrine; short-eared owl; bog rosemary; chickweed wintergreen; crowberry; lesser twayblade; common

UKBAP broad habitat	ALBAP priority habitat	ALBAP priority habitat phase 1 alphanumeric)	ALBAP Key sites	ALBAP Key site species
				toad; common frog; common lizard; adder; emperor moth; northern eggar moth; scotch argus; large heath; keeled skimmer; golden ringed dragonfly; four spotted chase; black darter; minotaur beetle
	Montane	D4	Muirkirk and North Lowther Hills SSSI/SPA	Water vole; otter; water shrew; golden eagle; golden plover; hen harrier; merlin; peregrine; short-eared owl; bog rosemary; chickweed wintergreen; crowberry; lesser twayblade

In a European context bogs are the most important habitat in East Ayrshire and not just for their intrinsic interest but also for the rare flora and fauna associated with this habitat. Raised bog is one of the most vulnerable types of bog and there are 38 in East Ayrshire, in addition to Airds Moss, see Table 8 and Figure 6. Table 8 has been compiled from available data and consultee responses but may not be complete, especially in relation to archaic sites.

Table 8 – List of archaic and extant raised bogs in East Ayrshire

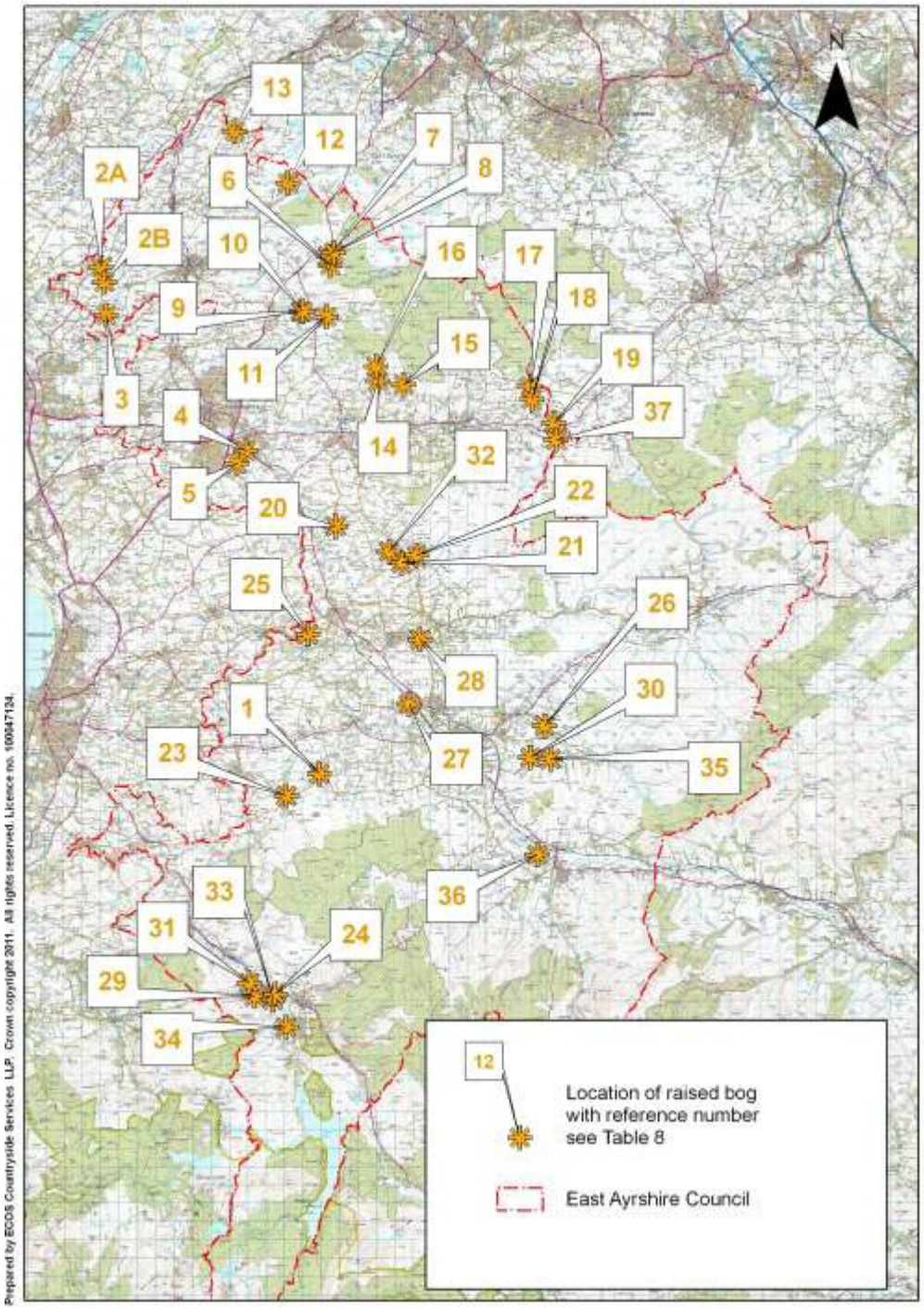
Ref No (see Figure 6)	Name	NGR
1	Barlosh Moss SSSI	NS489184
2A	Bloak Moss	NS370460
2B	Kennox Moss	NS372452
3	Haysmuir	NS373434
4	Torrance	NS449360
5	Riccarton	NS444353
6	Drumtee	NS495461
7	Tam's Hill	NS494466
8	Tam's Hill (East)	NS497468
9	Over Auchintiber	NS479436
10	Waterside West	NS480436
11	Waterside East	NS493433
12	Dun Moss	NS472506
13	Knockmade Moss	NS443534
14	Whatriggs Farm	NS521398
15	Hagars Moss	NS535396
16	Polbaith	NS520406
17	Harelea Hill	NS604395
18	Wingkingfield	NS605388
19	Allantonplains	NS617375
20	Low Holehouse	NS498319
21	Bashaw Moss	NS534299
22	Blairkip	NS542303
23	Bairston	NS471172
24	Dalmellington Moss SSSI	NS466064

25	Kipplemoss	NS483260
26	Low Moss	NS612210
27	Nr Auchinleck	NS538222
28	Nr Catrine	NS544257
29	Nr Dalmellington Moss	NS454063
30	Auchengibbert	NS604193
31	NW Dalmellington Moss	NS451070
32	South Auchenbrain	NS527305
33	Sillyhole Moss	NS464061
34	South of Bogton Loch	NS471046
35	South of Low Moss	NS615192
36	Yellow Moss	NS608140
37	Allantonplains Plantation	NS 618366

Nineteen raised bogs were surveyed by EAC and volunteers in 2009 as part of the ALBAP priority habitat survey. This Council-led survey reported that they were all were affected by adverse impacts, mainly drainage and the resulting invasion of scrub, burning, overgrazing and in many cases typical species were now scarce. Limited peat extraction was evident on at least two sites. The sites affected are Hagars Moss (NS 535396) and Allantonplains Plantation (NS 618366).

Data provided by East Ayrshire Coalfield Environment Initiative (CEI) confirms that 10 raised bogs have been irretrievably lost to agriculture, or a quarry in the case of Allantonplains. These are, Low Holehouse (NS498319), Allantonplains (NS617375), Barshaw Moss (NS534299), Blairkip (NS542303), Blairston (NS471172), Nr Auchinleck (NS538222), Nr Catrine (NS544257), Auchingibbert, Nr Logan (NS604193), South Auchenbrain, Nr Polbaith (NS527305) and a bog south of Low Mosss (NS615192). CEI have been actively involved in bog restoration at Airds Moss, Tappethill Moss and Dalmellington Moss.

Figure 6 - Location of East Ayrshire raised bogs.



Broad-leaved woodland is a significant EA resource in terms of area and woodlands registered on the Ancient Woodland Inventory (AWI) and Scottish Native and Ancient Woodland Inventories (SNAWI) record the resource. The value of the maps, reproduced from SNH in Appendices 3 and 4, are that they show sites that were mapped as woodland on the Roy Series military maps, surveyed 1745-55, and still hold woodland cover today, albeit as plantation, or other types of stand, that may not be native. As well as indicating areas of woodland value the woodland inventory maps also identify areas that are likely to hold typical, and possibly rare, woodland flora and fauna. The value of these woodlands is largely unknown due to lack of survey and their management is key to reversing some nationally negative wildlife population trends, see Table 9.

Trends – Phase 1 Habitats

Land cover of Scotland has been mapped using three aerial surveys in 1947, 1973 and 1988 and the key trends for Scottish land cover change 1947-88 are summarised alongside the results of the Scottish data from the UK Countryside Survey 2007[11], see Table 9.

Table 9 - Broad changes 1947-88 and the 2007 Countryside Survey

Broad Habitat	1947-1988	1998-2007
Urban	Built land increased by approximately 46%. Land managed for formal recreation e.g. playing fields and golf courses 138% Area of transport corridor increased by 22%	No comparable information
Arable	Arable land expansion of 11% Hedgerow length reduced by 50%	Arable and horticulture increased by between 11% (lowland) and 25% (Intermediate Uplands and Islands) Area of improved grassland increased by 9% across Scotland
Grassland	Rough grassland decreased by 10% Intermediate grassland increased by 15% Smooth grassland decreased by 11%	Acid grassland increased by 8% with no change in neutral or calcareous grassland. Plant richness decreased by around 17% in neutral grassland
Forest and woodland	Forest and woodland expanded by nearly 200% New conifer woodland replaced broad-leaved woodland (-23%), mixed woodland (-37 %) and coniferous woodland (-47%) Length of associated ditches, often as mire drainage for tree planting doubled	Area of broad-leaved woodland increased by 10%. Area of coniferous woodland decreased by 7.1% Species-richness Score decreased by 5 species in broad-leaved woodland and 12 species in coniferous woodland Competitive species increased in broad-leaved woodland whilst species of open ground deceased
Upland	Heather moorland was reduced by 23% Blanket mire decreased by 21%, lowland mire by 44%, mainly to afforestation and drainage Length of unsurfaced tracks increased by 29%	No significant changes to the extents of the 6 broad habitats which make up the upland landscape mosaic Area of bracken increased by 27% in the uplands and islands. Areas of bog decreased by 2.5% Species richness Scores decreased for

[11] http://countrysidesurvey.org.uk/

Broad Habitat	1947-1988	1998-2007
		dwarf shrub heath (1990-2007 - 12%); fen; marsh and swamp (- 23%); and bog (-11%).

Perhaps with the exception of breeding and wintering birds, adequate information is not available to provide information on regional trends, however, it is likely that the broad changes above will also be reflected in East Ayrshire as the underlying causes are likely to be equally applicable.

2.1.2 National Vegetation Classification (NVC)

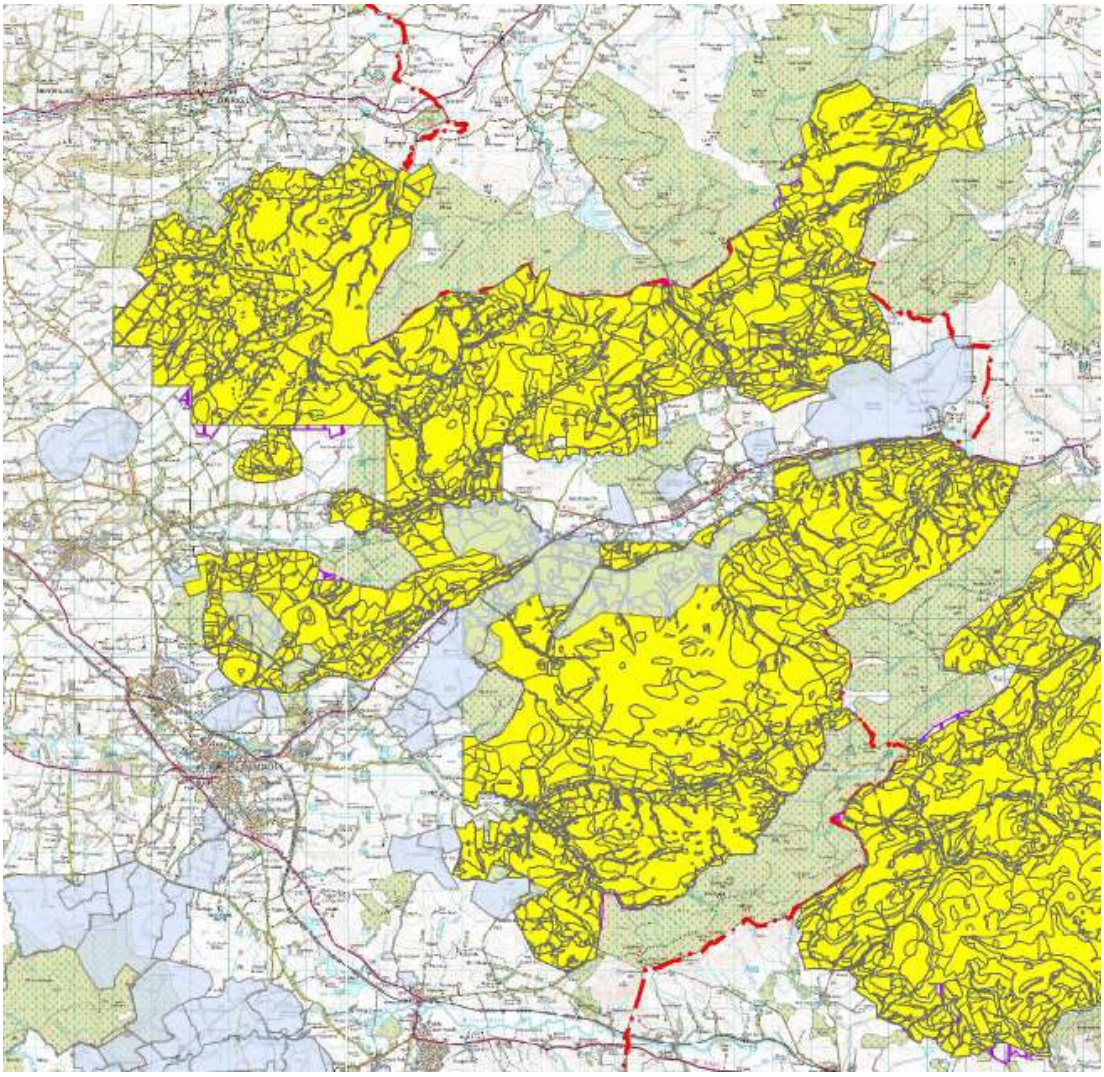
State

Unlike the phase 1 habitat survey, which is broad scale, the NVC is a detailed phytosociological classification, which describes all the known plant UK communities and their sub-communities in a prescribed method assigning standard descriptions and alphanumeric codes.

Coverage for East Ayrshire is low and, not unexpectedly, largely confined to European designated nature conservation sites in the east where NVC surveys were completed by SNH for the Muirkirk and North Lowther Uplands over three years, 1997-1999[12]. Digitised results, abstracted from SNH are shown in Figure 3.7. SNH may hold further NVC data not available at the time of drafting this report.

[12] http://jncc.defra.gov.uk/page-4259

Figure 7 - Core NVC coverage for East Ayrshire

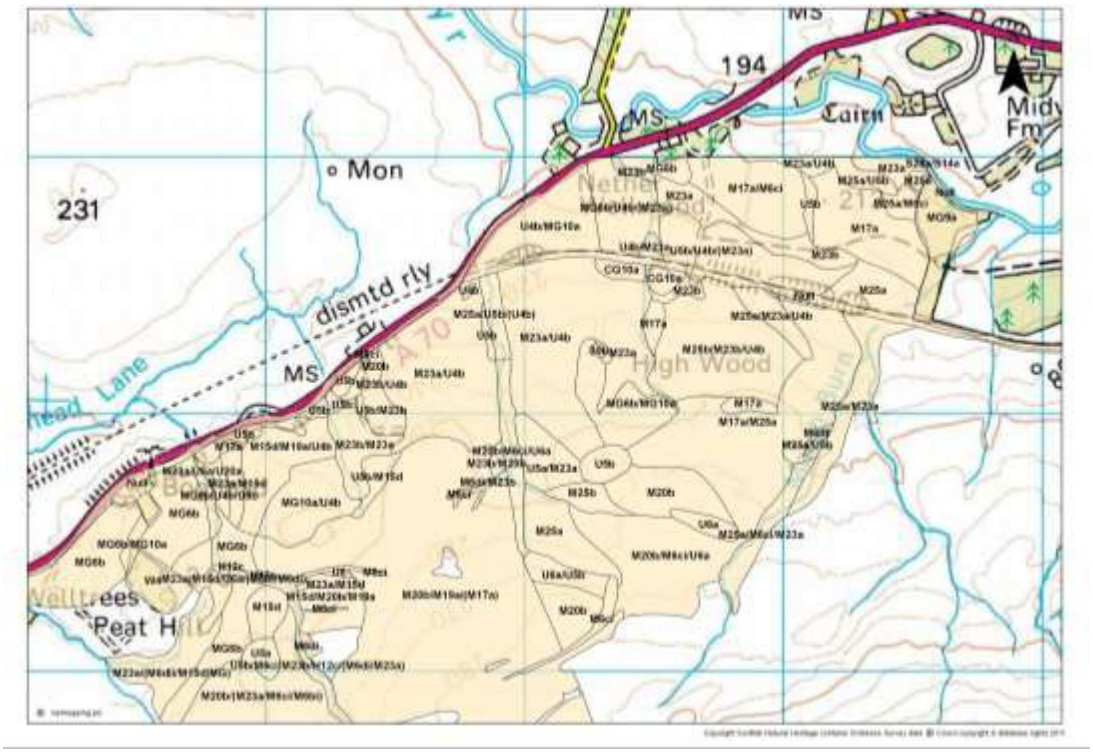


NVC communities are detailed descriptions of vegetation, which are of scientific interest for the management of sites with special interest. However, it can be a primary resource for habitat restoration due to the higher level of detail in relation to species presence and abundance, as illustrated by the data for Powharnal, which precedes opencast coal mining, see Figure 8.

The alphanumeric coding is complex and involves assignment of a code to each plant community and every sub-community of each community. This leads to the generation of a very large number of codes, too many to list in this report. A full list of NVC community level codes is available in the final appendix of the NVC Handbook[13]. In order to access sub-community level the interested party must refer to the relevant volume in Rodwell (1991 et seq)[14]

[13] http://jncc.defra.gov.uk/pdf/pub06_NVCusershandbook2006.pdf
[14] Rodwell (1991- 2000). British Plant Communities Vols 1-5) CUP

Figure 8 - Powharnal area NVC map, prior to opencast mining



As with the phase 1 habitat data, all available NVC data is digitally provided to EA as a standalone report at 1:10,000 scale in digital format and comprises 78 individual maps and a key.

SNH commissioned a further NVC survey of selected sites in Ayrshire over a period of two years 2005-2007 (DH Consultancy (2007)[15] and the contract included four East Ayrshire SSSI.

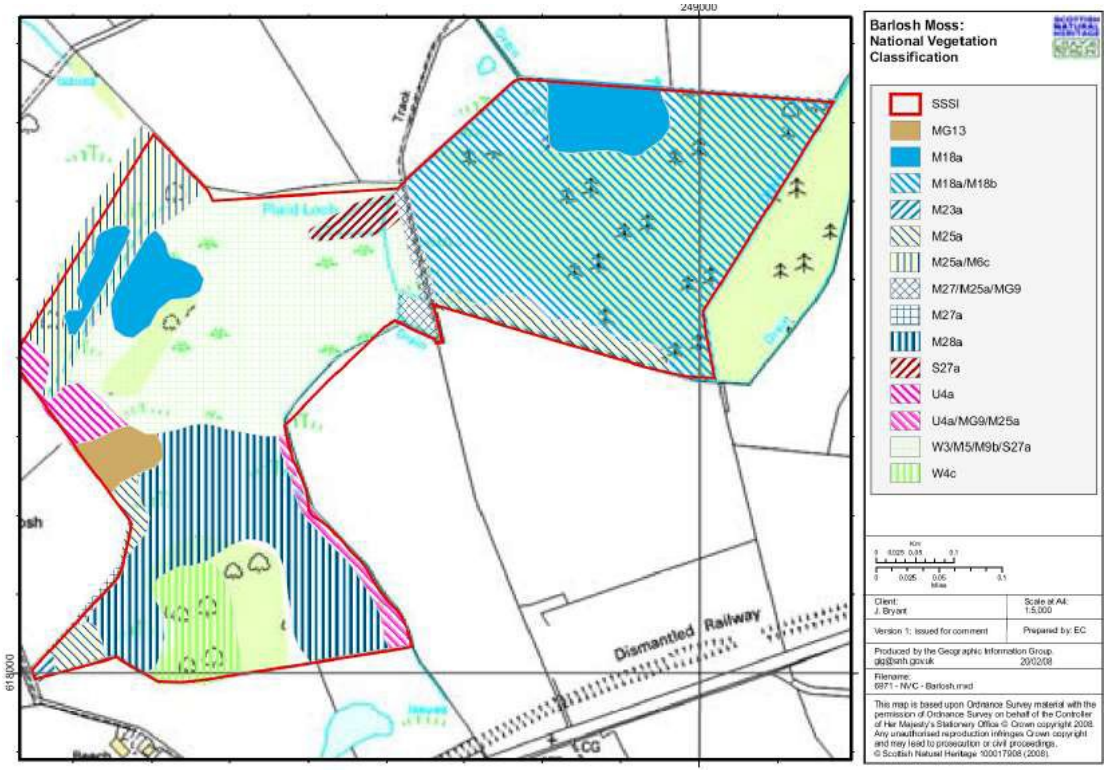
- Barlosh Moss SSSI
- Bogton Loch SSSI
- Dalmellington Moss SSSI
- Martnaham Loch and Wood (boundary crosses into South Ayrshire)

Main findings of theses four site surveys are summarised below and once again reference should be made to the NVC Handbook[13] to identify the NVC community/sub-community.

[15] DH Ecological Consultancy (2007). National Vegetation Classification (NVC) Survey, selected Sites of Special Scientifc Interest (SSSI) Strathclyde and Ayrshire. SNH Commissioned Report No 276 (ROAME No. F05L101)

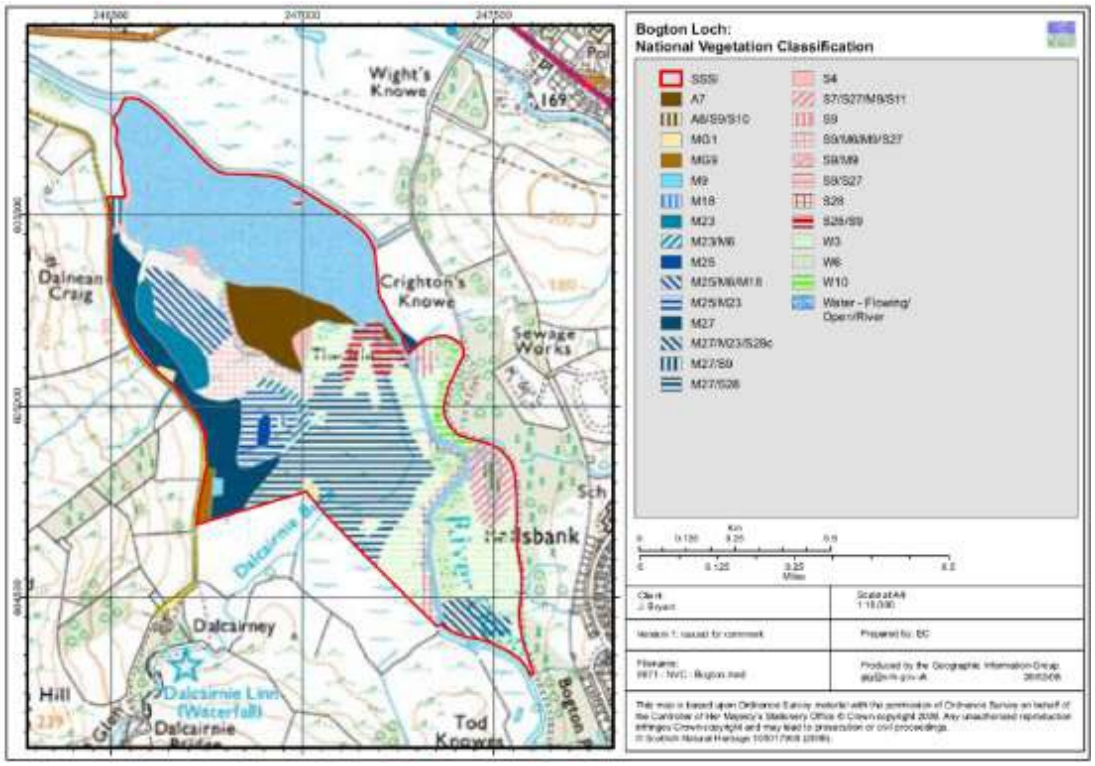
1. Barlosh Moss SSSI

This basin mire covers 37.8ha at a height of 145m and drains into tributaries of the Burnock and Taiglum Burns. M18 dominates with mire complexes that include M5, M9 and S27. W3 and W4 woodland has succeeded alongside Scots pine regeneration (a legacy of a former planting scheme.) Lagg fens areas held M25, M6 and M27. Notable plants recorded included *Andromeda polifolia* (Nationally Scarce), *Carex diandra* and a possible record of *Carex aquatilis* and *Vaccinium oxycoccus*. Unsurveyed peat soils extend beyond the SSSI boundary in the eastern section.



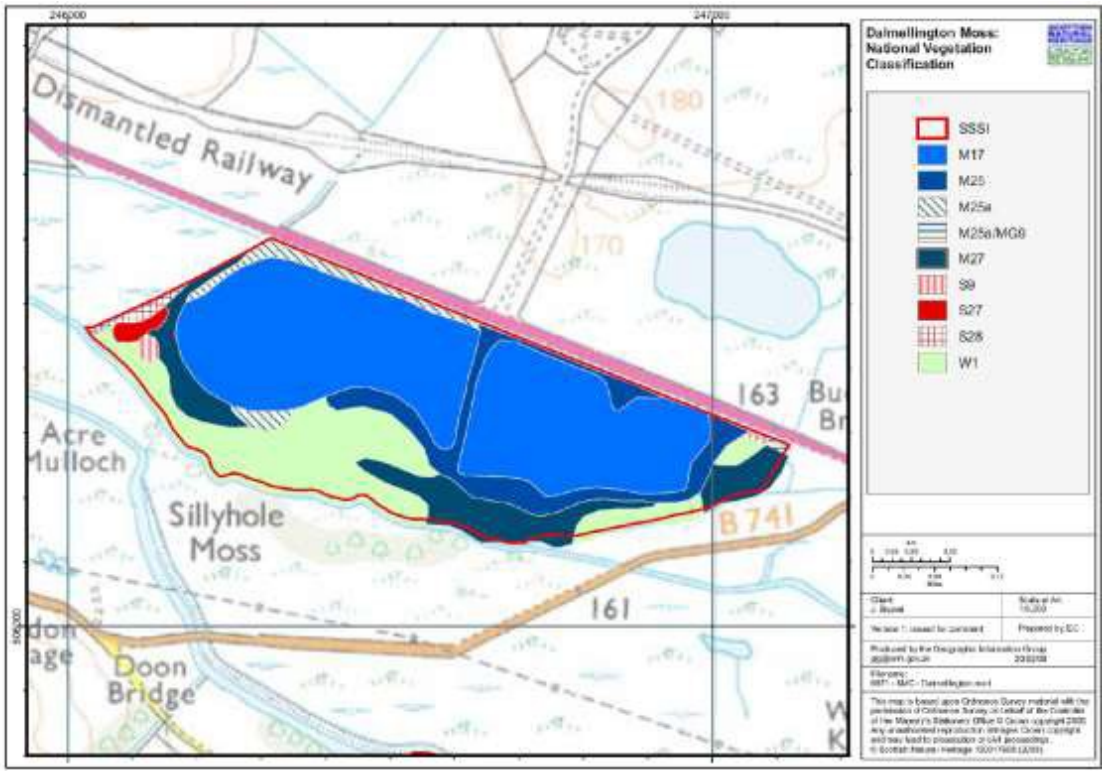
2. Bogton Loch SSSI

Vegetation surrounding Bogton Loch is a mosaic of 21 aquatic, swamp, mire and woodland associated with the Loch and running waters of the River Doon and Dalcairnie Burn. the following communities were present: A8; S4; S7; S9; S10; S11; S27; S28; M6; M9 M17); M19; M23; M25; M27; MG1; MG9; MG10; W2; W6; and W10. *Calamagrostis stricta* and *Calamagrostis epijegos* were notable.



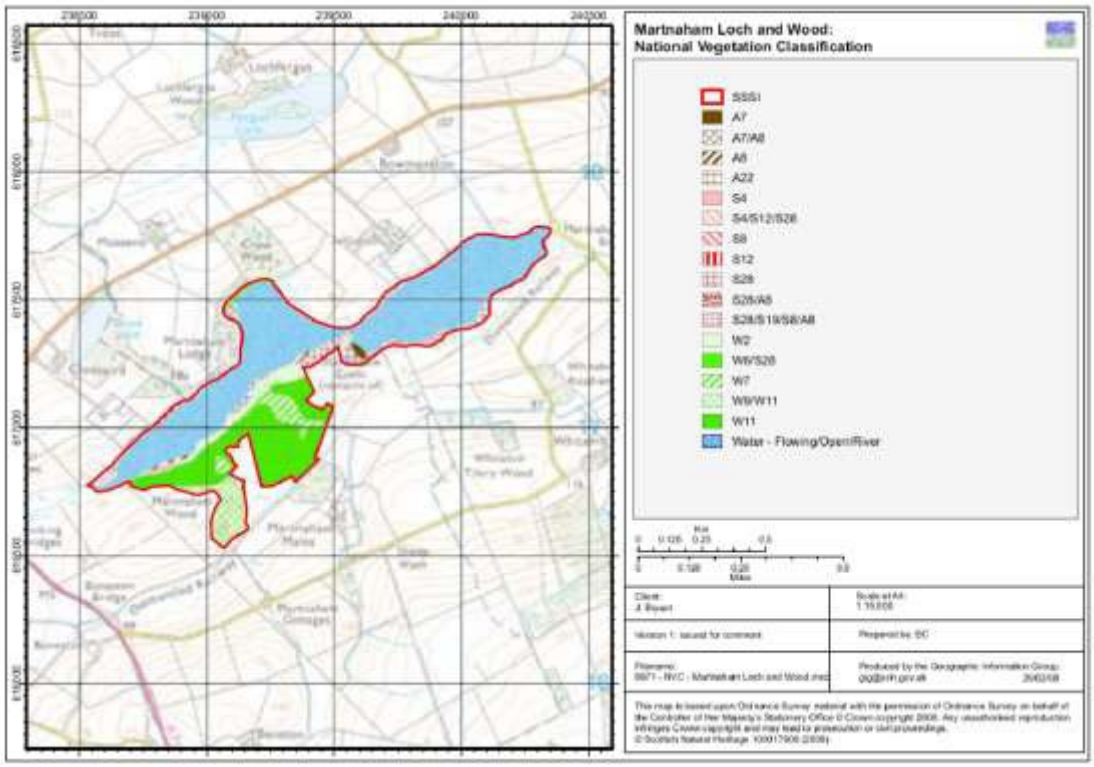
3. Dalmellington Moss SSSI

This raised mire is dominated by M17 with a broad secondary lagg fen comprising M25 and M27. The following communities mapped: M17; M25; M27; S7; S9; S27; S28; MG9; and W2. Five nationally and regionally scarce plant species were present, namely, *Andromeda polifolia*, *Calamagrostis stricta*, *Carex acutiformis*, *C. vesicaria* and *Scirpus sylvaticus*



4. Martnaham Loch and Wood

A 65.5ha site notified for its aquatic and woodland interest, it also encloses an Ancient Woodland Inventory site on the south side of the Loch. The ancient woodland was predominantly W11 with W7 and W9. Nineteen additional NVC communities were associated with the Loch: W1; W2; M9; M28; MG1; MG6; MG9; A7; A8; A9; A22; S4; S8; S10; S12; S19; S28 and one provisional new *Carex nigra-Agrostis stolonifera* community. Notable plants were *Butomus umbellatus*; *Ranunculus lingua* and *Biden tripartita*.



Trend – NVC Communities

As stated above, the NVC coverage for East Ayrshire is low and largely confined to European designated nature conservation sites. NVC is a relatively new classification, completed in 2000, and there are therefore no baselines on which to determine tends.

2.2 Species

A full list of protected species in Scotland is provided in Appendix 5. This can be compared with those listed below which are found in East Ayrshire.

2.2.1 Mammals

2.2.1.1 European Protected Species - Bats

Status, Distribution and Importance - Bats

Seventeen species of bat are found in the UK and at least nine are regularly known from Scotland with the number of species likely to be recorded increasing from north to south.

Table 10 – East Ayrshire bat status summary and habitat preferences

Common name	Latin name	Distribution	UK pre-breeding population	Scottish pre-breeding population	Habitat summer roosting	Habitat foraging
Brown long-eared bats	*Plecotus auritus*	Common, widespread	200,000	20-30,000	Houses, other buildings trees and bat boxes	Deciduous woodland up to 2km from roost. Avoid crossing open land preferring to follow hedgerows, tree lines or grassy banks when commuting.
Pipistrelles (Common and Soprano)	*Pipistrellus, P. pygmies*	Common, widespread	2-3 million	550,000	Buildings, esp. houses	Almost any including lit urban development. Sopranos are more commonly associated with rivers and lochs. Tree lines can be important commuting corridors.
Daubenton's bat	*Myotis daubentonii*	Common, widespread	150.000	40,000	Buildings, bridges and trees close to water	Open water, ditches
Leisler's bat	*Nyctalus leisleri*	Rare restricted	10,000	250	Buildings and tree holes	Widest range of open habitat. Not light averse.
Natterer's bat	*Myotis nattereri*	Common, widespread	100,000	17,500	Old buildings, bridges and tree crevices	Broad-leaved and wet woodland
Nathusius' pippistrelle	*P. nathusii*	Rare restricted	Not available	Not available	Tree holes and bat boxes	Rivers
Noctule bat	*Nyctalus noctula*	Rare restricted	50,000	250	Tree holes	Open water and wetlands. Not light averse and uses most other habitat. Long-distance commuter up to 26km from roost
Whiskered bat	*Myotis mystacinus*	Rare restricted	30-40,000	1,500	Buildings and tree holes	Rivers and woodland

Note: these population estimates are not highly reliable

In East Ayrshire, common and soprano pipistrelles are probably the most abundant followed by brown long-eared, Daubenton's and Natterer's bats. Other species have been less frequently recorded and this may be due to lack of survey coverage. New Leisler breeding colonies have been located at Culzean Castle and may be present in East Ayrshire. Noctules were also recently discovered roosting in a bat box at Dean Castle Country Park, Kilmarnock. Nathusius' bats have been recorded in East Ayrshire and were considered migrant until recently, when new data suggest that some are resident, at least in England.

Trends and Influential Factors - Bats[16]

Potentially adverse factors affecting bats in East Ayrshire are likely to include loss of tree cover, woodland clearance, changes to hedgerow distribution and bankside management of rivers streams and ditches.

Data from the National Bat Monitoring Programme (NBMP) suggests recent positive trends for common pipistrelle, Natterer's and Daubenton's bats whilst whiskered, brown long-eared Noctule and soprano pipistrelle were stable. The Scottish sample size is not yet large enough to establish any trends and consequently no East Ayrshire trends are available.

2.1.1.2 European Protected Species - Otter (*Lutra lutra*)

Status, Distribution and Importance - Otter

Otter in Scotland have recovered from a severe population decline due to pollution of freshwater and the resulting loss of fish stocks. This has been well documented over four national surveys of Scottish otter. The first in 1978 and the most recent in 2004 in which the stated that otter were ubiquitous, now occupying urban areas and highly disturbed waterways where they appear highly tolerant of human activity. This latest survey covered 1376 sites with positive otter evidence recorded in 92.08%. Strathclyde and Ayrshire were reported together as having a lower level of evidence (83.10%) but still suggesting a widespread recovery from the 23.94% reported in the first survey in 1978-79, see Figure 8. Otter are a qualifying feature of the Merrick Kells SAC, part of which is in East Ayrshire.

Figure 8 - Current distribution of otter based on available data

Trends and Influential Factors - Otter

[16] Swift, S.M. Dr. Bat Species in Scotland. Report to SNH. http://www.snh.gov.uk/docs/C208532.pdf

Acidification may be an issue in some SW Scotland catchments and water quality may have been locally affected in proximity to recent opencast coal mines. The overall trend is towards improved water quality although there is room for further improvement, as is evident from Table 11. Road traffic mortality is an unnatural factor which accounts for an unknown number of otter.

Table 11 – Water Quality in East Ayrshire, 2013 from SEPA Classification[17]

Class of Overall Status	2013 Status for East Ayrshire		
	River Waterbodies	Loch Waterbodies	Groundwater Bodies
High	151 (6%)	59 (18%)	N/A
Good	1167 (49%)	165 (49%)	314 (78%)
Moderate	616 (26%)	69 (21%)	N/A
Poor	378 (16%)	34 (10%)	89 (22%)
Bad	91 (4%)	7 (2%)	N/A
Total	2406	334	403

2.1.1.3 UK Protected Species - Badger (*Meles meles)*

Data has been collated with the support of Scottish Badgers and Scottish Wildlife Trust. Due to the sensitivity of this data it is reported in a confidential badger annex. To place badger sett data in the public domain could put local badgers at risk and the following summary is provided for public information.

Status, Distribution and Importance - Badger

Badgers are widespread in Ayrshire with East Ayrshire holding a moderate population, perhaps 100 social groups, mainly dispersed over lowland eastern farmland and woodland, Scottish Badgers (*pers. comm*).

Trend – Badger

The general Scottish Badgers view is that the population is stable and not highly persecuted. Road traffic accidents are frequent and limit recruitment to the breeding population and slows any expansion in distribution. Bovine tuberculosis is present in a small percentage of Ayrshire cattle herds and with only a moderate badger population this disease is not an issue in East Ayrshire.

2.1.1.4 UK Protected Species - Red squirrel (*Sciurus vulgaris*)

Status, Distribution and Importance - Red squirrel

The red squirrel population has fluctuated over the last 500 years due to deforestation and intensification of agriculture, with persecution the significant factor in the early 20th century. The current Scottish population is estimated as 120,000, approximately 75% of the UK population. This species has a broad distribution in East Ayrshire, having been recorded in all but two 10km squares, but there are no population estimates. NBN holds the Saving Scotland's Red Squirrels data used to create Figure 9.

[17] https://www.sepa.org.uk/data-visualisation/water-classification-hub/

Figure 9 - Summary of NBN/SRS data for Red Squirrel

Trends and Influential Factors – Red Squirrel

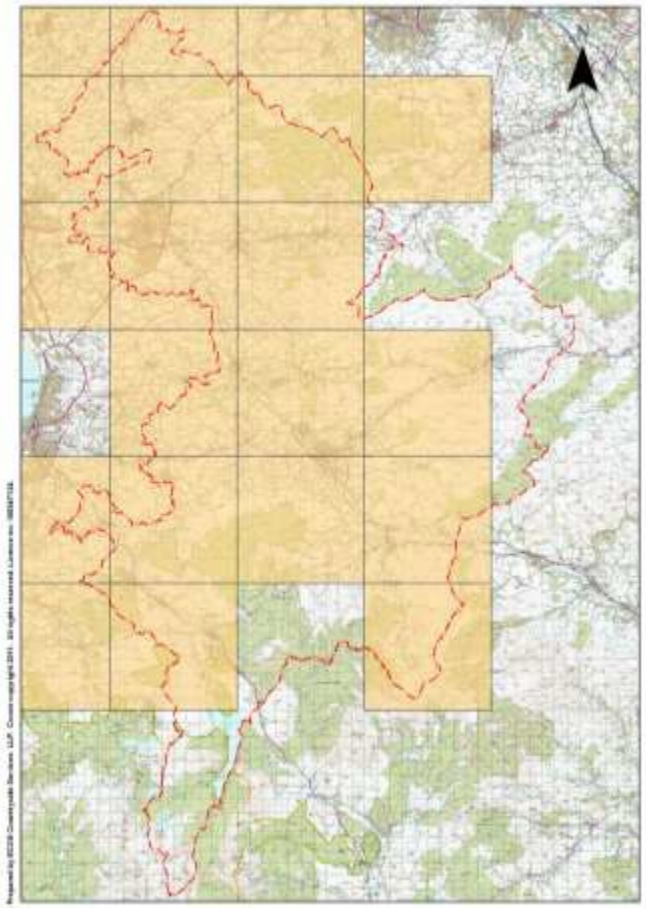
Forestry Commission surveys suggest that the red squirrel population is stable in their forests and this may be true for East Ayrshire. There are approximately 3 million grey squirrels in the UK and they are carrying the lethal Squirrel Pox virus across the Scottish border and without control this is a significant and on-going threat. SWT (B. Philp pers comm) observes that red squirrels are now largely confined to conifer plantations in the south of the area and few, perhaps none remain to the north of Cumnock.

2.1.1.5 UK Protected Species - Water vole (*Arvicola amphibius*)

Status, Distribution and Importance – Water Vole

Scottish water voles are genetically distinct from other UK populations and often have a black pelage. Numbers declined rapidly in the latter part of the last century and this is correlated with the rise of mink populations. It is now one of the rarest and most threatened UK mammals and is more likely to be found today in the upland catchments of rivers rather than their traditional stronghold of slow-moving lower sections of rivers, canals and ditches. The most recent national survey (2003) found no evidence of water vole in East Ayrshire, however sampling was sparse and current status is unknown.

Figure 10 - Historical summary of all NBN records for Water Vole shows the historical context underlining how widespread the water vole was prior to its local extinction.



Trends and Influential Factors - Water Vole [18,19]

Non-native American mink are a major predator of water vole and without control can cause local extinctions or prevent successful re-introduction. Mink are widespread in East Ayrshire, although Ayrshire Rivers Trust monitor and control their numbers. Water vole require over bank habitat and many otherwise suitable watercourses are degraded by grazing and poor riparian management. Adequately funded, positive intervention management is likely to be the key to re-establishing water voles.

[18] https://www.nature.scot/plants-animals-and-fungi/mammals/land-mammals/water-voles

[19] *Jefferies, D.J. (ed) (2003). The water vole and mink survey of Britain 1996-1998 with a history of the long term changes in the status of both species and their causes. The Vincent Wildlife Trust, Ledbury, U.K.*

2.2.2 Birds

2.2.2.1 Background

Ayrshire ornithology has been well served in the past with historical bird interest reported in four regional publications.

- Gray, Robert (1869). The Birds of Ayrshire and Wigtonshire. Murray & Son, Glasgow
- Richmond Paton, E & Pike, G Oliver. (1929). The Birds of Ayrshire. 2001 Reprint Dalbeatie Press. (Includes: Additions and Corrections to The Birds of Ayrshire; Scot Nat September - October 1932)
- McWilliam, JM. (1936). The Birds of the Firth of Clyde including Ayrshire, Dunbartonshire and South Argyllshire. Witherby.
- Hogg, Angus. (1983). Birds of Ayrshire, A County Checklist.

In addition, there is a huge resource of data from national wintering and breeding bird surveys that include species-specific surveys, mainly organised by the British Trust for Ornithology (BTO). The long - running Wetland Bird Survey being the best example. Regional bird records are submitted to the Ayrshire Bird Report (ABR), published annually since 1976, and Scottish Bird Report (SBR), published annually since 1969. The 2011 ABR includes a current checklist of Ayrshire birds by Angus Hogg and Fraser Simpson. The greatest majority of the data is originated by volunteers often spending very long hours in the field, in some cases over many years.

At present there is no current breeding atlas of the birds of Ayrshire, although a small number breeding and winter East Ayrshire tetrads, 2x2km squares, were sampled for the BTO Bird Atlas 2007-11, see Table 12.

Table 12 - BTO Bird Atlas 2007-11, tetrad coverage in East Ayrshire

Tetrad	**Winter Season**		**Breeding Season**	
	Early	**Late**	**Early**	**Late**
NS43J	√	√	**-**	√
NS43P	√	√	**-**	√
NS44F	√	√	√	√
NS44J	√	√	**-**	√
NS44K	√	√	√	√
NS44L	-	√	√	√
NS44P	√	√	**-**	√
NS44R	√	√	√	√
NS44V	√	√	**-**	√
10km square	**No of tetrads covered**			
NS50	**8**			
NS51	**8**			
NS52	**9**			
NS53	**14**			
NS60	**8**			
NS61	**8**			
NS62	**11**			

The most important bird conservation site in East Ayrshire, for breeding and wintering birds, is the Muirkirk and North Lower Hills Special Protection Area. The Ayrshire Birding website (http://www.ayrshire-birding.org.uk/category/locations_east_ayrshire/) identifies a list of places of merit for birdwatchers and these include the following sites in East Ayrshire. Further sites were added on the advice of Angus Hogg.

- Craigdullyeart and Corsencon, near New Cumnock
- Trabboch Loch and Stair
- Dean Castle Country Park
- Cairn Table, near Muirkirk
- Ness Glen
- Loch Doon
- Irvine Valley Trail
- Woodroad Park, Cumnock
- Knockintiber to Kilmarnock Railway
- Big Wood, Galston
- The New Cumnock Wetlands (Knockshinnoch Lagoons/Loch o' the Lowes/Creoch Loch/Black Loch)
- Glen Afton
- Bogton Loch/Moss

Table 13 is a list of protected species and species of conservation concern, which have been identified by ECOS as East Ayrshire species of material importance to EAC. The main criteria for their choice was inclusion on lists, which identify their nature conservation or biodiversity importance. Each of these species is addressed in the following sections at species level using the accessible available data.

Table 13 - List of target species and their conservation status.

Species*	EC Birds Directive Annex 1	Berne Convention on the Conservation of European Wildlife and Natural habitats	Bonn Convention on the Conservation of Migratory Wild Animals	Wildlife & Country - side Act 1981	UKBAP	ALBAP	Red List Species of Conservation Concern (SoCC)	Broad breeding Population trend, Ayrshire **
Black grouse					√	√	√	-ve
Bullfinch					√			+ve
Starling					√		√	+ve
Cuckoo					√		√	+ve
Curlew					√			-ve
Tree sparrow					√			-ve
Grey partridge					√		√	-ve
Dunnock		√			√			+ve
Hen harrier	√	√	√	√		√	√	-ve
Herring gull					√		√	-ve
House sparrow					√		√	+ve
Lesser redpoll		√			√		√	+ve
Lesser whitethroat		√				√		+ve
Lapwing					√		√	-ve
Red grouse					√			+ve
Reed bunting		√			√			+ve
Ring ouzel					√		√	-ve
Sky lark					√		√	+ve
Song thrush						√	√	+ve
Spotted flycatcher		√	√		√		√	-ve
Yellowhammer		√			√		√	+ve
Wood warbler		√			√		√	-ve

** Filtered to include only those regularly occurring in East Ayrshire*
*** From:http://www.ayrshire-birding.org.uk/rare_ayrshire_species/*

2.2.2.2 Key Species Summaries

Main sources of information

- *Scottish Breeding Bird Survey Trends for 2017*
- *http://jncc.defra.gov.uk/page-7588*
- *http://www.scottishraptorstudygroup.org/srms.html*
- *Balmer, D.E. et al (2013). Bird Atlas 2007-11: the breeding birds of Britain and Ireland. BTO.*
- *Forrester R & Andrews I (Eds) (2007). The Birds of Scotland. SOC*
- *Thom, V.M. (1986). Birds in Scotland. Poyser*
- *Werbham, C. et al (eds) 2002). The Migration Atlas. BT0*

The maps reproduced below have been abstracted, with permission, from the Ayrshire Birding web-site and represent a breeding baseline of 1991-97, which allows easy visual comparison with the current Bird Atlas 2007-11.

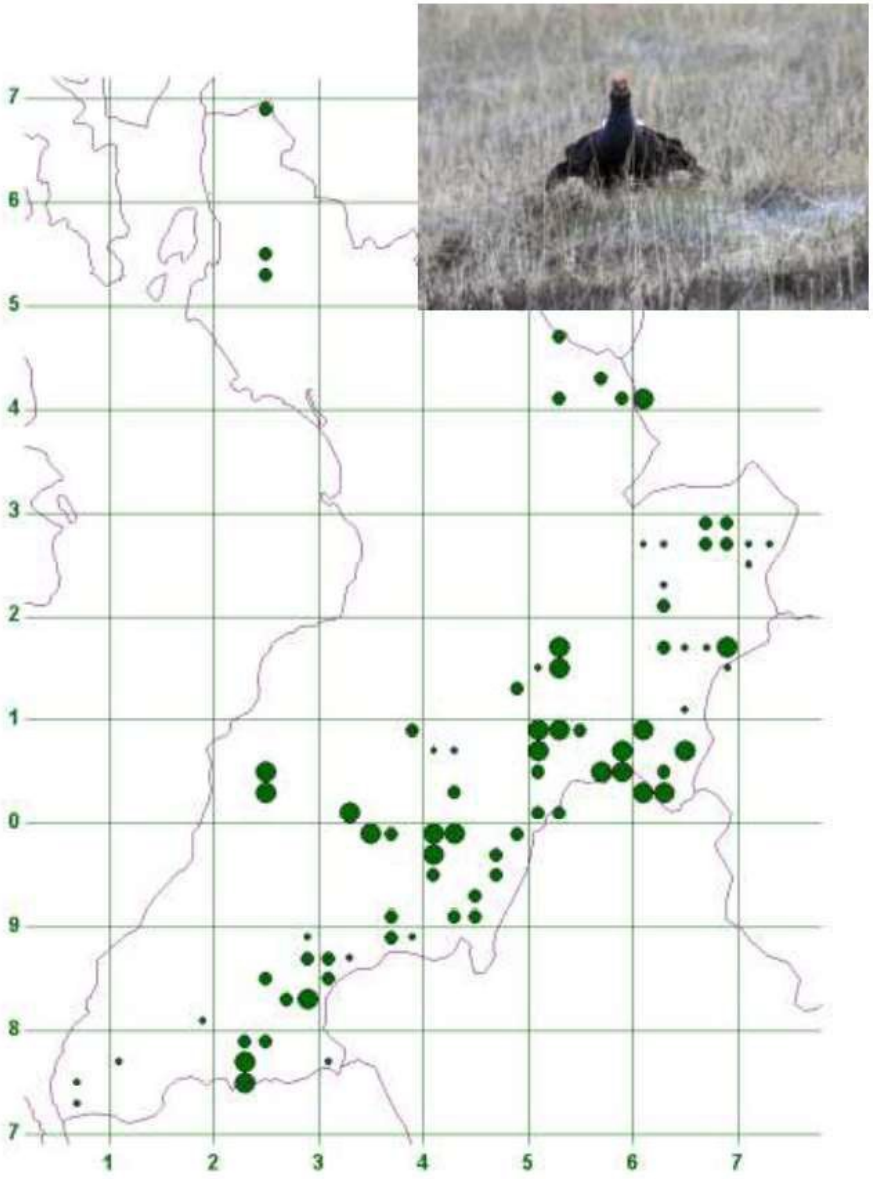
Key to status used in the species summaries

RB	Resident breeder
MB	Migrant breeder
NB	Non-breeder
FB	Former breeder
PV	Passage visitor
WV	Winter visitor

2.2.2.3 Black grouse (*Tetrao tetrix*)

Status, Distribution and Importance of Black Grouse (RB)

The Scottish population was estimated after the National Black Grouse Survey in 2005 at 3,344 lekking males, 71% of the British population, of which 800 were estimated in SW Scotland, approximately 24%. A substantial proportion of the Ayrshire population breeds in East Ayrshire on the Muirkirk and Glen Afton areas. In 2007, SNH commissioned a survey of the lek distribution at both these sites finding 17 leks, also confirming the known range contraction.



Comparison of the 1991-97 breeding map with the current Atlas suggest that a decline is still continuing, although local areas are now stable.

Trends and Influential Factors for Black Grouse (RB)

The trend is one of long term decline since the early 1900s, due to habitat and land-use change, increases in predator populations and climate change. Recent changes in forestry planting and management are improving the situation and the population may be stabilising in some areas.

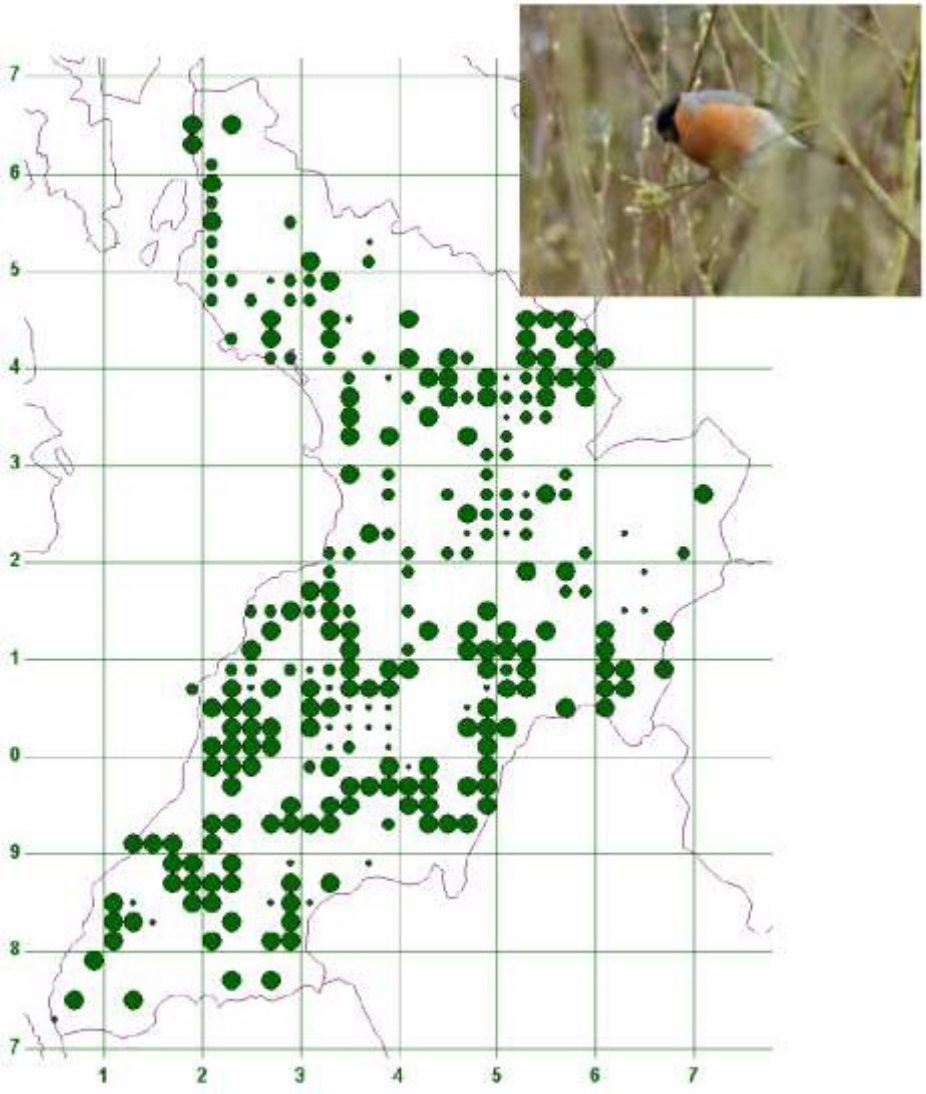
Conservation Status

This is a UKBAP, ALBAP and Red List SoCC

2.2.2.4 Bullfinch (*Pyrrhula pyrrhula*)

Status, Distribution and Importance of Common Bullfinch *(*RB)

Bullfinch breeding status in Scotland is estimated as 50,000-90,000 pairs with a wintering population of 120,000 birds.



Trends and Influential Factors for Common Bullfinch (RB)

The Scottish population is more stable than other parts of the UK where there have been severe declines and the latest BTO BBS summary suggests an overall increase for the period 1995-2012. Factors affecting numbers in Scotland are not clear, but declines in the south may be due to

deteriorating habitat quality and ability to survive outside the breeding season. This species maintains significant presence in East Ayrshire, especially in the southern 10k squares.

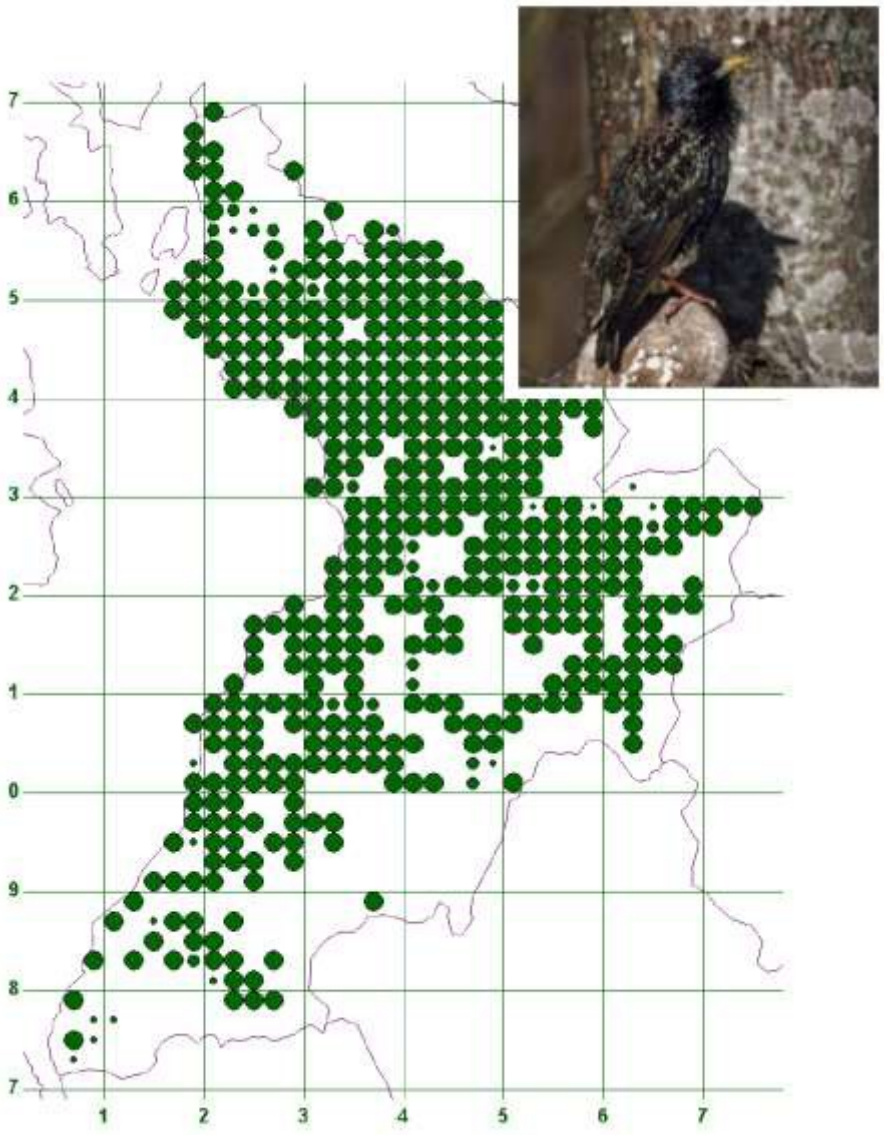
Conservation Status

This is a UKBAP priority species. Formerly a Red List SoCC but now placed in the Amber List.

2.2.2.5 Starling (*Sturnus vulgaris*)

Status, Distribution and Importance of Starling (RB WV PV)

A species that is widespread in both winter and during the breeding season, with Scottish populations of 2-3 million and 170-300,000 pairs respectively. The central belt, Borders and east coast of Scotland are their main Scottish strongholds at any time of year. The huge increase in winter numbers is due to the annual influx from northern Europe, mainly Norway, in contrast to Scottish breeders, which are more or less sedentary. Breeding numbers are strongest in the central East Ayrshire 10k squares.



Trends and Influential Factors for Starling (RB WV PV)

Despite the relatively high breeding population the starling has been in long term decline and the current overall BTO BBS change for Scotland 1995-2012 is -33%. Declines may be due to more intensive management of grassland and associated decreases in invertebrate populations.

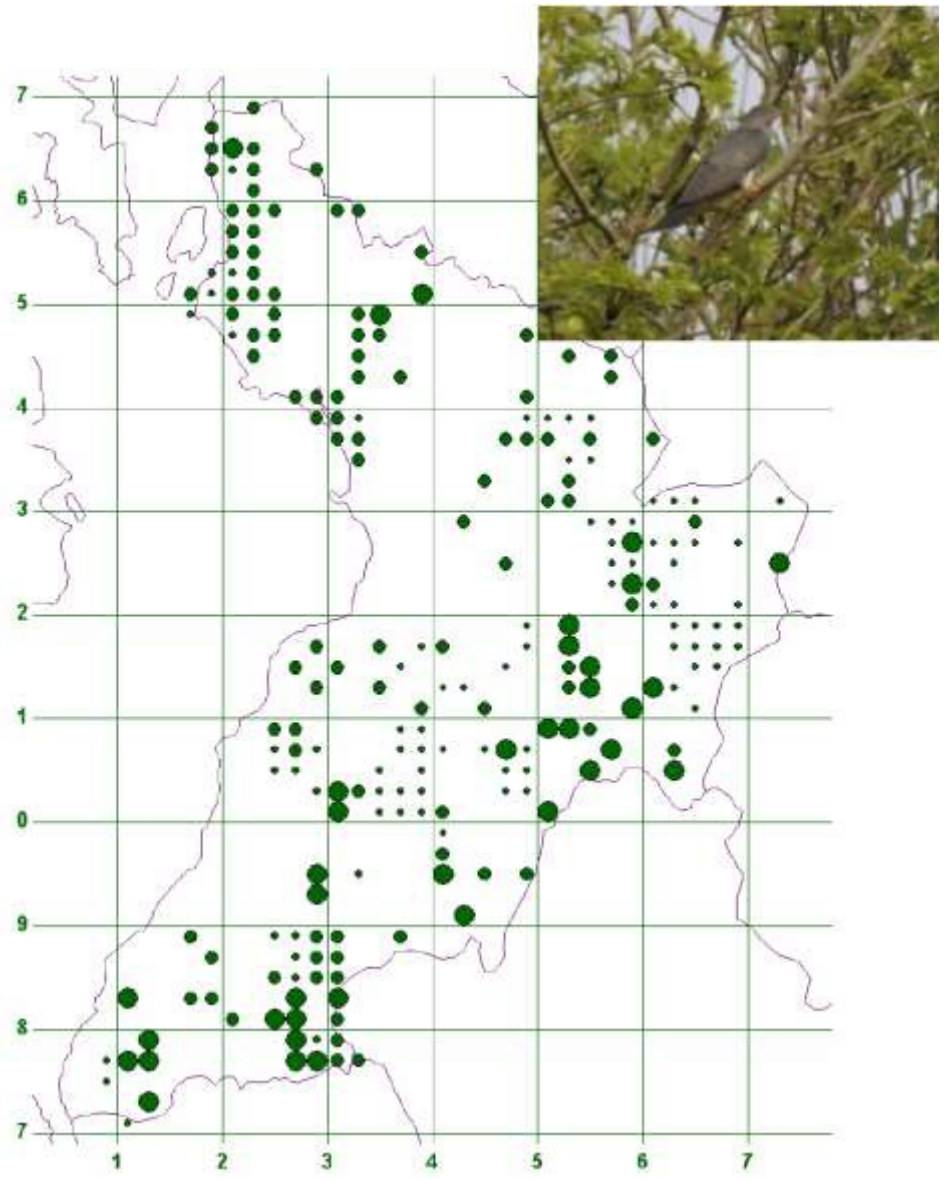
Conservation status

This is a UKBAP priority species and is included on the current Red List SoCC.

2.2.2.6 Cuckoo *(Cuculus canorus)*

Status, Distribution and Importance of Cuckoo (MB)

Since 1968, the breeding UK population of cuckoo has declined by an estimated 12% with a smaller level of decrease in Scotland including parts of Ayrshire. An uncommon breeder in East Ayrshire it appears to be well established in upland areas where the meadow pipit is likely to be the primary host.



Trends and Influential Factors for Cuckoo (MB)

The current trend is unknown in East Ayrshire. Reasons for the decline are not clear and may involve unknown factors in their wintering grounds, currently being investigated through radio tracking. Afforestation may have been important in Scotland.

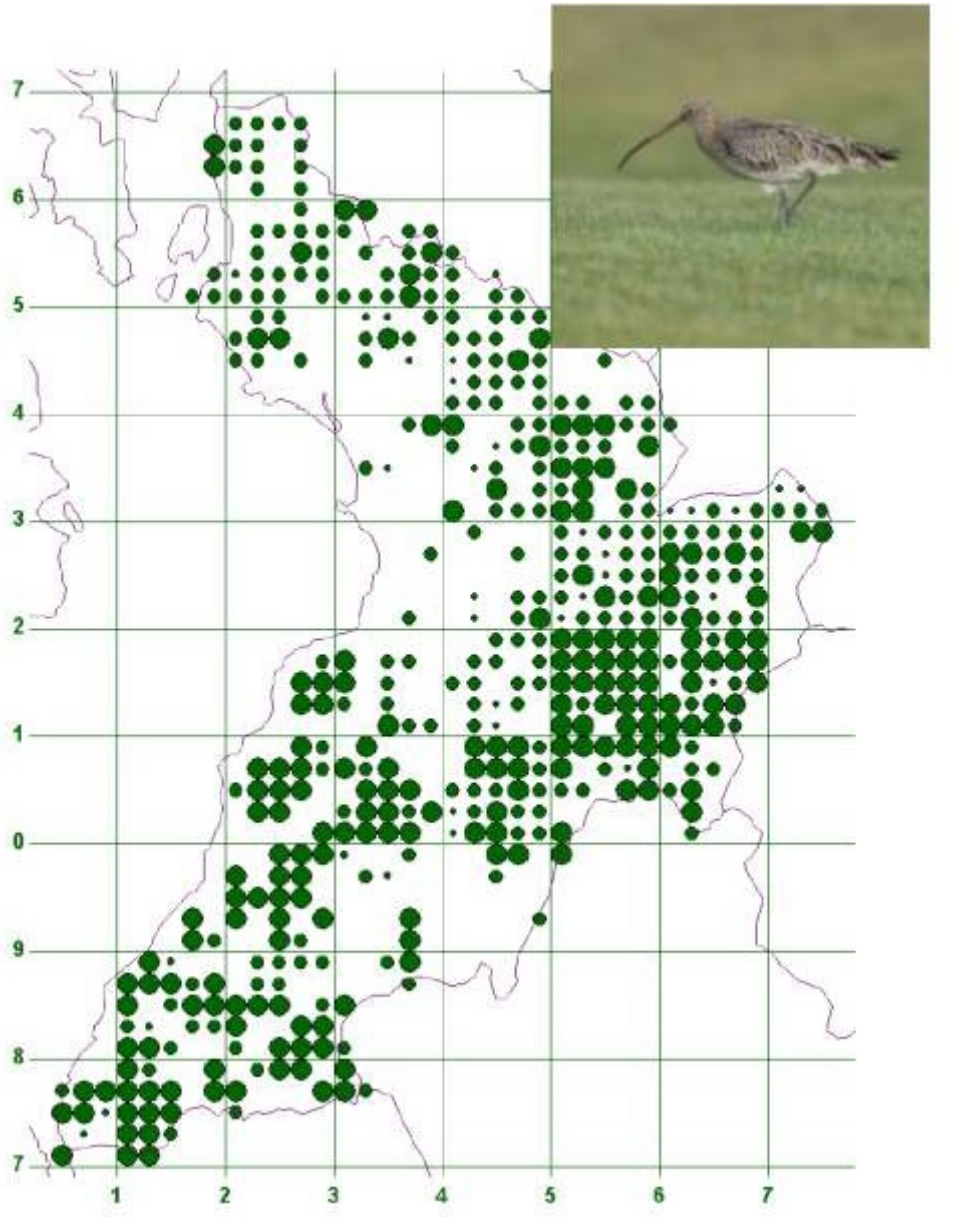
Conservation Status

This is a UKBAP priority species.

2.2.2.7 Curlew (*Numenius arquata*)

***Status, Distribution and Importance of Curlew* (RB WV PV)**

A widespread breeding bird in Scotland with an estimated population of 58,000 pairs (approximately 55% of the UK total), a significant proportion of which are found in the southern uplands, including Ayrshire. Recently they have moved from their preferred habitat on moorland and moorland edge on to farmland. According to BTO BBS the Scottish population has suffered a sharp decline, -55%, during the period 1995-2012.



Substantial numbers winter on the coast where they are joined by Scandinavian winter and passage birds. Few remain in East Ayrshire uplands in winter, with any recorded birds feeding on eastern pastures.

Trends and Influential Factors

The current breeding trend is very negative and may be due to habitat fragmentation, increased predation and changes to upland management. Wind farms and opencast coal mines may be adverse factors in East Ayrshire.

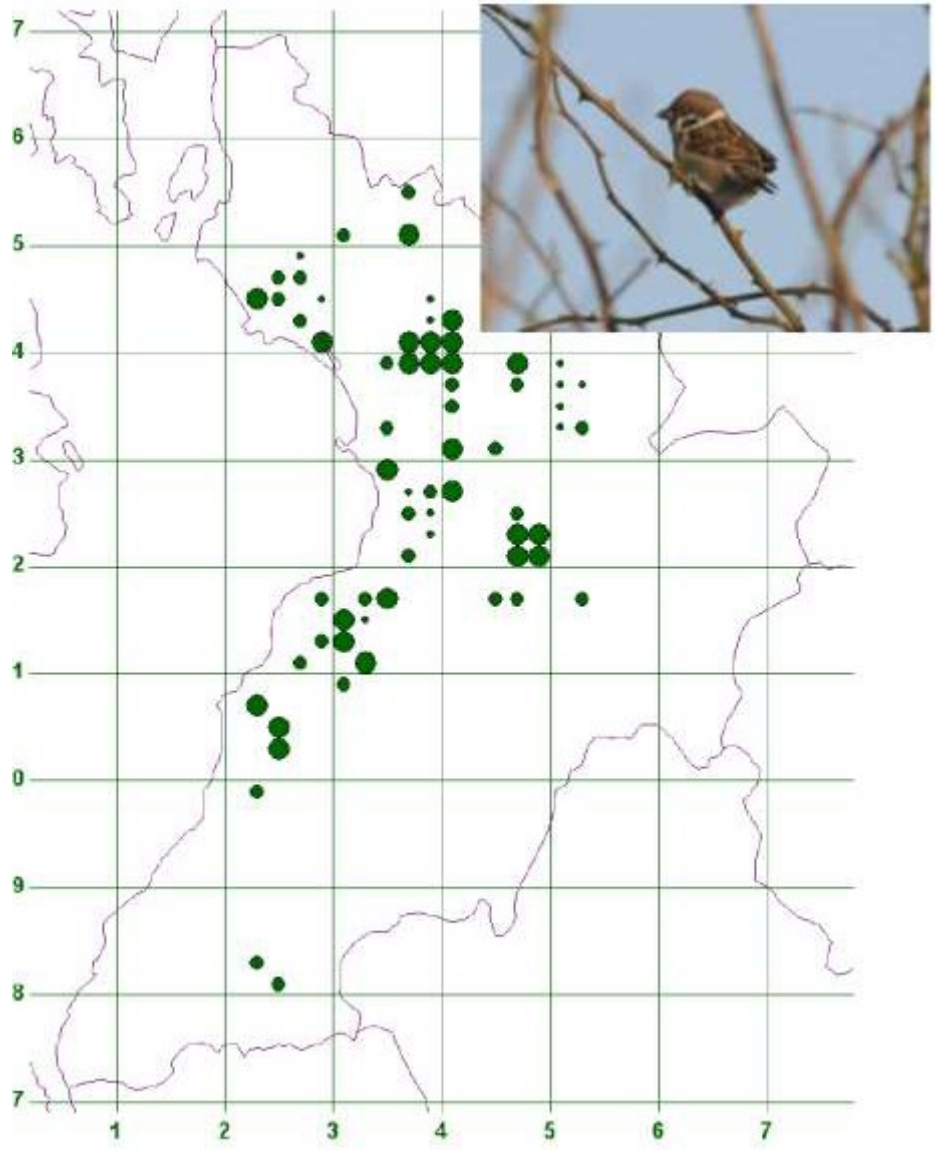
Conservation status

This is a UKBAP priority species.

2.2.2.8 Tree sparrow *(Passer montanus)*

Status, Distribution and Importance* of *Tree Sparrow (RB)

Another rapidly declining UK species with a discontinuous distribution of the estimated 4,000-8,100 Scottish breeding pairs. Breeding is associated with lowland arable and mixed farming with winter crops, especially stubble and brassicas, a factor in determining their winter distribution. During the period 1968-2000 the population in the UK declined by 73%, whilst the full extent of the Scottish decline has not been determined due to lack of data it is certainly not a positive outlook.



East Ayrshire supports the majority of the current Ayrshire breeding population, which can move to the coast in severe winters.

Trends and Influential Factors for Tree Sparrow (RB)

Current shift from winter to spring cereals is causing adverse effects along with increasing intensification of agriculture resulting in a reduction in hedgerow, field margins and unimproved grasslands. Tree sparrow are tree hole-nesting birds and their distribution can be affected by nest site availability in semi-mature and mature trees. Nest box schemes can be very successful in areas where there is a year round food supply.

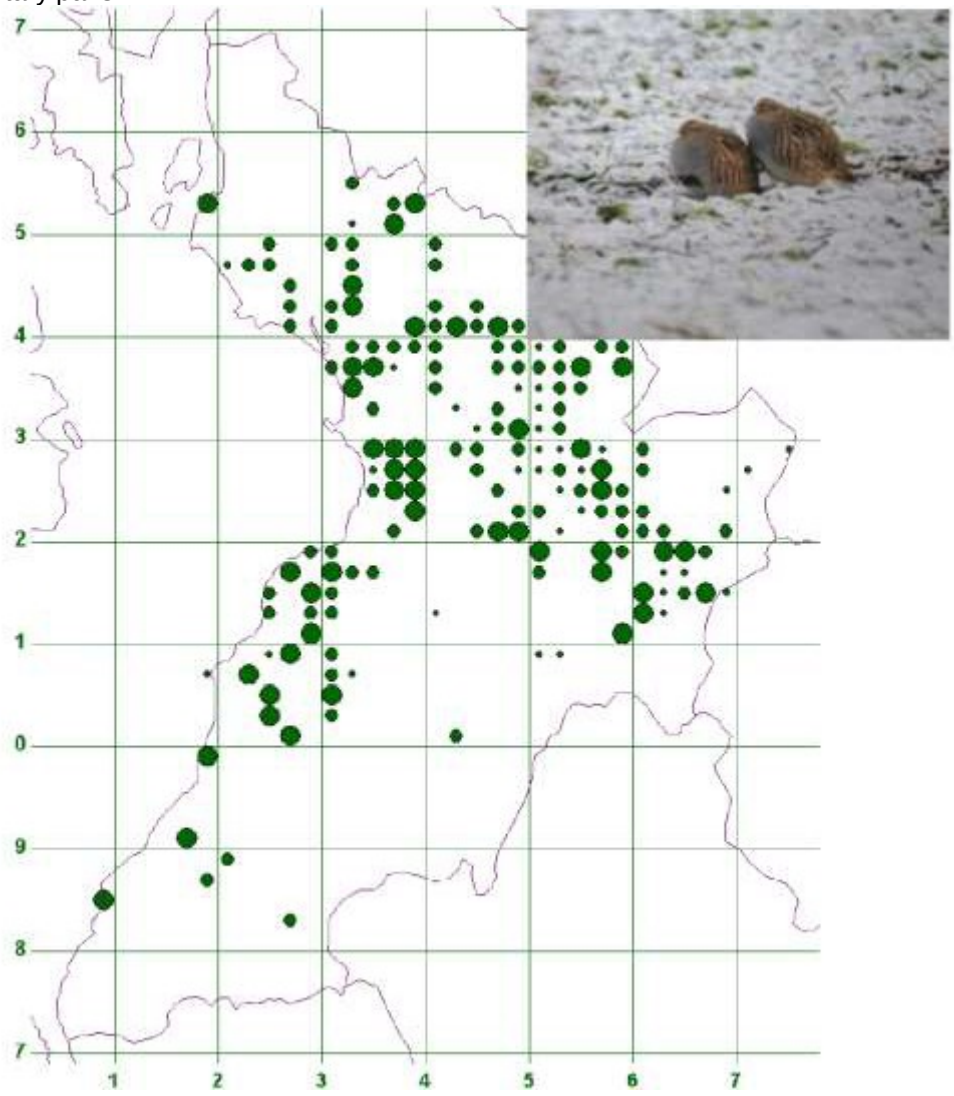
Conservation status

This is a UKBAP priority species.

2.2.2.9 Grey partridge *(Perdix perdix)*

Status, Distribution and Importance of Grey Partridge (RB)

Like the tree sparrow, grey partridge is a species with fortunes linked to arable and less intensive farming in the lowlands of Scotland. The Scottish population is estimated as 10,500- 14,600 largely sedentary pairs.



.

The East Ayrshire breeding map shows where they were once well represented, but are now very scarce breeding birds.

Trends and Influential Factors for Grey partridge (RB)

The use of pesticides and herbicides in modern farming is a significant factor alongside the reduction in semi-natural habitats. Other factors may be competition with the red-legged partridge that is now so frequently reared for field sports and increased predator populations e.g. mustelids and fox.

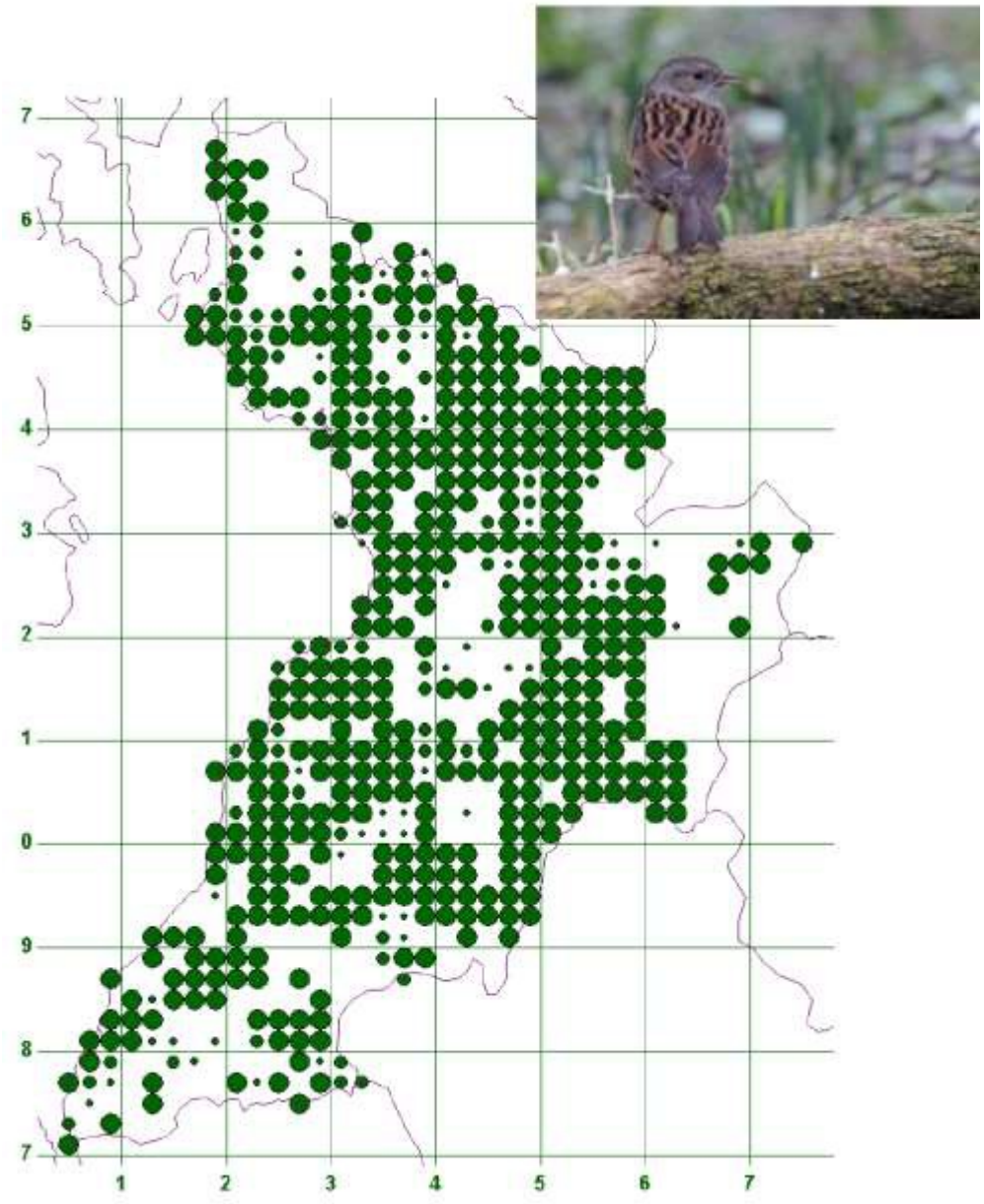
Conservation Status

This is a UKBAP priority and Red List SoCC.

2.2.2.10 Dunnock (*Prunella modularis*)

Status, Distribution and Importance of Dunnock (RB)

A local resident species with a healthy distribution.



A familiar visitor to garden bird tables, this bird has expanded its range into Scottish conifer plantations resulting in records where they had been previously absent and this is true of East Ayrshire where there is a healthy and wide distribution.

Trends and Influential Factors for Dunnock (RB)

BTO BBS data suggests a 61% increase in Scotland over the period 1995-2012, with upper and lower confidence limits of 30 and 90%. New habitat creation has enabled this species to move into new areas of habitat, within which there are likely to be temporal fluctuations as plantations mature. Current trend is positive.

Conservation Status

UKBAP priority species.

2.2.2.11 Hen harrier (*Circus cyaneus*)

Status, Distribution and Importance of Hen Harrier (RB)

In Birds of Scotland (2007) the population of hen harrier in Scotland was estimated at 633 pairs (76% of the UK breeding population) mainly breeding in the northern and western uplands of the mainland, Orkney, Outer and Inner Hebrides and wintering on lower ground on, or towards, the coast. The distribution of this species is stable due to their habitat preference, however numbers of birds on mainland sites fluctuate according to levels of human persecution. On grouse moors the level of persecution is so severe that there is local depletion to the point of absence. In 2012 the Scottish Raptor Study Group (SRSG) Scottish Raptor Monitoring Scheme Report found that visits to 558 home ranges confirmed site occupancy at 259 (49%). For the 10-year period 2003-2012 the annual percentage breeding successfully has steadily declined from a high of 61% in 2004. Table 14 shows the SRSG 2012 summary as reported for East Ayrshire.

Table 14 - SRS hen harrier data summary for East Ayrshire 2012

	Home ranges checked	**Home ranges occupied by pairs**	**Additional home ranges with single birds**	**Pairs known to lay eggs**	**Pairs known to hatch eggs**	**Pairs known to fledge young**	**Minimum number of young fledged**
East Ayrshire	27	2	2	2	2	1	3

Trends and Influential Factors for Hen harrier (RB)

The decline in numbers and breeding success is largely due to illegal persecution.

Conservation Status

UEC Annex 1, Wildlife & Countryside Act 1981, as amended (Schedule 1), UKBAP and ALBAP priority species and Red List SoCC.

2.2.2.12 Herring gull (*Larus argentatus*)

Status, Distribution and Importance of Herring Gull (RB)

UK breeding populations have declined in numbers over recent years, but not as badly as in Ireland. In 1990-91 a significant coastal population bred in Ayrshire with a small proportion on East Ayrshire inland sites.

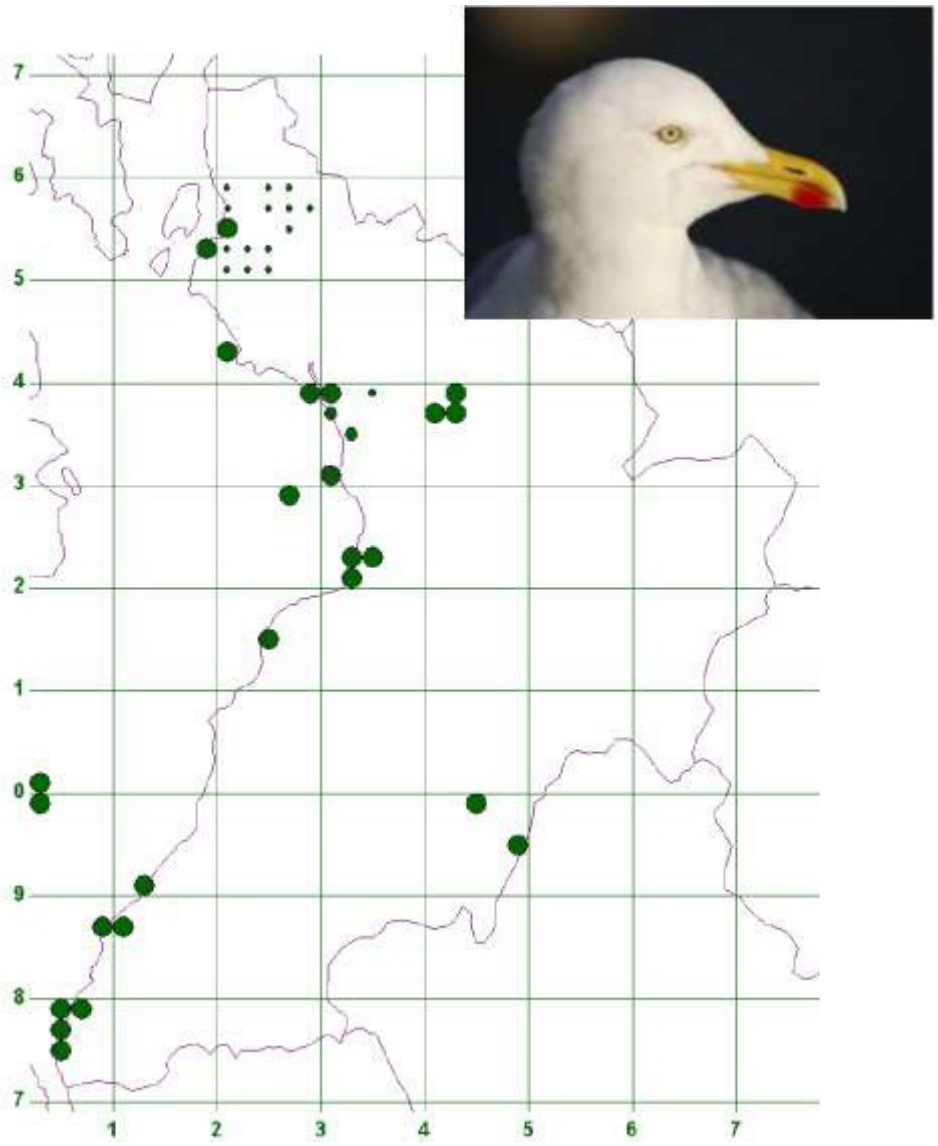


Table 15 - Numbers of coastal breeding herring gull (apparently occupied nests)

	Operation Seafarer 1968-70	***Seabird Colony Register Census (1985-88)***	***Seabird 2000 (1998-2002)***
Ayrshire	2123	7038	5634

Source. Forrester et al. (2013)

Trends and Influential Factors for Herring Gull (RB)

The trend is negative as a whole for coastal breeding birds, perhaps due to better management of land-fill sites reducing food supply whilst the inland trend is probably neutral and perhaps positive for winter birds.

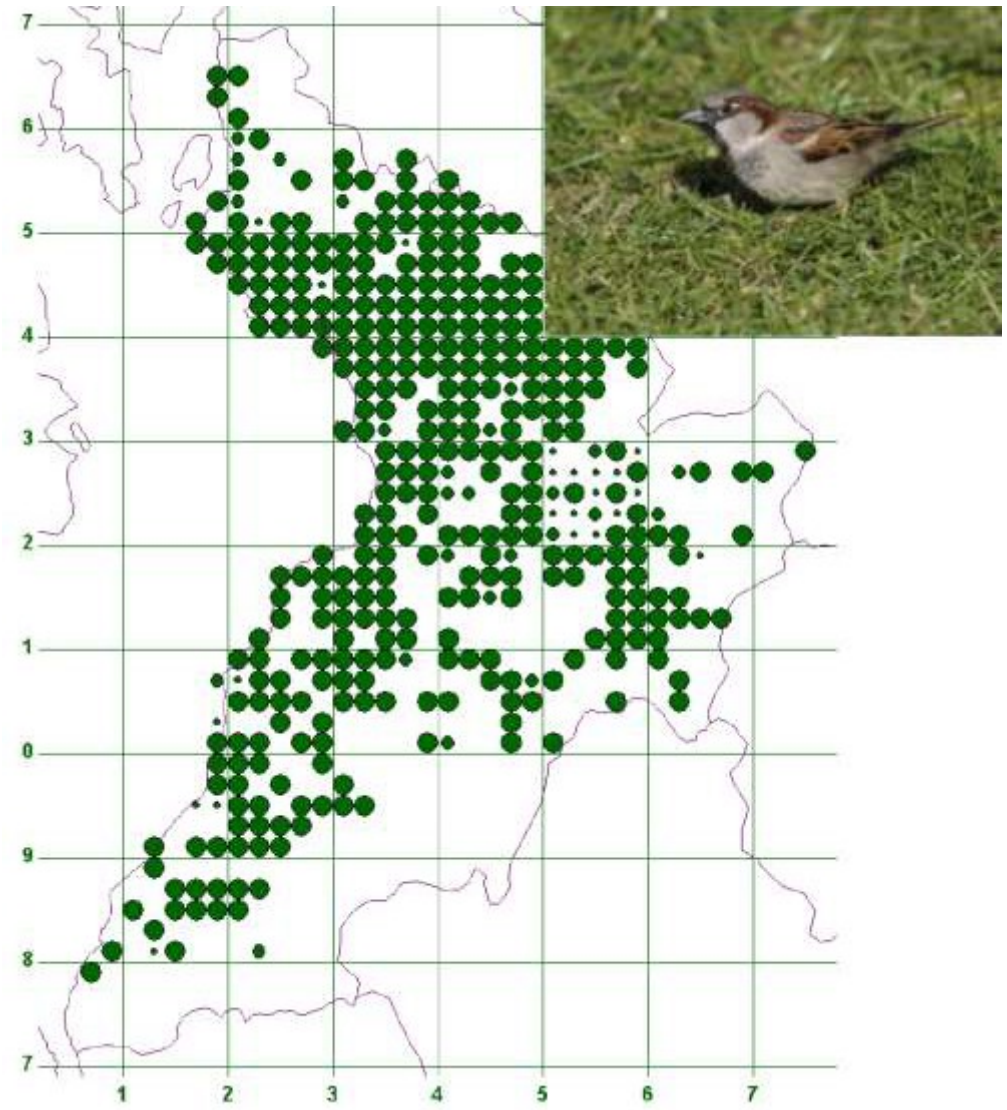
Conservation Status

This is a UKBAP priority and Red List SoCC.

2.2.2.13 House sparrow *(Passer domesticus)*

Status, Distribution and Importance for House Sparrow (RB)

There is a Scottish breeding population in the range 600,000-900,000 pairs. In East Ayrshire the distribution of this widespread breeding species is largely associated with the lowland and urban areas. Approximately 41.5% of the Scottish population is found in urban and suburban habitat and human presence is clearly a factor in their distribution as is the availability of food in these areas, garden feeders and mature gardens with shrubs and trees may affect local distribution.



Trends and Influential Factors for House Sparrow (RB)

Declines have been long term, with a UK-wide drop of 62% (1974-99), which has been reversed recently in Scotland with BTO BBS results suggesting an increase of 40%. House sparrows in the countryside have been adversely affected by modern practices whilst buildings are now less sparrow friendly in the urban and suburban areas.

Conservation Status

This is a UKBAP priority and Red List SoCC.

2.2.2.14 Lesser redpoll (*Carduelis cabaret*)

Status, Distribution and Importance of Lesser Redpoll (RB)

Only 7,500-15,000 pairs breed in Scotland and this may represent 20-40% of the world population. It is a distribution largely determined by the breeding resource, which is broad-leaved and coniferous woodland, prior to canopy closure. Studies in Dumfries and Galloway have shown that the prime age of Sitka spruce for breeding is 7-14 years old. It also utilises wider scrub, grasslands and wasteland for feeding. In East Ayrshire its strongholds are the conifer plantations of the north east and south.

Trends and Influential Factors for Lesser Redpoll (RB)

The reduction in the number of young conifer stands for breeding is the main factor in the decline of this species. Recent BTO BBS data suggests a halt to the decline, eastern Scotland excepted, and at least stability, if not a small increase, in East Ayrshire.

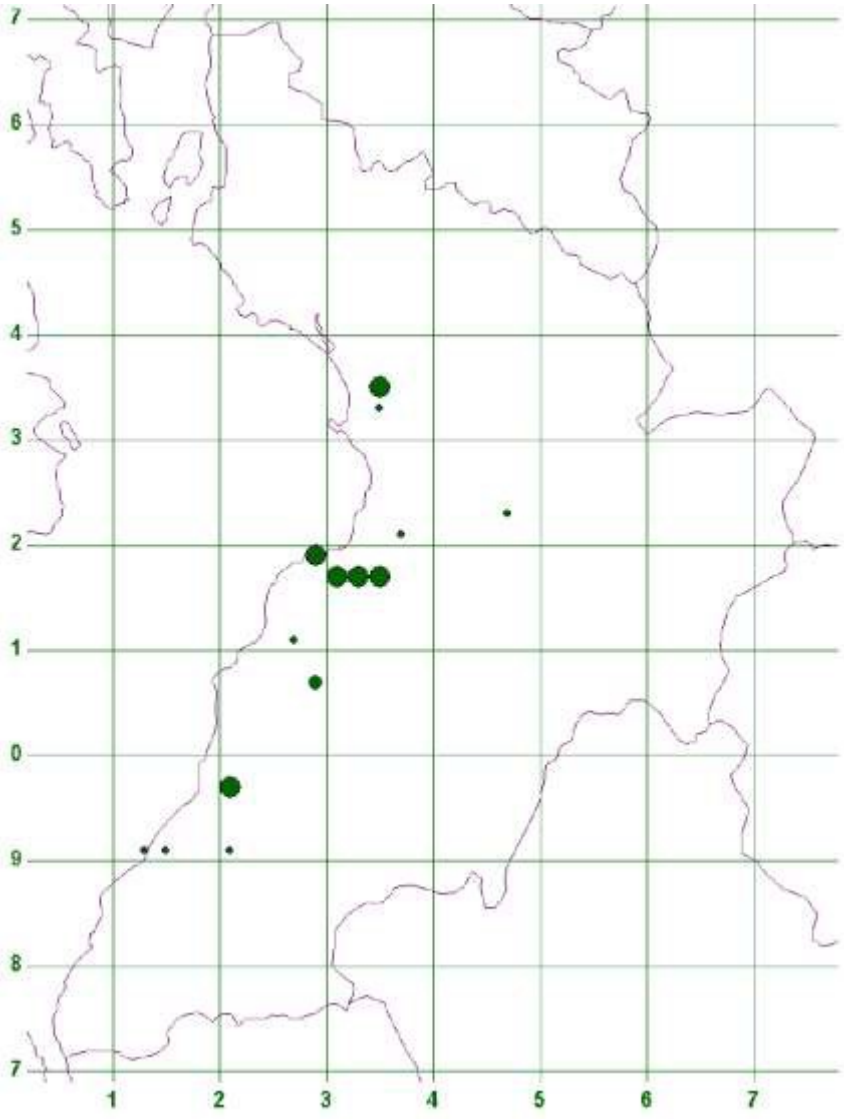
Conservation Status

This is a UKBAP priority and Red List SoCC.

2.2.2.15 Lesser whitethroat (*Silvia curruca currucca*)

Status, Distribution and Importance for Lesser Whitethroat (MB PV)

The lesser whitethroat is a frequent breeder in England and in Scotland is on the edge of its range, holding a very small fraction of the estimated UK population, perhaps <1%. Generally, found below a height of 200m, the estimated Scottish population of 400 breeding pairs is sparsely distributed across the central belt of Scotland, Ayrshire and Southern Dumfries and Galloway. NS31 and NS33 were the key squares for this species in East Ayrshire in 1991-97, and numbers will have increased further as their range expansion gathers momentum. The population increase is largely linked to climate amelioration, with the warmer summers allowing many “southern species” to push their breeding ranges northwards.



Trends and Influential Factors Lesser whitethroat (MB PV)

Since 1968-72 this migrant has expanded its range by 33% breeding in dense hawthorn and blackthorn scrub in hedgerows and on mineral workings, disused railways and regenerating woodland. It is often overlooked due it its short song period and often best located by alarm calls when feeding young. The overall trend is positive.

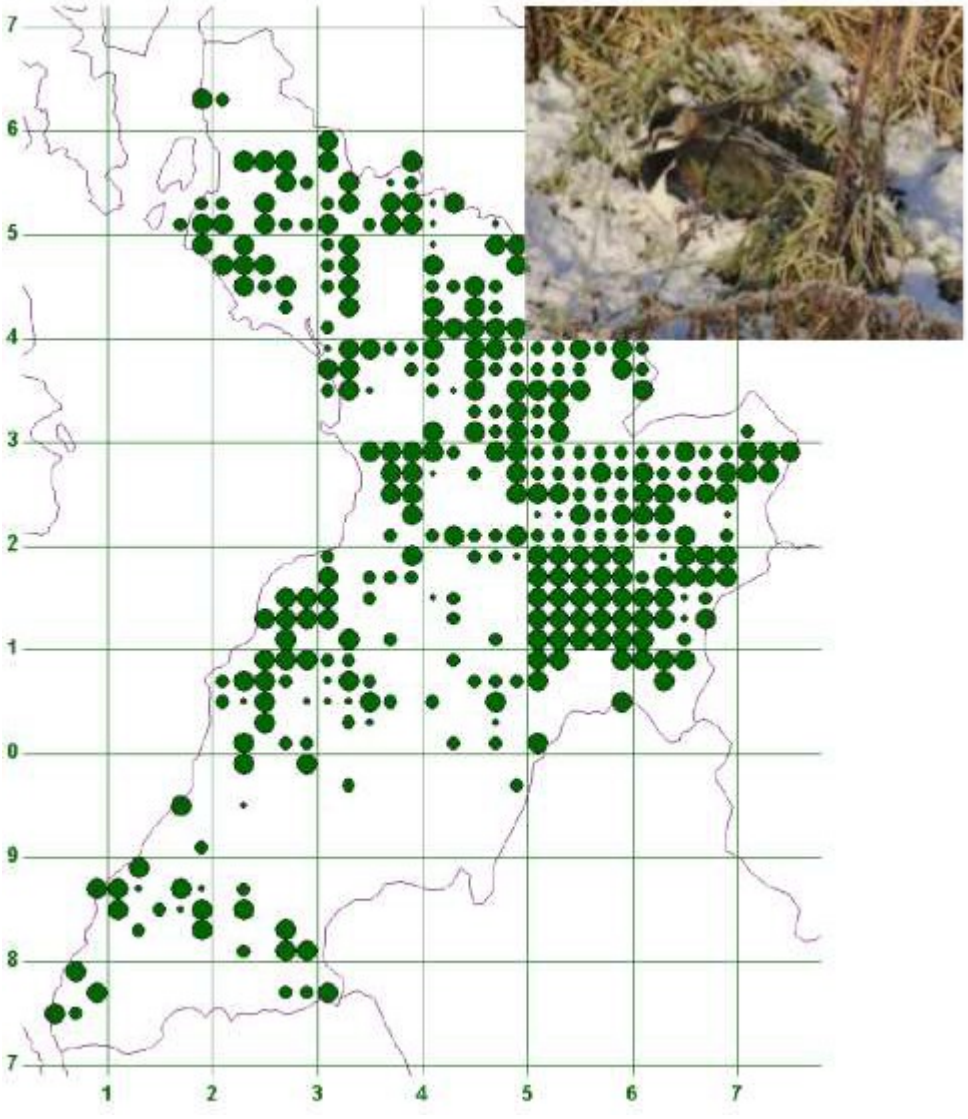
Conservation Status

ALBAP priority species.

2.2.2.16 Lapwing (*Vanellus vanellus*)

Status, Distribution and Importance of Northern lapwing (RB PV WV)

In Scotland, 71,500-105,600 pairs (52-66% of the British population) are estimated to breed with a widespread distribution over all but the highest ground. In East Ayrshire, the lapwing fares better on the marginal farmland and in the uplands than on the intensively managed lowlands.



Trends and Influential Factors for Lapwing (RB PV WV)

BTO BBS data suggest a 1995-2013 Scottish decline of -58% with farming intensification, wetland drainage in particular, the key adverse factor.

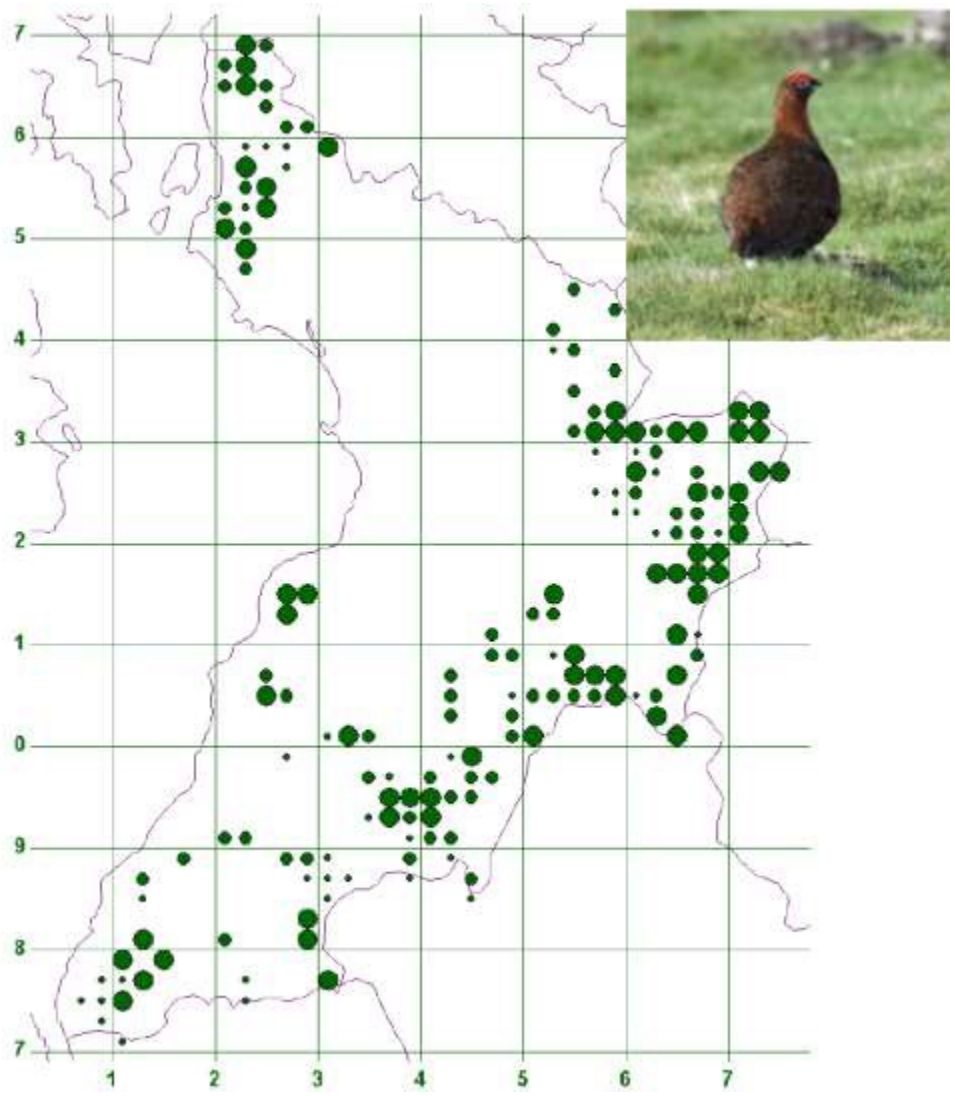
Conservation Status

This is a UKBAP priority and Red List SoCC.

2.2.2.17 Red grouse (*Lagopus lagopus scoticus*)

Status, Distribution and Importance of Red Grouse (RB)

Between 100,000 and 150,000 pairs of red grouse breed in Scotland with their distribution in East Ayrshire dictated by the availability of heather, its staple food and preferred nesting habitat.



Trends and Influential Factors for Red Grouse (RB)

Numbers are manipulated by shooting interests and heather management but the broad trend is positive due to moorland improvement schemes.

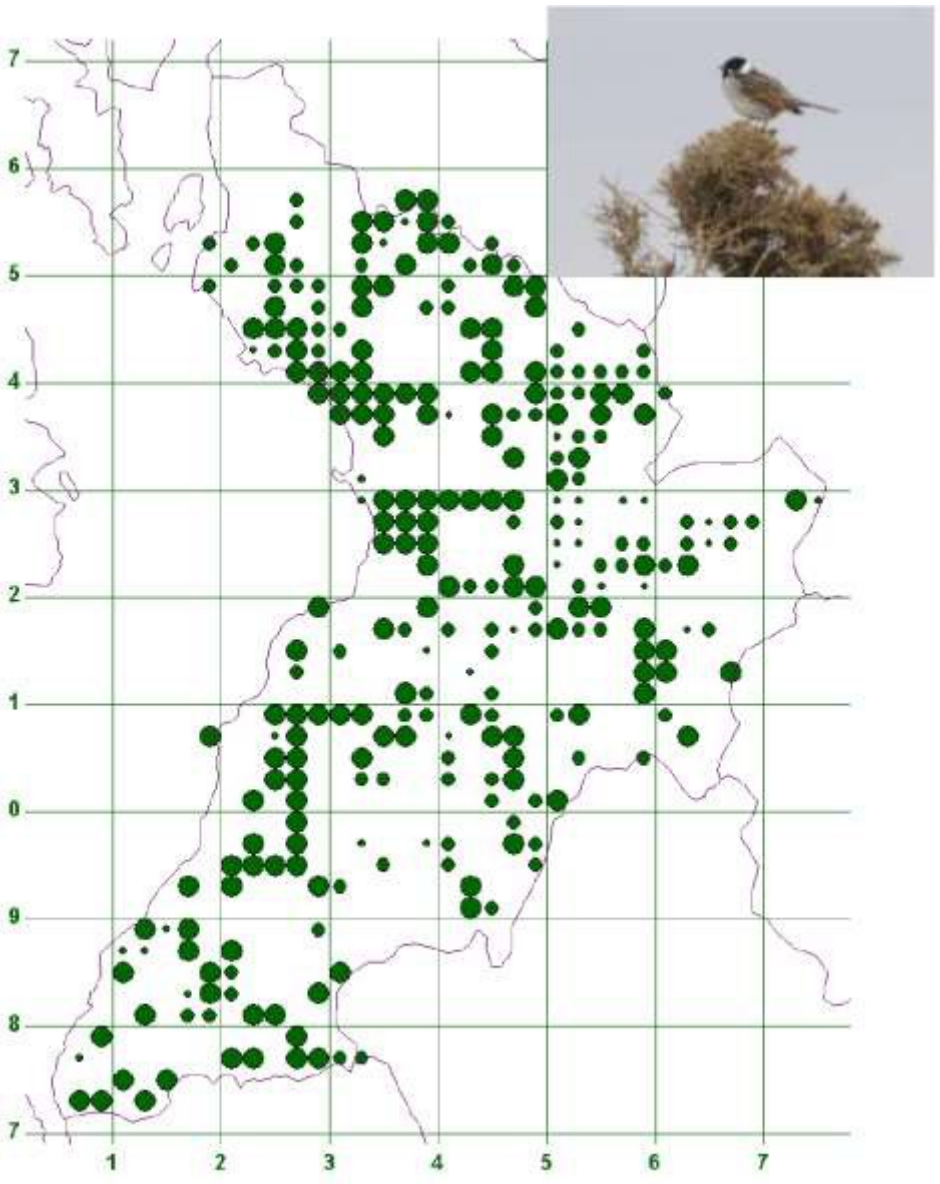
Conservation Status

UKBAP priority species.

2.2.2.18 Reed bunting (*Emberiza schoeniclus*)

Status, Distribution and Importance for Reed Bunting (RB (WV))

Only 15,000-30,000 pairs are resident in Scotland where their breeding distribution is dictated by wetland habitat. This wetland can be found in a wide range of situations resulting in the broad East Ayrshire breeding map. Generally breeding takes place below 300m and rarely includes woodland and plantations. Bogton Loch and Bogton Moss and the New Cumnock Wetlands are key sites.



Trends and Influential Factors Reed Bunting (RB (WV))

This species declined significantly over the last 25 years, however the 1994-2012 BTO BBS suggests the population is, at least for now, stable, resulting in its removal from the Red List SoCC. Further declines will follow if agricultural intensification, drainage and wetland habitat loss continues. Very cold winters are also known to deplete the population.

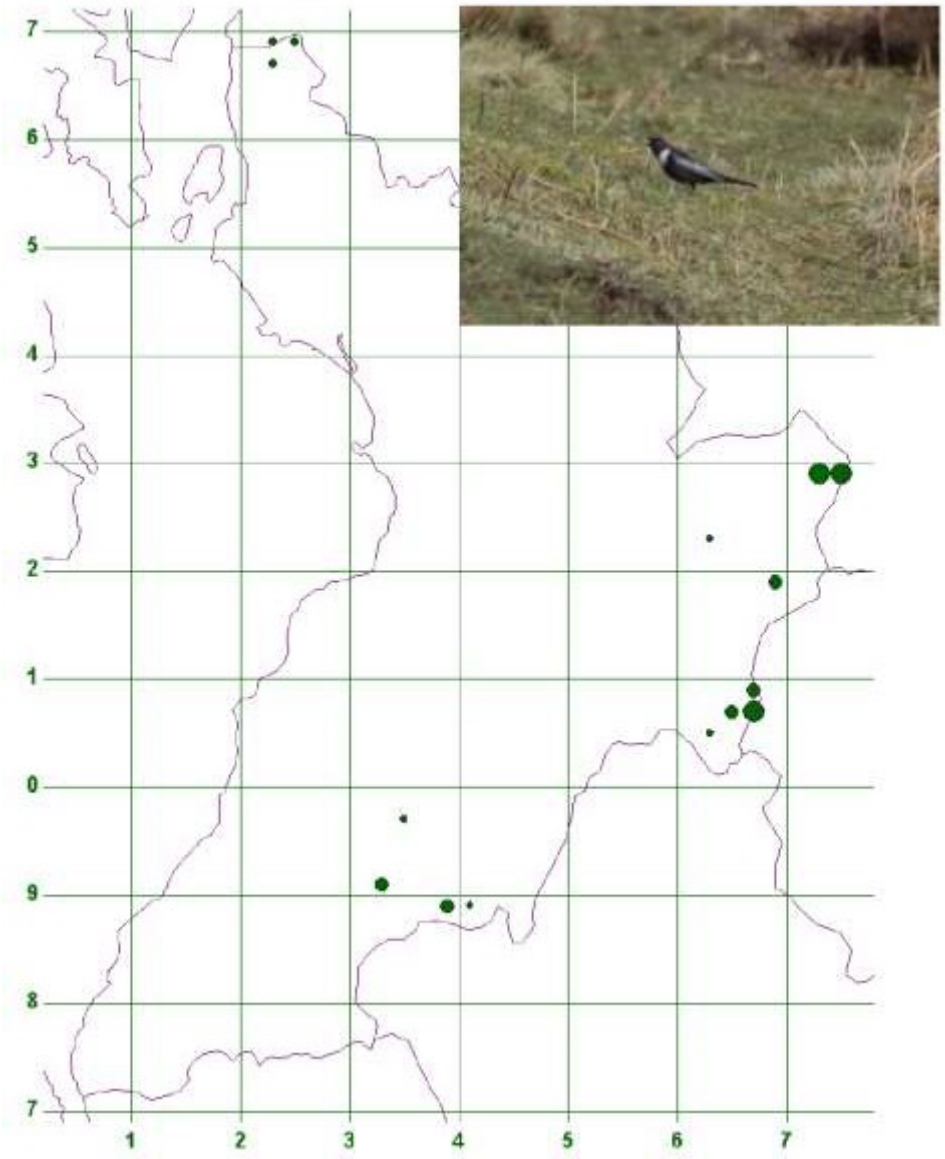
Conservation Status

UKBAP priority species.

2.2.2.19 Ring ouzel (*Turdus torquatus*)

Status, Distribution and Importance of Ring Ouzel (FB (MB))

Former rare and occasional breeder in East Ayrshire, see map, which no longer breeds.



Trends and Influential Factors for Ring Ouzel (FB (MB))

Factors affecting the numbers returning to breed in Britain are more likely to be connected to their wintering grounds in Spain and North West Africa, as the Scottish habitat has remained largely unchanged during the decline. The 2012 Ring Ouzel Survey found a -36% decline in Scotland between 1999 and 2012, which is important as Scotland holds the majority of the British breeding population. Future breeding in East Ayrshire is possible.

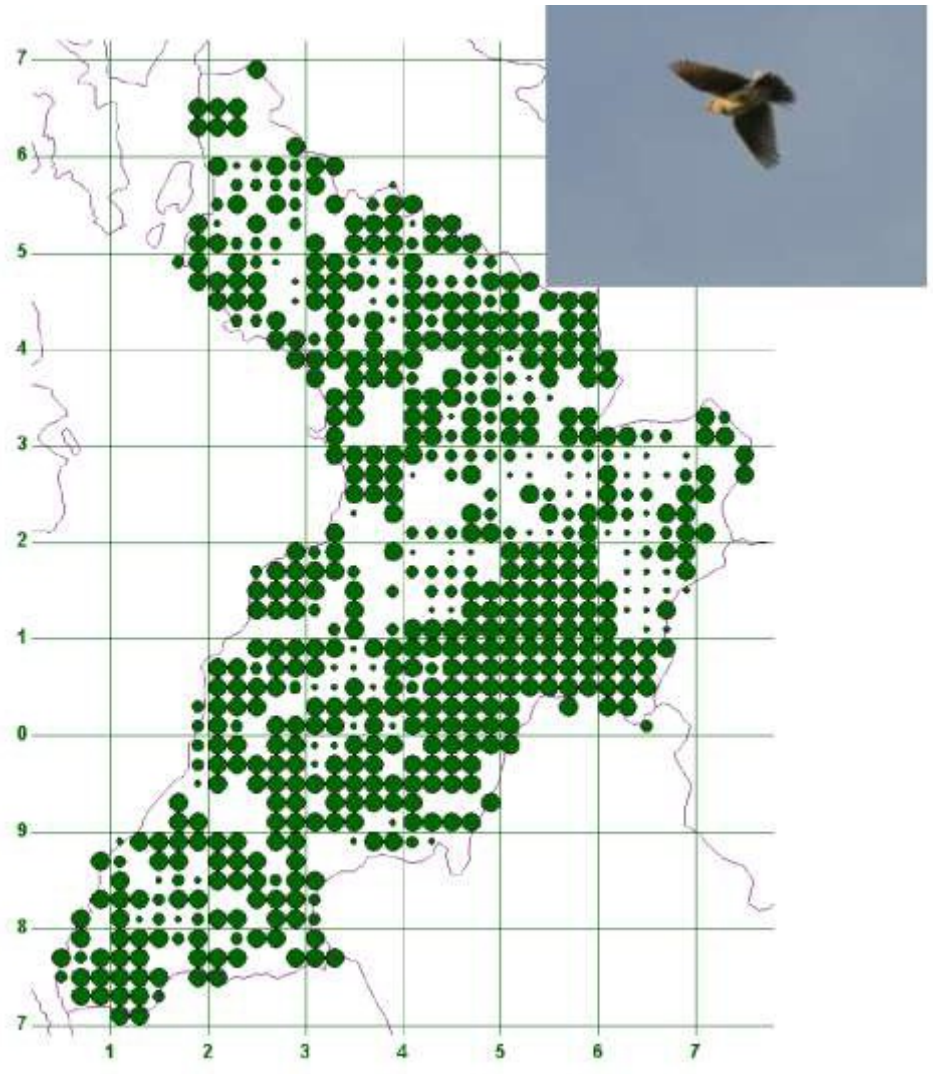
Conservation Status

UKBAP priority species.

2.2.2.20 Sky Lark *(Alauda arvensis)*

Status, Distribution and Importance of Sky Lark (RB MB PV WV)

Sky lark breed over open ground at almost all heights in Scotland, wintering in the lowlands and along the coast, where cold weather can encourage the formation of relatively large flocks. They are widespread in East Ayrshire, but like all other areas of Scotland numbers have declined dramatically.



Trends and Influential Factors for Sky Lark (RB MB PV WV)

BTO BBS data suggest a recent decline of -27% in Scotland for the period 1994-2012 which follows a long term decline. The main factors behind the upland decline are poorly understood but lowland influences are likely to include changes in cereal farming and the expansion of improved pasture. The Ayrshire Birding website suggests that Sky Lark continue to do well in many parts of Ayrshire.

Conservation Status

UKBAP priority action and Red List SoCC.

2.2.2.21 Song Thrush (*Turdus philomelos*)

Status, Distribution and Importance of Song Thrush (RB MB PV WV)

Broadly speaking, breeding Song Thrush status in Scotland remains good with a relatively stable breeding population, which has not been affected by the very serious decline in the south eastern parts of the UK.

Trends and Influential Factors for *Song Thrush (RB MB PV WV)*

The overall UK decline 1970-2010 was -54%. The East Ayrshire breeding and wintering population has declined since 1988-91 and may have stabilised or be increasing slightly in some areas, particularly maturing conifer plantations.

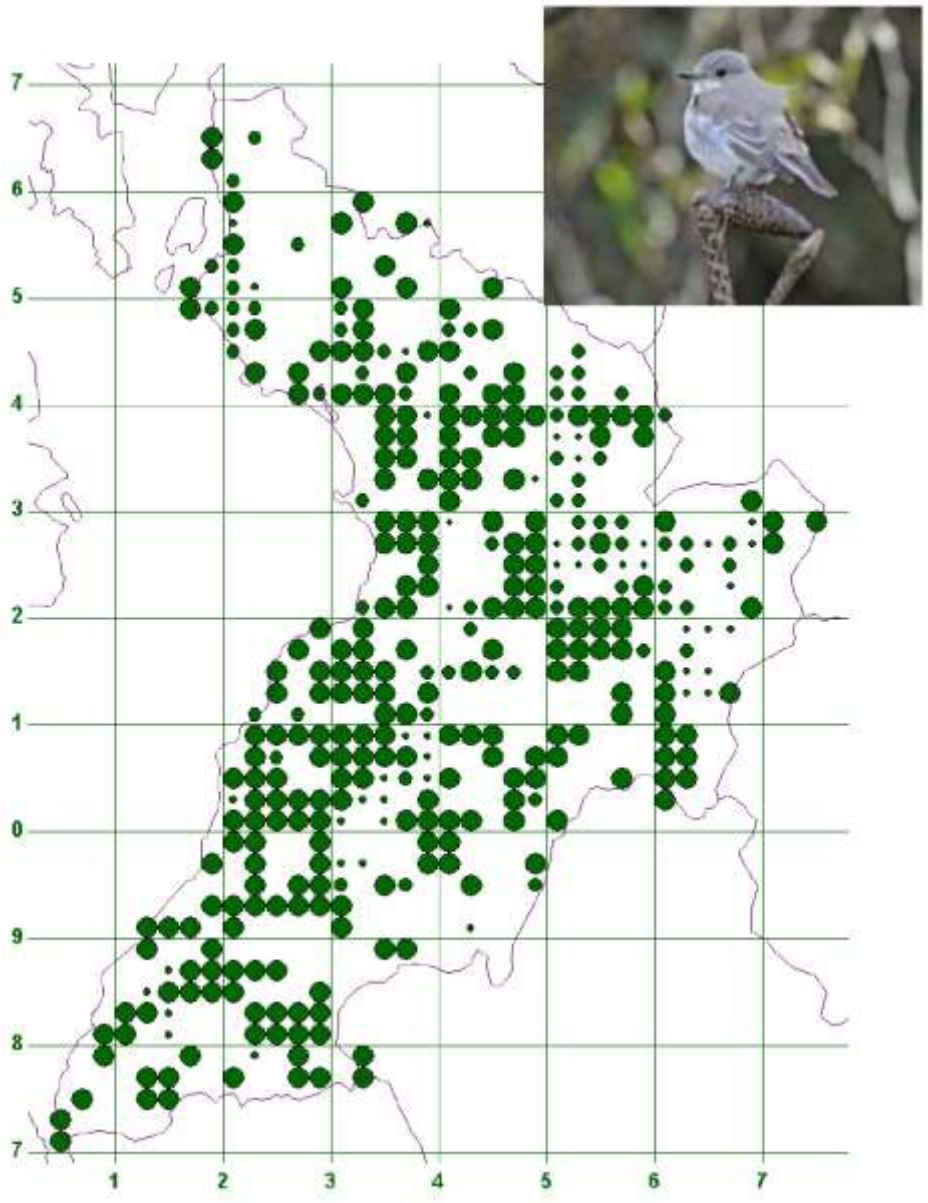
Conservation Status

ALBAP and Red List SoCC.

2.2.2.22 Spotted Flycatcher (*Muscicapa striata*)

Status, Distribution and Importance of Spotted Flycatcher (MB PV)

Breeding spotted flycatcher have undergone a long-term population decline across all habitats in Scotland since the 1960s and the decline is reportedly more noticeable since 1997. The map below therefore over represents the current distribution in Ayrshire.



The Birds of Scotland estimates a population of 10,000-20,000 and this too is probably over optimistic.

Trends and Influential Factors for Spotted Flycatcher (MB PV)

There is insufficient data to identify trends in Scotland, however, it is clear the population is in decline. Causes are likely to be wide ranging and include habitat loss and degradation in both UK summer breeding and wintering grounds in Africa. Cold wet summers have an adverse effect on chick survival and persecution on migration routes could also be exerting an adverse effect.

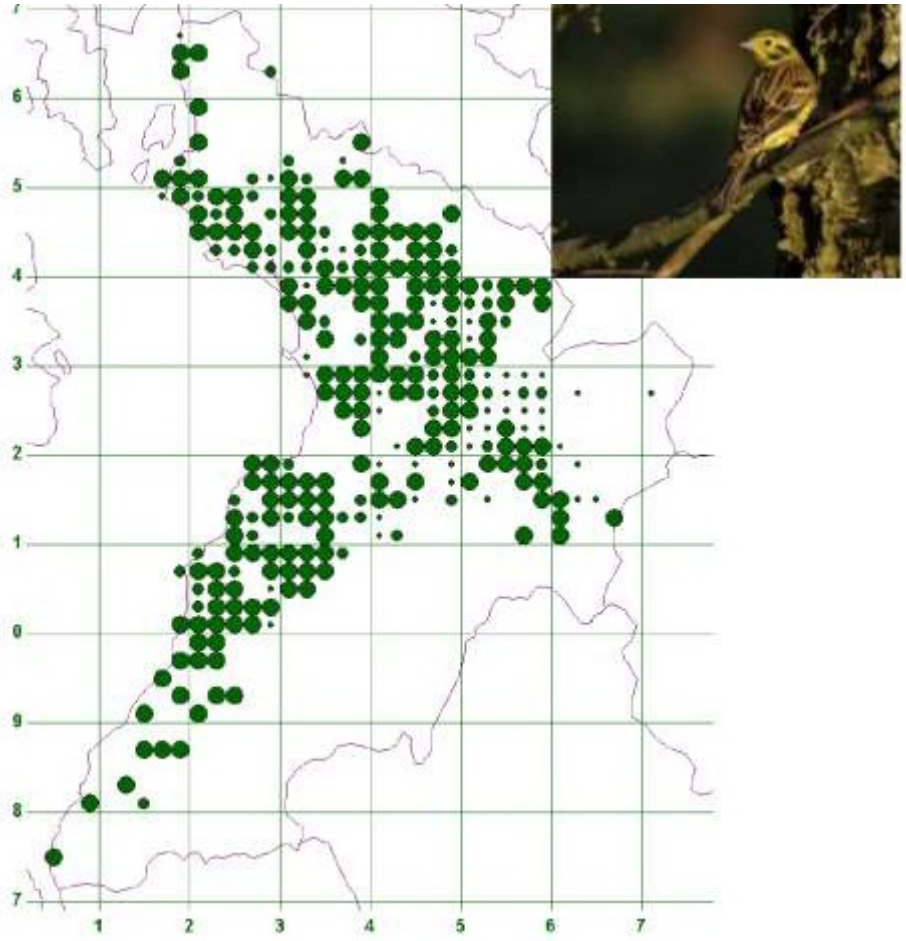
Conservation Status

UKBAP and Red List SoCC.

2.2.2.23 Yellowhammer (*Emberiza citrinella*)

Status, Distribution and Importance of Yellowhammer (RB)

In Scotland breeding numbers have declined, although this was not evident until the mid-1980s, a decline associated with a range contraction of 17% between the 1970s and 1990s. East Ayrshire holds healthy breeding populations with main concentrations in lowland East Ayrshire.



Trends and Influential Factors for Yellowhammer (RB)

As a seed-eating songbird it has been adversely affected by intensification of farming and increased use of herbicides.

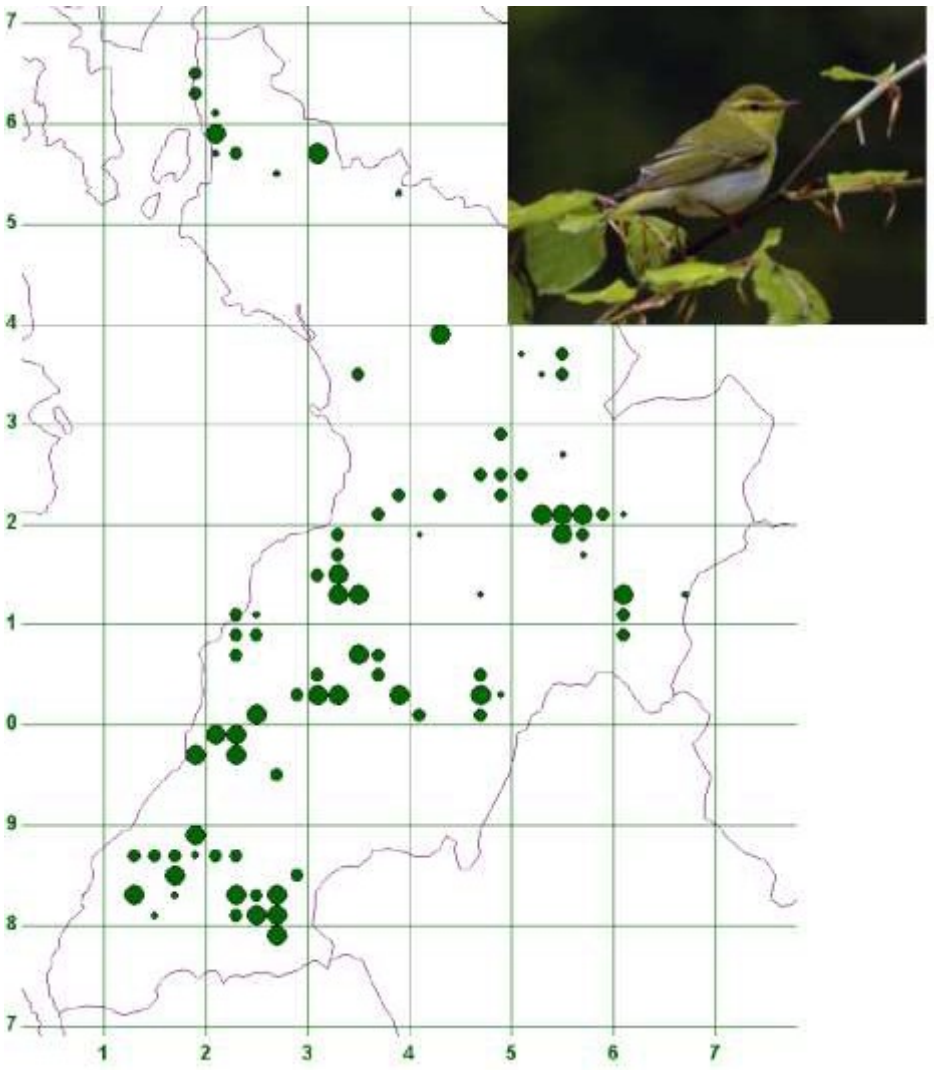
Conservation Status

UKBAP and Red List SoCC.

2.2.2.24 Wood Warbler *(Phylloscopus sibilatrix*)

Status, Distribution and Importance of Wood Warbler (MB PV)

A bird of closed canopy oak woodland and to a lesser extent other mixed broad-leaved woodland, the breeding population of this warbler has crashed in East Ayrshire and only one pair was confirmed breeding in 2011. In 2014 four singing males were recorded in Ness Glen, with one pair proved to be breeding.



Trends and Influential Factors for Wood warbler (MB PV)

The trend is very negative for East Ayrshire and may be influenced by climate or habitat change in the humid zone of tropical West Africa in which they winter. Studies in England found that territories were closely associated with structural features in their breeding sites and therefore local woodland management may have an impact.

Conservation Status

UKBAP and Red List SoCC.

2.3 Amphibians and Reptiles

There is no active amphibian and reptile group and therefore no active recording or database from which to collate data on the distribution and status of all amphibians and reptiles in East Ayrshire. Common species present include common frog, toad, palmate newt, smooth newt, slow worm and adder.

2.3.1 Great crested newt (*Triturus cristatus*)

Status, Distribution and Importance of Great crested newt

The national survey for the great crested newt (GCN) (Alexander 1997[20]) identified two historical sites in Ayrshire, both North Ayrshire. An absence of historical records meant that searches for GCN were not extended beyond these two sites. GCN are known to be successfully breeding at Culzean Castle, South Ayrshire and are widespread in Dumfries and Galloway as well as North Lanarkshire and Renfrewshire. There is no reason why new GCN metapopulations may not be confirmed in East Ayrshire with special survey effort. However, on the basis of the available information it may have always been absent, or have become locally extinct.

Trends and Influential Factors for Great crested newt

In Scotland the trend has been negative in the long term due to habitat fragmentation and loss of breeding ponds. Current range is limited to the east and south of the highland boundary fault, with isolated native populations in the Inverness area. A recent increase in survey effort, mainly to inform EIA, has resulted in new populations be added to the Scottish database each year.

Conservation status

Rare amphibian in Scotland and one that is highly protected[21].

2.4 Fish

2.4.1 Arctic charr (*Salvelinus alpinus*)

Status, Distribution and Importance of Arctic charr

Scotland is the stronghold for this species within the UK and a total of 258 Scottish lochs are known to hold populations of this species. By comparison there are 8 in North West England, 4 in North Wales and 74 in Ireland. Loch Doon holds the last naturally occurring population of Arctic charr in south west Scotland, which are now thought to be genetically distinct from their nearest neighbours in Argyll and Cumbria.

Trends and Influential Factors for *Arctic charr*

The population trend for Loch Doon is unknown. It is an extremely vulnerable population, the genetic integrity of which must be protected from any change, for example introduced Arctic charr from another population. They are at risk from diffuse pollution within the Doon catchment. Sources introducing adverse factors include intensive agriculture, commercial forestry, opencast coal mining and wind farms. The majority of known extinctions are from the south and west of Scotland and are likely to have been caused by acidification.

[20] *Alexander at al (1997). National Survey for the Great Crested Newt (Triturus cristatus). Report to SNH Contract no RASD/009/97/DASB*
[21] *http://www.snh.gov.uk/about-scotlands-nature/wildlife-and-you/great-crested-newt/legal-position/*

Conservation Status[22, 23]

In addition to the statutory protection provided it is UKBAP priority species.

2.4 Invertebrates

2.4.1 Butterflies and moths

Status, Distribution and Importance of butterflies and moths

In the south west of Scotland 32 species of butterfly are regularly recorded and 26 are likely to be found in Ayrshire. The publication of the Butterflies of South West Scotland by Butterfly Conservation Scotland was a massive step forward in the understanding of status and distribution.

Moth recording is highly specialised and this taxon is therefore normally under-recorded. Gill Smart has provided a list of 7 nationally, locally scarce or notable species according to East Ayrshire 10km square.

Table 16- Nationally scarce moth species in East Ayrshire

10km square	Latin name	No of records	Individuals	First record	Last record	Status
NS41	*Atemelia torquatella*	**1**	**0**	**1976**	**1976**	**Nationally Scarce A**
NS41	*Elachista alpinella*	**1**	**2**	**1976**	**1976**	**Nationally Scarce B**
NS41	*Phaulernis fulvguttella*	**1**	**1**	**1976**	**1976**	**Nationally Scarce B**
NS41	*Eupitheca valerianata*	**1**	**0**	**1976**	**1976**	**Notable (Nb)**
NS41	*Hypenodes humidalis*	**3**	**1**	**1976**	**1976**	**Notable (Nb)**
NS41	*Olethreutes olivana*	**2**	**1**	**1976**	**1976**	**Notable (Nb)**
NS53	*Hyppa rectilinea*	**4**	**11**	**2009**	**2011**	**Notable (Nb)**

Trends for butterflies and moths

Results from the UK Butterfly Monitoring Scheme provide enough data for analysis of Scottish trends over the period 1979-2012. Generalist species have maintained, or increased, in number e.g. peacock and small heath, especially over the last 10 years, whilst specialist species have declined. Worst affected have been grayling, large heath, meadow brown and ringlet. Two species have increased, orange-tip and dark green fritillary. There is insufficient data to determine trends in East Ayrshire for moths.

Conservation status

The following eleven butterflies are highlighted as key species in ALBAP.

- Common blue
- Dark green fritillary

[22] http://www.snh.gov.uk/about-scotlands-nature/species/fish/freshwater-fish/charr/

[23] https://www.sepa.org.uk/environment/water/river-basin-management-planning/actions-to-deliver-rbmp/priority-catchments/

- Dingy skipper
- Green hairstreak
- Green-veined white
- Large heath
- Large skipper
- Northern brown argus
- Peacock
- Scotch argus
- Small pearl-bordered fritillary

The 7 moth species of listed in Table 15 are not common (i.e. only recorded in 15-100 10km^2 in GB).

2.4.2. Other Invertebrates

Invertebrates of Ayrshire have been the subject of limited study and records are sparse[24]. This highlights the need to encourage invertebrate recording in East Ayrshire. The following list of important species, other than butterflies, are likely to occur in East Ayrshire and have been collated, primarily from Sivell and Phillips.

Molluscs

Freshwater pearl mussel (*Margaritifera margaritifera*)

Beetles

At Scottish level SNH have published reviews of water beetles, see link below.

https://www.nature.scot/plants-animals-and-fungi/invertebrates/land-

invertebrates/beetles

At regional level this group has been extensively covered and an unpublished provisional beetle list for Ayrshire has been compiled. The list of 940 species includes 127 notable and 11 Red Data Book (RDB) species. Three RDB have been recorded in East Ayrshire with two found in aquatic habitat and the third in decaying birch wood, see below

Hydraena pulchella (aquatic)
Hydroporus elongatulus (aquatic)
Oxypoda mutata (birch woodland*)*

Dragonflies and Damselflies

Azure Damselfly (*Coenagrion puella*)
Black darter (*Sympetrum danae*)
Blue-tailed damselfly (*Ischnura elegans*)
Common blue damselfly (*Enallagma cyathigerum*)
Common darter (*Sympetrum striolatum*)
Common hawker (*Aeshna juncea*)
Northern emerald damselfly (*Lestes sponsa*)
Northern emerald dragonfly (*Somatochlora arctica*)
Four spotted chaser (*Libellula quadrimaculata*)
Golden-ringed dragonfly (*Cardulegastor boltonii*)
Highland darter (*Sympetrum nigrescens*)

[24] *ALBAP*
http://www.snh.gov.uk/docs/B424909.pdf

Large red damselfly (*Pyrrhosoma nymphula*)
Migrant hawker (*Aeshna mixta*)

The northern emerald dragonfly is a key species in Scotland and present in East Ayrshire that is found almost exclusively on bogs, with close proximity to trees. The argent and sable moth (*Rheumaptera hastata*) is an ALBAP priority species.

There is a need to identify the location(s) of notable species and species assemblages in East Ayrshire.

Moths

The argent and sable moth (*Rheumaptera hastata*) is an ALBAP priority species.

Other invertebrates

There has been some local recording of Diptera and Hymenoptera, but data was not available to this report.

2.5 Plants

The Botanical Society for the British Isles (BSBI) is responsible for plant recording and uses the vice-county system, based on the Counties of Great Britain, which was first used for the purposes of regional recording in 1852, with the whole of Ayrshire forming VC75. There is no sub-division of the VC according to Local Authority. Appendix 6 lists all plants recorded in Ayrshire as well as their origin. Recording is carried out by local recorders and occasionally they publish local lists or write local flora.

Status, Distribution and Importance of Plants[25],[26]

(i) Lower plants

The recording of lower plants i.e. fungi, lichens, liverworts and mosses is carried out by local specialists and results are often reported in specialist publications. The British Bryological Society hold many records and have produced maps at 10km^2 level which might be made available to an East Ayrshire biological recording centre.

(ii) Higher plants

In 1998, June Thurston compiled a list of notable plants recorded in Ayrshire and Arran since 1981. Data was assembled according to five levels of importance from British to local. Twenty-seven species of national importance are listed, with their frequency of occurrence in East Ayrshire, in Table 17. This table, combined with UK, Scottish and ALBAP botanical priority species allows identification of higher plant species priorities for East Ayrshire. It is 40 years out of date but the only list available at the time of reporting.

Table 17 - Nationally rare native plants in East Ayrshire

Latin name	Common name	No of 10km Squares in Ayrshire with records
Andromeda polifolia	Bog rosemary	1
Calamagrostis stricta	Narrow small-reed	1

[25] *Pearson et al (2002) New Atlas of the British Flora. OUP*

[26] *Thurston, J 1998. Notable Plants Recorded in Ayrshire and Arran (Unpublished manuscript) BBS (2010) Mosses and Liverworts of Britain and Ireland: a field guide.*

Latin name	Common name	No of 10km Squares in Ayrshire with records
Carex aquatilis	Water sedge	3
Carex diandra	Lesser tussock sedge	2
Carex magellanica	Bog sedge	4
Carum verticillum	Whorled caraway	7
Centaurium littorale	Seaside centaury	1
Coincya momensis	Isle of man cabbage	3
Doronicum plantagineum	Green leopards-bane	3
Eleocharis acicularis	Slender spike-rush	1
Equisetum hyemale	Dutch rush	2
Equisetum pratense	Shady horsetail	2
Festuca altissima	Wood fescue	3
Gagea lutea	Yellow Star-of-Bethlehem	1
Lavatera arborea	Tree mallow	2
Lobularia maritima	Sweet Alison	1
Lysmachia thrysiflora	Tufted loosestrife	3
Mertensia maritima	Oyster plant	3
Meum athamanticum	Spignel	6
Pilularia globulifera	Pillwort	1
Ranunculus baudotii	Brackish Water-crowfoot	1
Raphanus raphanistrum maritimus	Sea radish	2
Sedum villosum	Hairy stonecrop	6
Setaria viridis	Green bristle-grass	1
Subularia aquatica	Awlwort	1
Vicia lutea	Yellow vetch	2
Zostera noltii	Dwarf eelgrass	1

Ayrshire is currently the target of a BSBI project to update the local rare plants register and the BSBI Local Recorder will be completing surveys and reporting over the next two years. An up-to-date account of the status of Ayrshire plants will therefore soon be prepared and the BSBI will be looking at options to provide a sub-listing for East Ayrshire. Ahead of this the BSBI recorder has highlighted the importance of industrial sites with one such site in East Ayrshire holding Scotland's only *Ophrys apifera* (bee orchid) population, Ayrshire's only *Hypopitys monotropa* (yellow birds-nest) population and a population of the scarce *Gallium album* (white bedstraw). Clearly derelict man-made habitat can be of importance to nature conservation.

East Ayrshire Council holds a register of important trees, not all native, with Tree Preservation Orders (TPOs), see Appendix 7. These trees are largely associated with urban and designated landscapes and all due to age have biodiversity significance, not least for mosses and lichens and this potential nature conservation value needs to be reviewed.

Trends for Plants

Trends in plant populations largely follow the fortunes of habitats and where adverse effects are taking place that affect semi-natural and natural habitats e.g. bogs, lochs and grassland, the overall trend is likely to be negative. Freshwater ponds, lochan and lochs in particular hold macrophytes that are very sensitive to changes in water quality.

Conservation status

The current status of rare plants in Ayrshire is being reviewed and updated.

PRESSURES

3.0 Pressures

Pressures on ecological interest include:

- Direct Impacts – habitat loss;
- Direct Impacts – protected species;
- Direct and Indirect Impacts on watercourses and ponds;
- Indirect Impacts on habitats or species;
- Invasive Non Native Species;
- Cumulative Impacts on habitats or species; and
- Climate change

Typically, pressures on biodiversity in East Ayrshire have been related to development, such as housing development transport, minerals extraction and renewable energy/wind developments. However, the less easily quantified pressures of climate change, land use change from agriculture and forestry may be equally, if not more, significant.

All public bodies in Scotland have a legal duty to further the conservation of biodiversity under the Nature Conservation (Scotland) Act, 2004[27] and this is generally applied through the development planning process through policy, development management and EIA and through agreements, which require site restoration or compensatory provision.

Biodiversity is further protected through legal agreements for Ecological Clerk of Works and Planning Monitoring Officer on major developments, which seeks to ensure protection of habitats and species during stages of construction, operation and restoration[28].

CONCLUSIONS

4.1 Conclusions

Overall, there is a wealth of biological data available for East Ayrshire and whilst some is fairly dated, it still provides an overall picture of the current ecological capital. There is a suite of sites with both European and national protection and a range of species, including protected species, which are important to the overall health of the ecosystem in East Ayrshire. There have been pressures on the biological resource from development including habitat fragmentation and minerals extraction and it is important that future proposals for development include both survey and assessment for key habitats and species to inform decisions.

The trends in key species of flora and fauna are broadly negative, excepting bats, otter, a few species of bird and several common butterflies e.g. peacock and orange-tip. The extent and quality of natural bird resources for breeding and wintering has decreased in extent over the last 25 years in East Ayrshire. Some bird species do buck the national trends e.g. yellowhammer, but, overall the picture is one of diminishing populations and alarmingly two woodland bird specialists, the pied flycatcher and wood warbler, may follow corn bunting, corncrake and water vole as local breeding extinctions. Hen harrier and black grouse are two upland species with locally fragile populations.

[27] http://www.legislation.gov.uk/asp/2004/6/pdfs/asp_20040006_en.pdf
[28] https://www.east-ayrshire.gov.uk/PlanningAndTheEnvironment/Minerals,%20Waste%20and%20Onshore%20Wind%20Site%20Monitoring%20Reports/Quarterly-Compliance-Monitoring.aspx

4.2 Recommendations

The following key recommendations are made in order to ensure that new policies and plans are robust in respect of nature conservation, the delivery of planning obligations in relation to development are credible and the Council's biodiversity duties and obligations are fully met. Listed recommendations are an ideal and some may not be feasible.

- A local biological records centre should be set up with adequate funding and staff to deliver a competent service to the Council and other parties.
- The Ayrshire Biodiversity Action Plan must be updated as a matter of priority.
- The Council should establish a contact database, which lists those organisations, charities and individuals who have special knowledge of East Ayrshire flora and fauna.
- The East Ayrshire phase 1 habitat survey is out of date and should be updated. It must include detailed target notes to provide depth of detail at species level for locations of special interest.
- The East Ayrshire broad-leaved woodland resource appears significant, but ignored, and should be the subject of a special study to determine their value and management needs.
- The audit has identified bogs as a specially threatened habitat in East Ayrshire and one, which is both diminishing and degraded. Given its European importance the Council should consider updating relevant policies and prepare a new Habitat Action Plan for peatlands in order to protect the remaining habitat and to meet its biodiversity obligations.
- In conjunction with Botanical Society of the British Isles (BSBI), a list must be made of non-protected sites of importance for flora in East Ayrshire. Without this list there is a high risk of local extinctions on sites of less obvious importance for plans e.g. derelict land.
- Specialist reviews are required to assess the potential importance of fungi, lichens and mosses. These difficult lower plant groups are poorly recorded and often overlooked in terms of all forms of assessment. In the absence of comprehensive data, a checklist should be compiled for assessing risks from new Council policies, developments and changes to land-use. The Royal Botanic Gardens may be able to help produce a proforma for assessing potential risks.
- Invertebrate interests are poorly understood and, as a first step towards a better understanding of development impacts, a Proforma site invertebrate risk assessment should be created in conjunction with Butterfly Scotland and Buglife. Completing the proforma should be a simple desk-top exercise highlighting the need for an invertebrate survey and could be completed by prospective developers. It could also inform Council staff on land owned and managed by East Ayrshire Council.
- Citizen science, public monitoring of the environment, is making an increasing successful and cost-effective contribution to natural science and may be an opportunity for Council involvement.

MINERALS – ECOLOGICAL IMPACTS ASSOCIATED WITH MINERALS OPERATIONS

5.1 Summary

This section provides a short review of the impacts that have arisen from mineral extraction in East Ayrshire and then looks more broadly at potential impacts of future operations including unconventional gas and how these should be addressed though planning policy and control.

5.2 Relationship between Mineral Extraction and Ecological Designations

5.2.1 Quarries

There are 3 known active quarries, hard rock and sand and gravel, at the time of reporting. None are known to have had any adverse impact on European or other nature conservation sites. Both types of quarrying leave voids, which lend themselves to positive after use in a nature conservation context. Hard rock extraction may leave exposed cliff suitable for breeding peregrine falcon whilst sand and gravel quarries can create excellent wetlands. Throughout Scotland there are excellent examples of the latter which are now nature reserves. The advantage of these sites is that they are man-made and are unlikely to have extant wildlife constraints and can therefore be reworked to maximise their wildlife potential, but this is only possible if planning applications are supported by site restoration plans which have been prepared by experienced parties including ecological input and are developer funded.

5.2.2 Opencast Coal Sites (OCCS)

Open cast mining has been a significant industry in Ayrshire with 68 sites ranging from restored to currently active. There are two European Sites in proximity to, or contain OCCS:

- Airds Moss Special Area of Conservation (SAC)
- Muirkirk and North Lowther Uplands Special Protection Area (SPA)

Currently, significant adverse impacts from OCCS directly and indirectly affect Muirkirk and North Lowther Uplands SPA. All impacts arise from the past operation of Dalfad OCCS, Grievehill OCCS, Grievehill Extension OCCS and Powharnel OCCS. All are unrestored sites following the collapse of operating coal companies and, excepting Grievehill, they now form part of the portfolio of the Scottish Mines Restoration Trust[29]. An early assessment of the impacts on these sites is provided in section 5.3, with a more detailed assessment in a standalone report to East Ayrshire Council.

5.3 Understanding Broad Impacts of Mineral Extraction on Ecological Interest

The broad potential impacts are:

- Direct habitat loss from overburden stripping to create extraction area and indirect impacts on habitats through changes to groundwater regimes etc.;
- Contamination of watercourses;
- Impacts on protected species – direct via loss of key features within a species range or through indirect effects such as disturbance, contamination, water pollution etc.;
- Damage to sensitive ecological receptors from airborne pollution, particularly broad-leaved trees, bogs and grassland;

[29] http://www.smrtrust.org

- Adverse effects can be compounded by poor restoration, which can result in poorly drained and biologically dull habitat. Water-filled voids left behind are often too deep to support submerged and emergent aquatic plants.
- Restoration of terrestrial habitats can be constrained by poor soil and sub-soil storage resulting in "losses" of material leaving a shortfall for soiling any restored areas. Shallow soils, of mixed origin mixed with young rock is not an easy substrate on which to establish new habitats; and
- Improper peat storage, for example at Dalfad where peat has been stored in a deep void that is water-filled and is now unrecoverable, can present difficulties. Peat stored on the land surface and allowed to dry oxidises to create a hard impenetrable crust, too challenging for most pioneering plants.

5.4 Potential Impacts of Unconventional Gas on Ecological Interest

Unconventional gas extraction sites have relatively small scale landscape effects, resulting from tracked access, creation of a compound, installation of a rig and associated equipment and vehicles. Site investigation and testing precedes any commissioning and is equally intrusive and most often left in situ prior to full development. If a significant number of individual compounds and rigs are grouped over an area, the ecological effects could be cumulatively significant. Potential impacts carry a high residual risk to the local aquatic environment.

1. Land take depends upon the size of the operation but short-medium term habitat loss and long term habitat degradation are issues.
2. The operations use a very high volume of water and this requires a local source. Abstraction can adversely affect local water tables and indirectly affect flows in adjacent watercourses.
3. Water used in the process is contaminated by chemicals added downhole and any uprisings of fracking water during boring have to be dealt with safely. Only a relatively small percentage of the contaminated water is recovered for decontamination and storage facilities are required for the latter process. Contaminated fracking water, up to 50% of the total used remains underground.
4. Above ground storage, or spillage, of contaminated water represents a high risk to the local environment and can result in the creation of contaminated land.
5. The installation of above ground structures with associated noise and lighting can have an adverse effect on local fauna. Bats in particular could be adversely affected by the introduction of light, as some bats are light averse and commuting routes and foraging could be disrupted.

5.5 Review of Ecological Impacts of Mineral Extraction in East Ayrshire

This summary assessment has been extracted from a more detailed assessment undertaken for East Ayrshire Council by ECOS Countryside Services LLP in consultation with a range of consultees including SNH. The detailed assessment included literature review, baseline data review (habitat survey data, Habitat Management Plans etc.) and a level of fieldwork survey to ground-truth available information.

5.5.1 Designated Sites

Impact on Airds Moss SAC – there are currently no impacts on this designated site from neighbouring opencast coal operations

Impact on Muirkirk and North Lowther Uplands SPA

Three OCCS have had a direct impact on the Muirkirk and North Lowther Uplands SPA, namely Powharnel, Dalfad and Grievehill (and its extension)

Based on the 1991 Phase 1 habitat survey significant areas of vegetation have been impacted by all three OCCS:

- Within the SPA a total of approximately 200.66ha have been impacted with bogs bearing the brunt of the damage over an area of approximately 159.1ha.

- Unimproved acid grassland was also badly affected, a total of approximately 38.036ha.
- It is clear that a high proportion of semi-natural SPA habitats have been impacted.
- Restoration at Powharnel and Dalfad has not been able to restore deep peat habitats, but does make a contribution in terms of the heaths that have been created on shallow peat.

Table 18 – Total areas of SPA habitat directly impacted by mining

Alpha-numeric code	Habitat Description	Powharnal SPA Habitat Loss (ha)	Dalfad SPA Habitat Loss (ha)	Grievehill (extension) SPA Habitat Loss (ha)	Total Habitat Impacted in SPA
B1.1	Acid grassland unimproved	**29.4**	**8.6**	**0**	**38.0**
B1.2	Acid grassland semi-improved	**0**	**0.1**	**2.6**	**2.7**
B1.2 / A2.2	Acid grassland semi-improved / Scrub scattered	**0**	**0.06**	**0**	**0.06**
B5	Marsh / Marshy grassland	**0**	**0.7**	**0**	**0.7**
E1.6.1	Bog, Sphagnum bog – Blanket bog	**1.75**	**0**	**6.7**	**8.4**
E1.7	Bog, wet modified	**142.7**	**3.6**	**4.4**	**150.6**
Total		**173.8**	**13.2**	**13.6**	**200.7**

5.5.2 Protected Species and Other Habitats

Due to the nature and scale of mineral extraction, OCCS proposals are usually accompanied by an Environmental Impact Assessment and submission of an Environmental Statement as part of the consenting process. Therefore potential impacts on protected species and notable habitats out with designated sites during construction, operation and restoration (where applicable) have been addressed fully in consultation with statutory consultees including SNH.

5.6 Conclusions and Recommendations

5.6.1 Conclusions

There have been historical impacts on nature conservation and biodiversity resulting from minerals extraction with particular cases relating to the demise of two major operators in 2012, which resulted in the abandonment of sites without restoration or with partial restoration. These impacts have included European designated sites and work is currently underway to address these issues through partnership working between East Ayrshire Council, Scottish Government and key agencies including SNH to development restoration plans. A series of recommendations for future protection of biodiversity have been suggested in Section 4 above.

With hindsight there are many issues that directly relate to the operation of Powharnal, Dalfad and Grievehill OCCS and key lessons learnt.

1. Mineral extraction on peatlands is highly destructive with limited opportunity for restoration associated with significant peat depths, however restoration potential is site specific and should be informed by appropriate peat surveys and a Peat Management Plan
2. Large scale open casting is vulnerable to market changes and operator collapse; therefore, small scale extraction is more likely to be sustainable

3. Boundaries need to be closely monitored to prevent migration beyond the agreed planning boundary.
4. Restoration opportunities are likely to be more successful if:

    - Soil and overburden stripping and storage is closely monitored, by a suitably qualified specialist (mineral surveyor / environment consultant/ ecologist) and strictly follows a plan which ensures the highest possible opportunity for re-use;
    - Account is taken of the extant habitats and special measures taken for rare, or difficult to restore habitats e.g. calcareous grassland;
    - Habitat mitigation plans are kept as simple as possible and therefore accessible to all parties;
    - Habitat mitigation plans should only be accepted if they offer a very high guarantee of success; and
    - Habitat mitigation plans must be financially secure.

5.6.2 Recommendations for mineral policy review

The complexity of mineral policy review is largely beyond the remit of an ecological audit and should be determined by a multidisciplinary group. Ecological priorities require discussion with statutory and non-statutory consultees. A new policy must be clearer in its identification of nature conservation constraints and of areas where mineral workings are likely to be acceptable. It must deliver new guidelines for the preparation of supporting documents particularly where mitigation, enhancement or compensation plans are to be conditioned. Consented operational activities must be more closely and more frequently monitored and audited. In order to deliver a credible policy consideration should be given to updating the current baseline for flora and fauna. The council are committed to early dialogue with mineral operators to ensure issues and opportunities are addressd early in site design development.

GLOSSARY

Ayrshire Local Biodiversity Plan (ALBAP) – sets out a shared set of conservation priorities for East, North and South Ayrshire

Ancient Woodland Inventory - Ancient Woodland is defined as land that is currently wooded and has been continually wooded, at least since 1750. The Ancient Woodland Inventory (AWI) is a provisional guide to the location of Ancient and Long-established Woodland in Scotland (Scottish Natural Heritage - http://www.snh.gov.uk/planning-and-development/advice-for-planners-and-developers/woodlands/)

Archaic Bogs - bogs where the peat has been removed or oxidised down to the groundwater table, or where the peat is buried e.g. under development or planted woodland

Biodiversity – diversity among and within plant and animal species in an environment

Blanket Bog - type of peatland found in the uplands

Bog – a wetland that accumulates peat, a deposit of dead plant material

BTO – British Trust for Ornithology

BBS – Breeding Bird Survey

East Ayrshire Coalfield Environment Initiative (CEI) – partnership between the East Ayrshire Council and and conservation bodies

Habitats Directive - Adopted in 1992, the Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora aims to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements.

Invasive Non Native Species (INNS) - Non-native species are those plants and animals which have found their way to a new habitat through human activity and can cause damage to native species and habitats

Local Nature Conservation Sites (LNCS) - non-statutory designation identifying locally important areas for nature and landscapes

Local Nature Reserve (LNR) – sites protected under the National Parks and Access to the Countryside Act 1949 and managed for educational and recreational interest as well as nature conservation reasons

National Vegetation Classification (NVC) - The National Vegetation Classification (NVC) is a more detailed classification than the Phase 1 Habitat Survey for UK plant communities

Phase 1 Habitat Survey – standard classification and associated field survey technique providing a systematic way to record semi-natural vegetation and other wildlife habitats. Each habitat type/feature is defined by way of a brief description and is allocated a specific name, an alpha-numeric code, and unique mapping colour.

Raised Bog - a peat bog in which growth is most rapid at the centre, giving it a domed shape

Red List Species of Conservation Concern (SoCC) – lists bird species at risk using standardised criteria and covers 244 species with breeding, passage or wintering populations in the UK

Scottish Natural Heritage (SNH) - Scottish public body responsible for the country's natural heritage, especially its natural, genetic and scenic diversity

Scottish Wildlife Trust (SWT) - Scottish conservation organisation

SNHi – Interactive resource providing information on important habitats and species - http://www.snh.gov.uk/publications-data-and-research/snhi-information-service/

Site of Special Scientific Interest (SSSI) – Site of Special Scientific Interest (SSSI) is a conservation designation providing protection at the UK level which best represent our natural heritage - its diversity of plants, animals and habitats, rocks and landforms, or a combinations of such natural features.

SoCC – Species of Conservation Concern

Special Protection Area (SPA) - protected sites designated under the EC Habitats Directive for internationally important species

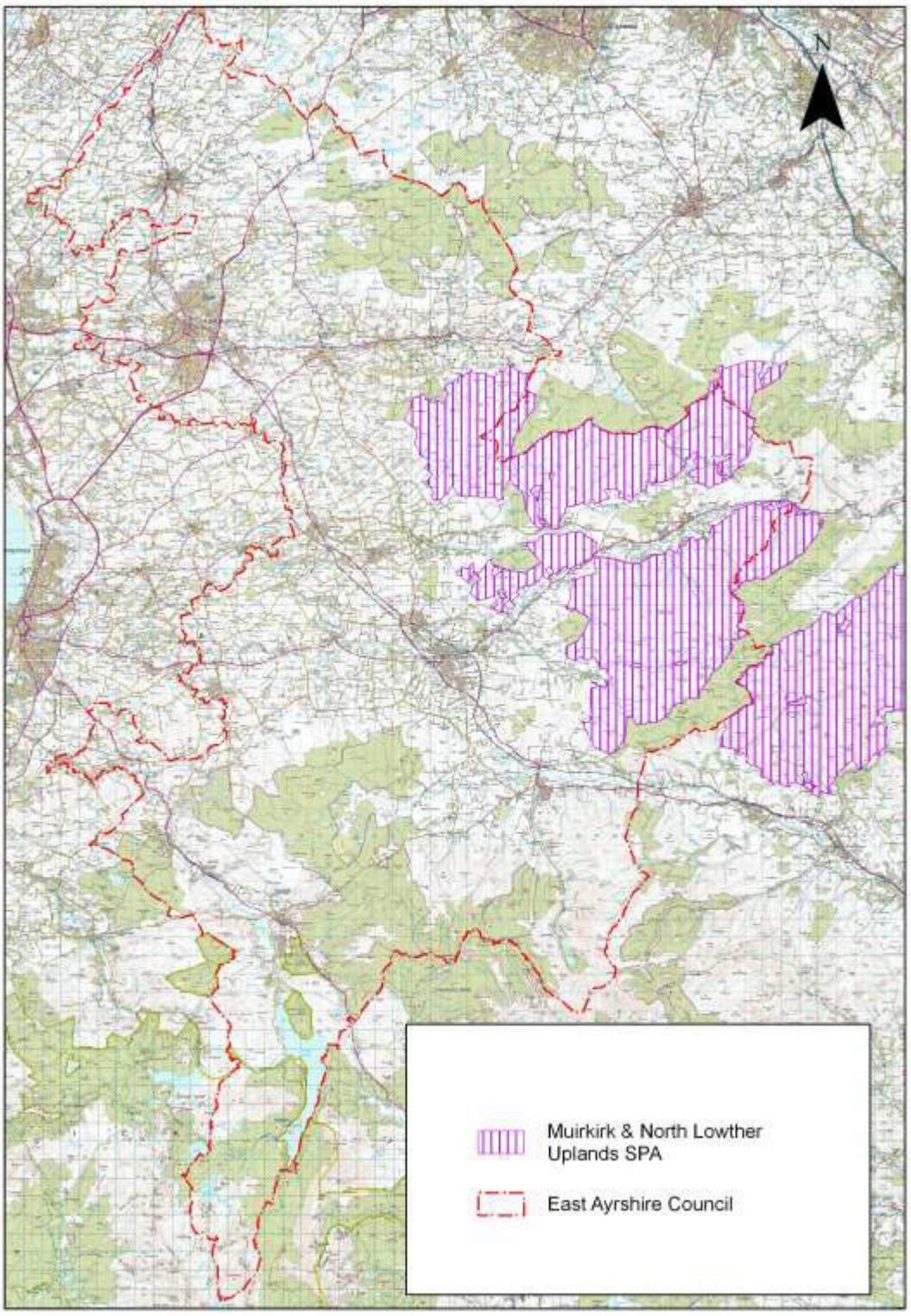
Special Area of Conservation (SAC) – protected sites designated under the EC Habitats Directive for internationally important habitats

UK Biodiversity Action Plan (UKBAP) - UK BAP describes the biological resources of the UK and provided detailed plans for conservation of these resources

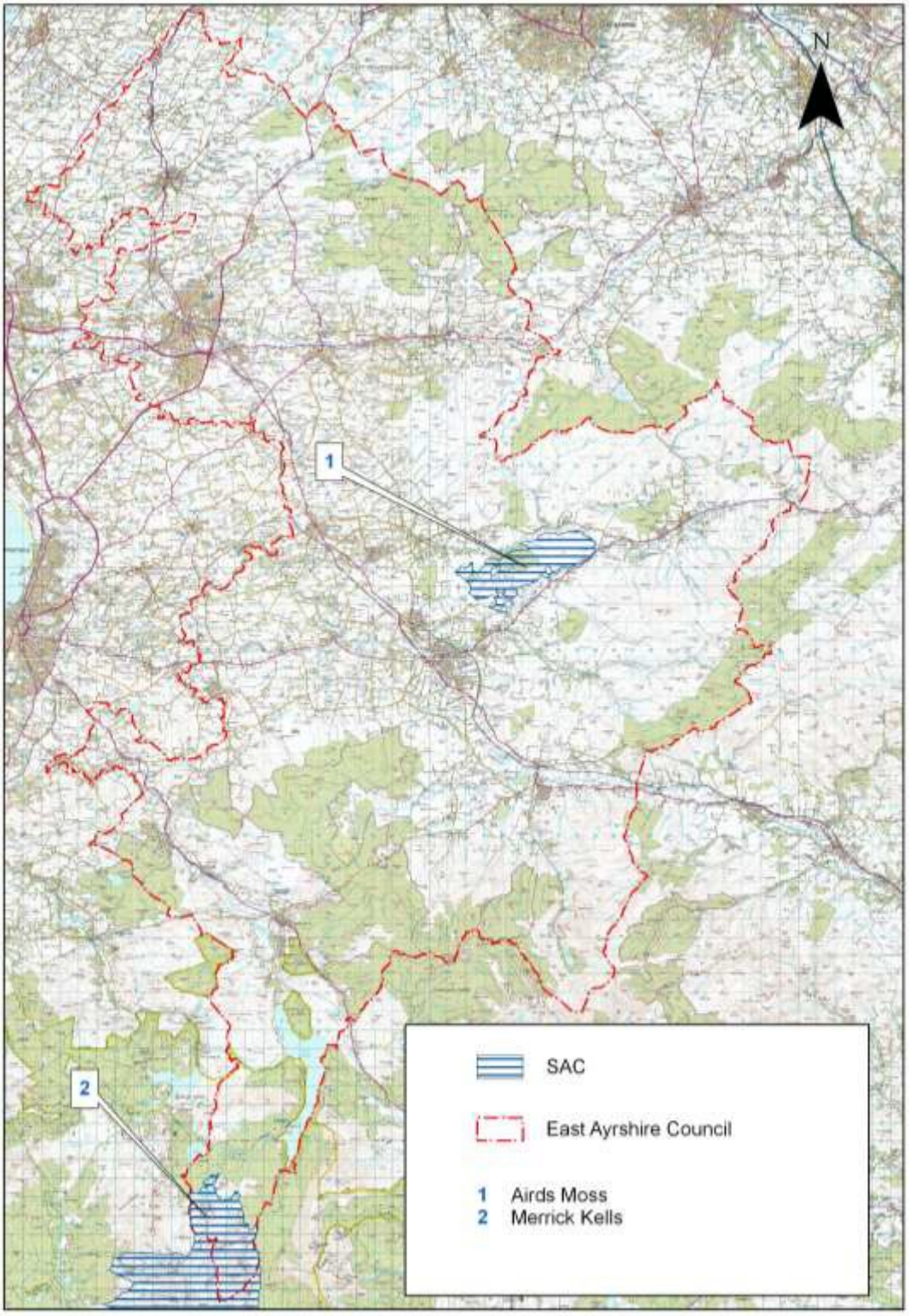
Unconventional gas - The term unconventional gas refers to natural gas held in rocks that cannot be exploited using traditional methods. Shale and coal are source rocks for unconventional gas

Appendix 1 - European statutory designated sites

1. Location of Special Protection Area (SPA)



2. Location of Special Area of Conservation (SAC)



Appendix 2(a). East Ayrshire Local Nature Conservation Sites (LNCS), raw data

ECOS Ref No (see Appendix 3 (b).	SITE NAME	EAC GIS REF. NO*	DESIGNATION	NGR Easting	NGR Northing
0	Dunaskin Ironworks	C1	Wildlife Site	244292	608453
1	Cumnock Burn/Pennyvenie Burn	C2	Provisional Wildlife Site	249351	606712
2	Cessnock Water	C3	Provisional Wildlife Site	250537	628991
3	Riggfoot/Lanemark Bogside Wetland	C4	Provisional Wildlife Site, Surveyed	258755	612448
4	Glenbuck Loch, Woodland & Floodplain	C6	Provisional Wildlife Site	275227	628704
5	Merrick Kells	C7		245003	589130
6	Craiglee Uplands	C8	Provisional Wildlife Site	246045	596021
7	Auchenroy /Glenmount Uplands	C9	Provisional Wildlife Site	245998	602046
8	Benbeoch/Pennyvenie Glen	C10	Provisional Wildlife Site	249324	608242
9	Connel Burn/Benty Cowan	C11	Provisional Wildlife Site	257350	608272
10	Muirkirk South Uplands	C12	Provisional Wildlife Site	268365	622004
11	Muirkirk North Uplands	C14	Provisional Wildlife Site	264338	630819
12	Dalmellington Town Common	G1	Provisional Wildlife Site	248368	605297
13	Dunaskin Glen / Benquhat Hill	G2	Provisional Wildlife Site	246020	609630
14	Bent Burn	G3	Provisional Wildlife Site	249777	617379
15	Craighead	G4	Provisional Wildlife Site	249218	632578
16	Oxenshaw Bridge	G5	Provisional Wildlife Site	251924	628080
17	Nith Bridge	G7	Wildlife Site	259430	613918
18	Ryderston Belt	G8	Provisional Wildlife Site	258788	618355
19	Guelt	G9	Provisional Wildlife Site	263830	619076
20	Corsencon Hill	G10	Provisional Wildlife Site	266977	614633
21	Glenmuirshaw	G11	Provisional Wildlife Site	269428	619841
22	Crosshands Heath / Friendlesshead Hill	H1	Provisional Wildlife Site	248517	630387
23	Crosshands Heath / Friendlesshead Hill	H1	Provisional Wildlife Site	249737	630502
24	Bryan's Height	H2	Provisional Wildlife Site	250070	601623
25	Wallace Moor / Keir's Hill	M1	Provisional Wildlife Site	242677	607689
26	Barlosh Moss	M2	Provisional Wildlife Site	248575	618426
27	Martyrs' Moss	M3	Provisional Wildlife Site	251772	611758
28	Glaisnock Moss / Carnivan Hill	M4	Provisional Wildlife Site	256174	615341

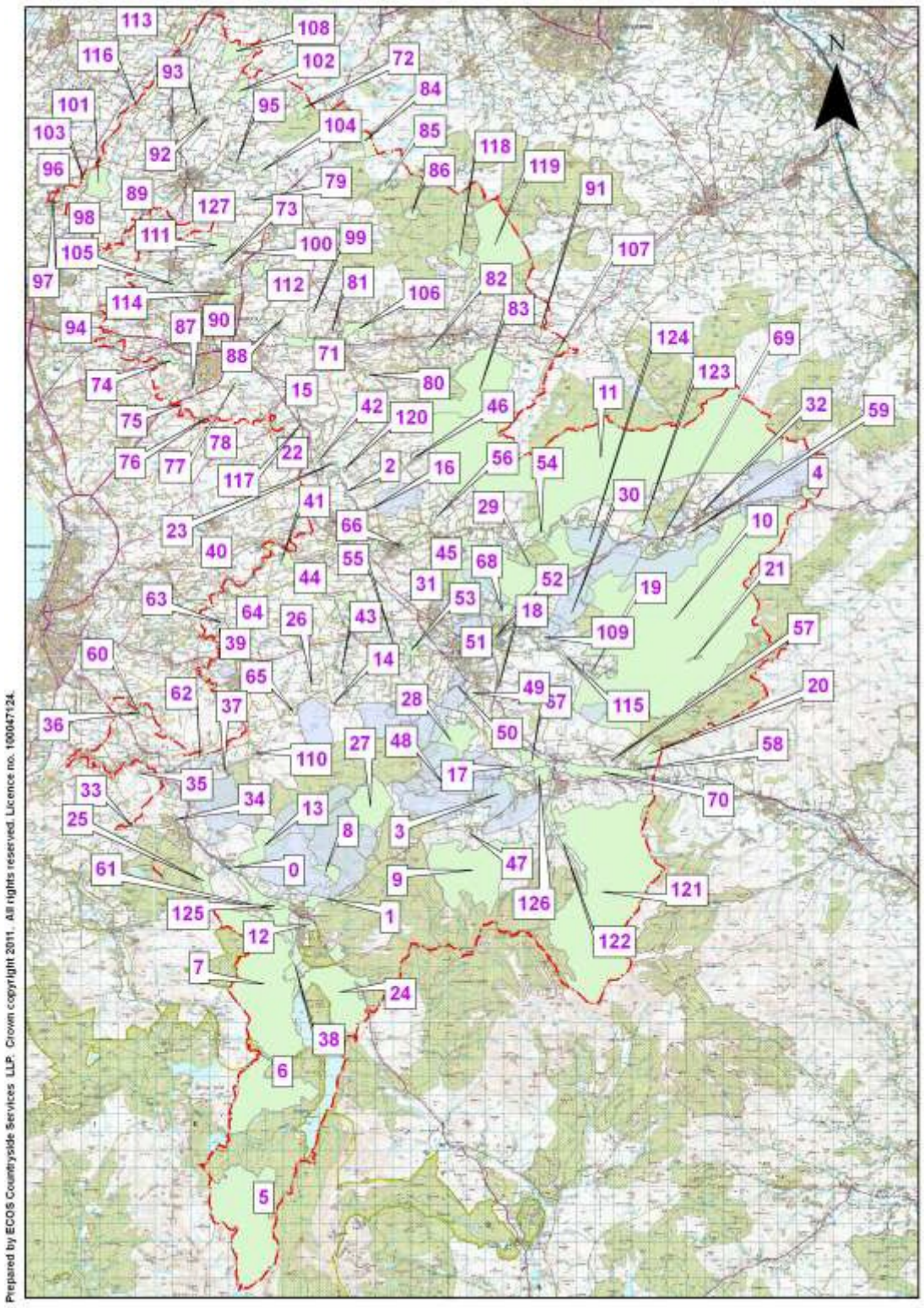
ECOS Ref No (see Appendix 3 (b).	SITE NAME	EAC GIS REF. NO*	DESIGNATION	NGR Easting	NGR Northing
29	Airds Moss	M5	Provisional Wildlife Site	260485	634929
30	Dalfad Moss	M7	Provisional Wildlife Site	262735	622330
31	Bogend Burn Scrub	S2	Provisional Wildlife Site	253589	624460
32	Kirk Plantation	S3	Provisional Wildlife Site	269807	627815
33	Dallowie Burn Woods	WD1	Provisional Wildlife Site	238806	610626
34	River Doon Woodland	WD2	Provisional Wildlife Site	241113	611064
35	River Doon Woodland	WD2	Provisional Wildlife Site	239061	613591
36	Martnaham Wood	WD3		239205	616906
37	Bow Burn / Ashentree Glen Wood	WD4	Provisional Wildlife Site	243779	613716
38	Craigengillan / Ness Glen Wood	WD5	Provisional Wildlife Site	247624	603175
39	Water of Coyle / Drongan Wood	WD6	Provisional Wildlife Site	243159	619591
40	Stair Wood / Dalmore Bank	WD7	Provisional Wildlife Site	244119	623310
41	River Ayr : Stair to Barskimming	WD8		246930	625176
42	Cessnock Water Woodland	WD9	Provisional Wildlife Site	248990	630710
43	Burnock Water	WD10	Provisional Wildlife Site	250182	619042
44	Lugar Water and Auchinleck Estate	WD11	Provisional Wildlife Site	250216	622890
45	River Ayr : Damhead to Nether Heilar	WD12	Provisional Wildlife Site	254677	626172
46	Auchmannoch Woods	WD13	Provisional Wildlife Site	254134	630800
47	Dalleagles Woodland	WD14	Provisional Wildlife Site	257254	610253
48	Dalgig Plantation	WD13	Provisional Wildlife Site	255736	612979
49	Glaisnock Glen / Velvetere Wood	WD16	Provisional Wildlife Site	257364	617967
50	Horsecleugh Glen Woodland	WD17	Provisional Wildlife Site	256531	618337
51	Shankston Wood	WD18	Provisional Wildlife Site	256288	619452
52	Lugar Water : Holmhead to Braehead	WD19	Provisional Wildlife Site	258623	621039
53	Dumfries House	WD20	Wildlife Site	253971	620297
54	River Ayr: Mid Heilar to Chapelhouse	WD21	Provisional Wildlife Site	261079	626699
55	Dumfries House	WD20	Wildlife Site	253017	620647
56	Cleuch Burn	WD22	Provisional Wildlife Site	255385	627599
57	Mansfield/Garclaugh/Garepool Burns	WD23	Provisional Wildlife Site	264862	614228
58	Merkland Wood	WD25	Provisional Wildlife Site	266316	613781
59	Kames Hill Woodland	WD26	Provisional Wildlife Site	269301	626782
60	Martnaham Loch / Snipe Loch	WT1		238988	617162

ECOS Ref No (see Appendix 3 (b).	SITE NAME	EAC GIS REF. NO*	DESIGNATION	NGR Easting	NGR Northing
61	Doon Valley Wetlands	WT2	Provisional Wildlife Site	246361	606150
62	Kerse Loch	WT3	Provisional Wildlife Site	242475	614392
63	Trabboch Wetlands	WT4	Provisional Wildlife Site	243634	621807
64	Trabboch Wetlands	WT4	Provisional Wildlife Site	244083	621086
65	Belston Loch	WT5	Provisional Wildlife Site	247557	616928
66	Catrine Voes	WT6	Provisional Wildlife Site	253415	626009
67	New Cumnock Wetlands	WT7	Provisional Wildlife Site	260555	614206
68	Lugar Loch Wetlands	WT8	Provisional Wildlife Site	258954	622405
69	River Ayr Floodplain	WT9	Provisional Wildlife Site	267470	626001
70	Nith Floodplain	WT10	Provisional Wildlife Site	264444	613632
71	East Holmes Wetlands	WT11	Provisional Wildlife Site, Surveyed	248280	637136
72	Corsehouse Reservoir	WT15		248084	649901
73	North Craig Reservoir	WT13	Provisional Wildlife Site	243723	641374
74	Caprington Castle & Estate	WD29	Provisional Wildlife Site	240900	636123
75	Inchgotrick Quarry	WD30		241386	633694
76	Howcommon (Craigie Hill)	G12	Provisional Wildlife Site	242846	632993
77	Riccarton Moss (Crossbush)	M8	Provisional Wildlife Site	244393	634916
78	Dallars Mains	WD32	Provisional Wildlife Site	245891	633056
79	Burnfoot Reservoir	WT14	Provisional Wildlife Site	245214	644870
80	Burn Anne & Holywell	C15	Provisional Wildlife Site	251727	635319
81	Orchard Plantation & West Belvedere	WD36	Provisional Wildlife Site	249669	637695
82	Lanfine Estate	WD37	Provisional Wildlife Site	254942	636667
83	Glenoul Burn, Logan Moss, Distinkhorn	C14	Provisional Wildlife Site	257712	634497
84	Fenwick Moor (Greenfield Burn)	M12	Provisional Wildlife Site	251449	648120
85	Craigendunton Reservoir	WT16	Provisional Wildlife Site	252565	645672
86	Crins Hill	G15	Provisional Wildlife Site	254020	644131
87	Treesbank Estate	WD29	Provisional Wildlife Site	242088	634584
88	Templeton Burn and Armsheugh	WD33	Provisional Wildlife Site	246948	638376
89	Hillhouse & Water Plantation	WT12	Provisional Wildlife Site	241070	646582
90	Templeton Burn and Armsheugh	WD33	Provisional Wildlife Site	245977	638592
91	Loudoun Hill	C16	Provisional Wildlife Site	261027	637805

ECOS Ref No (see Appendix 3 (b).	SITE NAME	EAC GIS REF. NO*	DESIGNATION	NGR Easting	NGR Northing
92	Dunlop House	WD40	Provisional Wildlife Site	242869	649338
93	Dunlop House	WD40	Provisional Wildlife Site	242288	649519
94	Craig House	WD27	Provisional Wildlife Site	237799	637266
95	Robertland & Swinzie Burn	C18	Provisional Wildlife Site	244465	646947
96	Montgreenan & Lugton Water	WD38	Provisional Wildlife Site	234324	645168
97	Montgreenan & Lugton Water	WD38	Provisional Wildlife Site	234461	644928
98	Montgreenan & Lugton Water	WD38	Provisional Wildlife Site	234650	644635
99	Polbaith Burn & Castlehill Glen	WD34	Provisional Wildlife Site	248648	638724
100	Meikle Mosside	M11	Provisional Wildlife Site	244720	642010
101	Bloak & Kennox Mosses	M9		236937	645804
102	Totherick	G14		244570	650823
103	Bloak & Kennox Mosses	M9		236135	645999
104	Clonherb	WD42	Provisional Wildlife Site	245845	646491
105	Carmel Water : Tour to Waterpark	WD39	Provisional Wildlife Site	241082	640266
106	Loudoun Castle Woodlands & Waterside	WD35	Provisional Wildlife Site	251166	637870
107	Allanton Plains & Avon Water	C17	Wildlife Site	261777	636266
108	Knockmade Moss	M10		244415	653000
109	Low Moss	M6	Provisional Wildlife Site, Surveyed	261256	620980
110	Rankinston Scub, Water of Coyle	S1	Provisional Wildlife Site	245492	614680
111	Rowallan Estate	WD41	Provisional Wildlife Site	243404	642411
112	Craufurdland Estate	C19	Provisional Wildlife Site	245579	641141
113	Lugton Moss	M14	Provisional Wildlife Site	241837	653693
114	Dean Estate Country Park	WD31	Provisional Wildlife Site	244122	639801
115	Glenmuir Water : Lugar to Kyle Castle	WD24	Provisional Wildlife Site	262434	619971
116	Upper Lugton Water	G13	Provisional Wildlife Site	239007	650060
117	Carmell and Cessnock Water	WD9	Provisional Wildlife Site	247932	632585
118	Pley Moss	M13	Provisional Wildlife Site	256615	641832
119	Glen Water	WD43	Provisional Wildlife Site	258569	642466
120	Friendlesshead Farm	G6	Provisional Wildlife Site	250368	630194
121	Afton Uplands	C12	Provisional Wildlife Site	264401	607106

ECOS Ref No (see Appendix 3 (b).	SITE NAME	EAC GIS REF. NO*	DESIGNATION	NGR Easting	NGR Northing
122	Glen Afton	C5	Provisional Wildlife Site	262272	609715
123	Marchhouse Hill		Wildlife Site	266617	627055
124	Nether Wellwood Farm		Wildlife Site	263715	626233
125	Dalmellington Moss		Reserve	246543	606340
126	Knockshinnoch Laggons		Reserve	260968	613483
127	Bowes Rigg Drying Green		Wildlife Site	242305	646296

Appendix 2(b) Location and extent of East Ayrshire's LNCS, according to the EAC list



Appendix 2c - Scottish Wildlife Trust LNCS list, as provided 4th December 2014

Afton Uplands	Provisional WS	An extensive upland site which encompasses a range of upland mire, montane heath and grassland habitats. Has alpine clubmoss and juniper. The montane sedge, *Carex bigelowii* , is frequent over the sumit of Craigbraneoch and Blackcraig.
Allanton Plains	Provisional WS	Low lying complex of marsh, swamp, bog and fen habitats, associated with a species-rich old railway line, in the flood plain of the Avon Water.
Auchenroy/Glenmount Uplands	Provisional WS	An extensive site with various interesting upland habitats including large tracts of *Molinia* grassland but also substantial areas of blanket bog and good representation of acid grassland.
Auchmannoch Woods	Provisional WS	Semi-natural and policy woodlands on steep burn banks. Also has areas of semi-improved wet meadow and some tall herb.
Ayr Gorge Woodlands SWT Reserve	Wildlife Site	A steep ravine covered with ancient oak and ash woodland. This reserve is one of the most important woodland areas for wildlife in Ayrshire. Paths follow the riverbank and up through mixed broadleaf and larch forest, offering the visitor a stimulating but peaceful woodland experience.
Barlosh Moss SSSI	Wildlife Site	A relatively undisturbed complex of mires developed on the site of a former loch.
Belston Loch	Provisional WS	Loch with surrounding swamp, willow carr and marshy habitat types.
Benbeoch/Pennyvenie Glen	Provisional WS	Botanical interest lies in the vegetated ledges, scree and boulders of Benbeoch Craig which is surrounded by acid grassland. Pennyvenie Glen contains semi-natural gorge woodland of upland character of birch, alder and ash with good shrub and ground layers.
Bent Burn	Provisional WS	Wide roadside verge with many acid loving species and bounded at each end by dense willow scrub.
Bloak and Kennox Mosses	Provisional WS	Two particularly fine examples of raised bog habitat containing uncommon plants and insects.
Blood Moss and Slot Burn SSSI	Wildlife Site	An excellent example of blanket bog vegetation and one of the best of its type in southern Strathclyde. Also has heather-dominated hillsides dissected by streams. There are plant species rare or uncommon in southern Scotland, notable invertebrates and a variety of upland breeding birds.
Bogend Burn Scrub	Provisional WS	Dense thorn-scrub with scattered mature ash, birch and rowan. Frequent rush-dominated marshy areas. Abundant birdlife.
Bogton Loch SSSI	Wildlife Site	A freshwater loch with an extensive range of associated marshland and mire plant communities.
Bow Burn/Ashentree Glen Wood	Provisional WS	Bow Burn has semi-natural birch/alder woodland along its steep banks, some mature oak and pine and a good shrub layer. Ashentree Glen is a small, wych elm dominated woodland with good structure and some dense thorn and hazel.
Bowsrigg Drying Green, Stewarton	Wildlife Site	Has a large population of the pink waxcap fungus (*Hygrocybe calyptraeformis*) which is a key species in UK and Ayrshire Biodiversity Action Plans. This is one of only 2 known sites in Ayrshire.
Bryan's Heights	Provisional WS	An extensive area of wet heath characterised by uneven micro-relief. Hummocks are dominated by heather and bracken while hollows are dominated by *Molinia* with abundant bog myrtle. Also has dry heath, mire, an upland loch (Loch Muck) and part of the shore of Loch Doon.
Burn Ann and Holywell	Provisional WS	A natural watercourse flanked by a mosaic of grassland, woodland and scrub. The grassy slopes tend to be species-rich and contain orchids such as early-purple and common spotted. Wet flushing on the slopes contributes to the habitat and species diversity. The woodland is native and semi-natural.
Burnfoot Reservoir	Provisional WS	A valuable freshwater body with marginal vegetation. Of local value for breeding and wintering birds.
Burnock Water	Provisional WS	Semi-natural gorge woodland plus areas of gorse/broom scrub, old coppiced hazel woodland and small areas of semi-improved grassland.

Dalleagles Woodland	Provisional WS	Old mixed plantation dominated by oak, beech and larch; with ash and alder by the burn where the ground flora is better.
Dallowie Burn Woods	Provisional WS	Two small areas of semi-natural woodland along a burn. Dallowie Wood is birch/alder dominated. Dalvennan Wood is hazel/oak dominated with good ground flora and flushes.
Dalmellington Moss SWT Reserve and SSSI	Wildlife Site	An area of raised bog on the floodplain of the River Doon regarded as one of the best examples in the district. It supports a wide range of typical and rare bog plants as well as being a winter refuge for roosting birds of prey.
Dalmellington Town Common	Provisional WS	An unenclosed town common, unusual for the district. Largely semi-improved *Molinia* grassland with short heather. There are also acid grassland and marshy areas within the site.
Dean Castle Country Park	Provisional WS	Mixed woodland and riverbanks with considerable educational value. Important for birds, mammals and plants.
Dollars Mains	Provisional WS	A valuable area of old coppiced woodland with an unusual flora and a diversity of breeding birds.
Doon Valley Wetlands	Provisional WS	A range of mire and fen communities covering a sizeable area of the floodplain. Associated with Dalmellington Moss and Bogton Loch SSSIs.
Dumfries House	Wildlife Site	Mature broad-leaved woodland and mixed plantation in the grounds of Dumfries House estate, which incorporates a stretch of the Lugar Water, some cut-off ponds of that river, several tributary burns, a large parkland and the amenity areas associated with the network of access tracks.
Dunaskin Glen/Benquhat Hill	Provisional WS	Dunaskin Glen is a steep-sided gorge with scattered scrubby woodland of upland character, rich ground flora and species-rich ledges and flushes. Benquhat Hill is a good example of upland grassland with rock outcrops supporting a good variety of mosses, lichens and uncommon ferns.
Dunaskin Ironworks	Wildlife Site	A post-industrial site in the valley of the River Doon comprising a mosaic of ephemeral habitats, stands of tall herb, wetland, broad-leaved woodland and scrub. While it cannot be considered as natural, some of the habitats on the site are long-established and diverse. The range of different types of spoil material with localised water-logging, mounding and compaction provide for a rich flora, including many local rarities.
Dunlop House	Provisional WS	Estate policies with some mature woodland and botanical interest. The relatively treeless area is good for birds.
Fenwick Moor	Provisional WS	A wet peat bog with ponds containing uncommon invertebrates and characteristic moorland plants.
Friendlesshead Farm	Provisional WS	Lowland semi-improved acid grassland, unusual for the area, with heath species present.
Glaisnock Glen/Velvetere Wood	Provisional WS	Glaisnock Glen has semi-natural woodland with good structure. The site also has policy, old plantation and scrub woodland as well as mature parkland trees.
Glaisnock Moss/Carnivan Hill	Provisional WS	Lowland blanket bog with unmodified central core surrounded by modified bog and semi-improved acid grassland. Has a good variety of bog species.
Glen Afton	Provisional WS	Semi-natural valley woodland, scrub and semi-improved grassland. Predominantly alder and birch with good shrub and ground layers.
Glen Water	Provisional WS	A glen with a good variety of habitats, including semi-natural woodland. Valuable for breeding birds.
Glenbuck Loch, Woodland and Floodplain	Provisional WS	A variety of habitat types, including Glenbuck Loch that has good scrub/swamp areas providing an important habitat for birds; the semi-improved upper River Ayr floodplain with scattered scrub, swamp and marsh; the mixed mature policy woodland around Glenbuck Home Farm which, although not botanically interesting, contributes to the habitat diversity of the site.

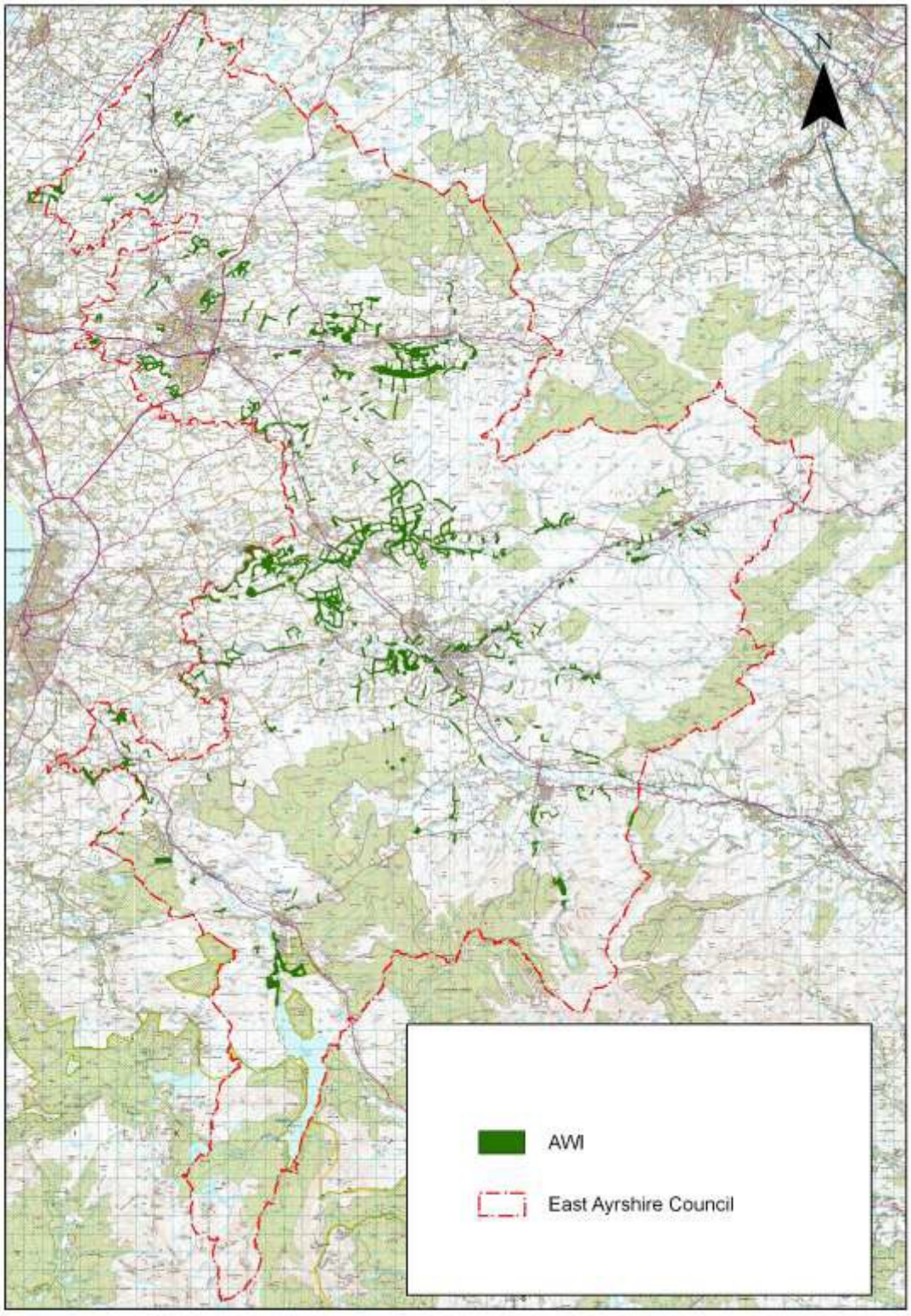
Glenmuir Water (Lugar to Kyle Castle)	Provisional WS	A variety of woodland habitats including semi-natural gorge woodland, old plantation, dense scrub and small patches of semi-improved pasture.
Glenmuirshaw	Provisional WS	Herb-rich grassland with wet patches and flushes.
Glenoul Burn, Logan Moss and Distinkhorn	Provisional WS	An extensive area of upland habitats, rich in wildlife generally and containing some scarce species of breeding birds.
Guelt	Provisional WS	A damp grassland site with a stream running down the middle.
Hillhouse and Water Plantation	Provisional WS	An area containing flooded old quarries and wetland habitats. Some bird interest.
Horsecleugh Glen Woodland	Provisional WS	A semi-natural woodland in a steep-sided glen. Dominated by ash and elm with some oak. Good structure and species diversity. Also includes scrub and semi-improved grassland with marshy patches.
Howcommon (Craigie Hill)	Provisional WS	A remnant area of upland grassland and scrub habitats. Wet areas are valuable for waterfowl.
Kames Hill Woodland	Provisional WS	On part of the Muirkirk Esker which is a interesting glacial feature of the River Ayr. Undisturbed old plantation with good regeneration, dead wood and good ground flora.
Kerse Loch	Provisional WS	A loch with small areas of swamp, willow carr and wet meadow. Some botanical interest.
Kirk Plantation	Provisional WS	Birch woodland on the site of a former conifer plantation. Acid ground flora of heather, blaeberry and wavy hair-grass. Managed as a Community Woodland.
Knockmade Moss and Glazert Burn	Provisional WS	Wetland associated with a remnant of raised bog and the headwater of a small watercourse. Four large patches of globeflower, a rare plant in Ayrshire, were found here in 1992. Botanical richness is apparent and there is abundant bird, invertebrate and amphibian life.
Knockshinnoch Lagoons SWT Reserve	Provisional WS	A haven for breeding and wintering birds. As a significant route between the Solway Firth and the Clyde, this Nith valley site attracts many migrant waders. A large part of the reserve is a level coal bing on which there is a good footpath through swaths of wildflowers and a birchwood.
Lanfine Estate	Provisional WS	An estate with areas of mature woodland and glens containing a variety of breeding and wintering birds, also with mammals and uncommon plants.
Loch Doon SSSI	Wildlife Site	The last known site in south-west Scotland for the Arctic charr. The Loch Doon fish are now thought to be a genetically distinct population. The loch is also the largest and best example of an oligotrophic (nutrient poor) water body in south Strathclyde.
Loudoun Castle Woods and Waterside	Provisional WS	An estate with high quality deciduous and mixed woodlands good for birds. Also has a wooden glen and a marsh area rich in aquatic life.
Loudoun Hill	Provisional WS	A volcanic plug with some interesting areas of herb-rich pasture, wet flushes, scree slopes and woodland.
Low Moss	Provisional WS	Raised bog which has suffered erosion from grazing but retains interesting species such as bog rosemary.
Lugar Loch Wetlands	Provisional WS	Various open water, swamp, mire, semi-improved grassland and scrub habitats of considerable botanical interest. There is ornithological interest too. The site is largely undisturbed and of artificial origin. Craigston Glen, with its scrub and grassland, is included.

Lugar Water (Holmhead to Braehead)	Provisional WS	Semi-natural woodland on steep valley sides plus old plantation and scrub along the Lugar Water (Cumnock to Lugar) and Bellow Water. There is some recreational use, particularly at Woodroad Park.
Lugar Water and Auchinleck Estate	Provisional WS	Semi-natural mixed deciduous woodland along the steep burn sides. Auchenleck Estate is old policy woodlands which include areas of semi-natural woodland and scrub, two wetlands and a semi-improved meadow.
Lugton Moss	Provisional WS	An area of rough grassland and marsh of value to breeding and wintering birds.
Mansfield, Garclaugh and Garepool Burn Woodlands	Provisional WS	Semi-natural gorge woodlands dominated by birch/alder with oak.
Marchouse Hill	Wildlife Site	Various blanket bog communities that include hare's-tail cotton-grass mire and a large area dominated by bog myrtle, wet modified bog, acid flush, acid grassland and marshy grassland. Has nesting golden plover and snipe.
Martnaham Fen and Snipe Loch	Provisional WS	Adjacent to Martnaham Loch and Wood SSSI comprising additional areas of botanical and ornithological interest. Contains fen, alder carr and ancient oak woodland.
Martnaham Loch and Wood SSSI	Wildlife Site	The loch, which is the most botanically diverse in the district, has extensive emergent reed-swamp. Ornithological interest on the loch is also significant. Martnaham Wood is one of the largest remaining oak woods in lowland Ayrshire. It is an ancient woodland site which is still dominated by oak and birch with abundant hazel in the understorey.
Martyre's Moss	Provisional WS	Blanket bog hemmed in by forestry and opencast workings. The moss has a good microform mosaic and extensive bog pool system.
Meiklie Mosside	Provisional WS	A raised bog which is largely wooded but still exhibiting good ground flora. Some bird interest.
Merkland Wood	Provisional WS	A semi-natural alder/birch woodlands which nestles in the gentle slopes of the Nith Valley adjacent to the floodplain. The ground is very wet.
Merrick Kells	Provisional WS	Upland habitat outside the SSSI boundary that exhibits a similar vegetation type at a lower altitude i.e. wet heath with patches of dry heath and acid grassland. Includes Craigfionn and Craigmawhannel.
Merrick Kells SSSI	Wildlife Site	The most extensive upland area in Galloway unaffected by afforestation. It contains the most important and varied system of patterned blanket mire in Britain and the only example of upland vegetation in South Scotland currently unmodified by grazing and burning. The site encompasses the Silver Flowe, the most southerly development of characteristic oceanic blanket mire vegetation. Important for breeding birds and invertebrates.
Montgreenan and Lugton Water	Provisional WS	A stretch of mature plantations and semi-natural woodlands which, together with the riverside habitats and policies, support mammals, birds and other animals as well as a rich ground-flora.
Muirkirk North Uplands	Provisional WS	Area of upland blanket mire with rare and valuable habitats and species outside Muirkirk Uplands SSSI. Important for upland breeding birds.
Muirkirk South Uplands	Provisional WS	Blanket bog, wet and dry heath and base-rich flushes outside Muirkirk Uplands SSSI. Important for birds and plants.

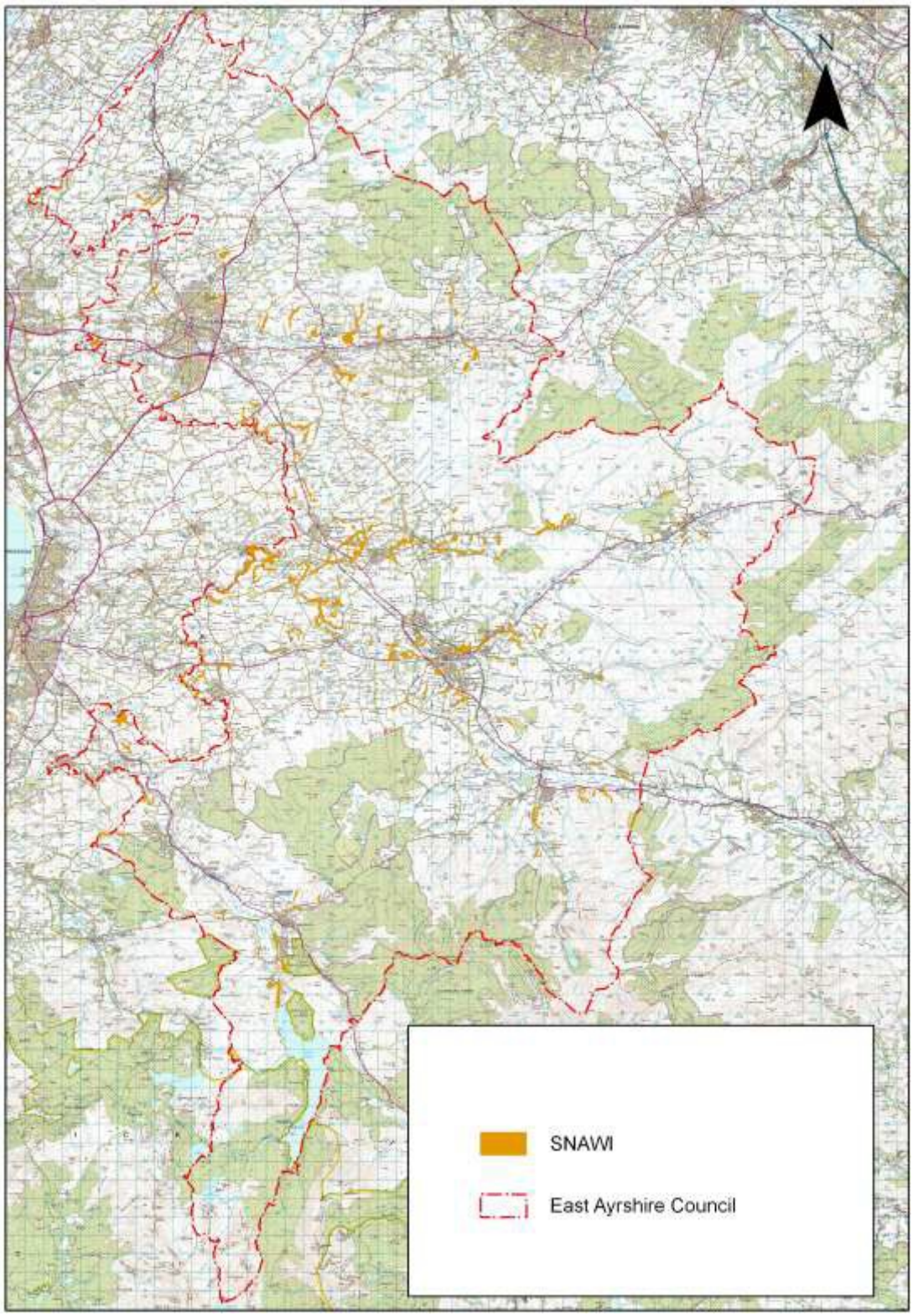
Muirkirk Uplands SSSI	Wildlife Site	Two adjacent upland areas (north and south of Muirkirk) and a low lying blanket bog (Airds Moss) in between. The vegetation across the area comprises the best example of upland habitat in south Strathclyde. The dominant habitats include blanket bog, wet and dry heath and acid grassland. Also provides breeding and foraging habitats for a diverse upland breeding bird community of national significance.
Ness Glen SSSI	Wildlife Site	A narrow, steep-sided ravine which is locally calcareous. Remnant gorge woodland dominated mainly by ash is found along the river, while on the upper, less steep slopes mixed woodland pre-dominates. Rich ground flora. Important for oceanic mosses/liverworts, epiphytic lichens and its breeding bird community.
Nether Wellwood Farm	Wildlife Site	Nether Wellwood Farm is a large area of bog and is part of the outstanding lowland blanket bog of Airds Moss. It is important for breeding birds, particularly raptors and waders. It is good for plants and has the locally rare great sundew and white-beaked sedge.
New Cumnock Wetlands	Provisional WS	Subsidence lagoons with open water, swamp, carr and mire habitats. On the floodplain of the River Nith which is an important migratory route for birds. Passage and breeding bird interest is high. Associated with Knockshinnoch Lagoons SWT Reserve.
Nith Bridge	Wildlife Site	This small site has very high habitat diversity and high plant diversity. Many of the habitats are diverse examples of their type. Three unusual habitat types are present: base-rich grassland, naturally occurring bird cherry dominated scrub and towering bare earth banks.
Nith Flood Plain	Provisional WS	This floodplain has been drained and improved but retains areas subject to periodic flooding which provides a good habitat for wildfowl and breeding waders.
North Craig Reservoir	Provisional WS	A disused, partially drained reservoir good for plants and birds.
Orchard Plantation and West Belvedere	Provisional WS	Old estate policies, species-rich and of educational value.
Oxenshaw Bridge	Provisional WS	A bank and meadow by the Cessnock Water. Fairly species-rich with a large number of greater butterfly orchid.
Pley Moss	Provisional WS	An acid wetland area with some botanical and entomological interest.
Polbaith Burn and Castlehill Glen	Provisional WS	A glen with good examples of semi-natural woodland of extensive floral diversity. Important for mammals and birds. Has waterfalls and other geographical features.
Rankinston Scrub	Provisional WS	A large area of dense hawthorn, blackthorn, gorse and willow scrub on the banks of the upper reaches of the Water of Coyle, and beside a disused railway with scattered birch and alder. Also includes a small area of undisturbed semi-natural oak/birch woodland.
Riccarton Moss	Provisional WS	A small remnant of raised bog habitat. Largely drained but of botanical value. The surrounding area, when flooded, is of ornithological interest.
Rigfoot/Lanemark Bogside Wetlands	Provisional WS	Remnant lowland bog, semi-improved grassland, marshy grassland, subsidence ponds, swamp, carr, marsh and some permanent pasture. It is generally good for wildlife, especially birds.
River Ayr (Damhead to Nether Heilar)	Provisional WS	River corridor woodland made up of a wide variety of semi-natural and planted types.
River Ayr (Mid Heilar to Chapelhouse)	Provisional WS	Predominantly semi-natural woodland of upland character. The Catrine to Sorn section is rich in fungi.
River Ayr (Stair to Barskimming)	Provisional WS	Extensive stretch of semi-natural riverine and old plantation woodlands with a rich ground flora including less common species. Also rich in mammals and invertebrates.

River Ayr Floodplain	Provisional WS	Various wetlands and associated scrub habitats.
River Ayr Gorge SSSI	Wildlife Site	A sandstone gorge containing one of the best examples of semi-natural deciduous woodland in the district. Important for invertebrates.
River Doon Woodland	Provisional WS	Semi-natural deciduous woodland on the steep banks of the river plus some policy woodland.
River Irvine Wetlands	Provisional WS	A complex of wet grassland, marsh, swamp and open water in the flood plain of the River Irvine.
Roberland and Swinzie Burn	Provisional WS	A valley with semi-natural woodland and grassland. Has plant, bird and mammal interest.
Rowallan Estate	Provisional WS	A mature, wooded estate with plant, mammal and bird interest.
Ryderston Belt	Provisional WS	A good variety of semi-natural habitats including herb-rich meadow with patches of acid grassland and marsh, thorn scrub, willow scrub and mature broadleaved woodland with a dense shrub layer. Possible bird interest.
Shankston Wood	Provisional WS	A mature oak woodland with a variety of other broadleaves including exotics. Has plant and bird interest.
Stair Wood/Dalmore Bank	Provisional WS	Semi-natural, plantation and scrub woodlands.
Templetonburn and Armsheugh	Provisional WS	A stretch of the River Irvine and two tributary valleys containing woodland and scrub habitats of value to breeding birds and mammals.
The Totheric	Provisional WS	A large, species-rich marsh residing in a natural hollow. The water table is at the surface in summer and there is an abundance of typical marsh plants with no single dominant.
Trabboch Wetlands	Provisional WS	Three small wetlands of which Trabboch Loch is the largest and most interesting botanically. Has bird interest.
Treesbank Estate	Provisional WS	This old estate contains mixed woodland habitats with a varied flora and abundant birdlife. Old pasture, marsh and regenerating woodland are also present.
Upper Lugton Water	Provisional WS	A good quality watercourse with some botanical interest along its banks. Has uncommon breeding birds.
Wallace Moor/Keirs Hill	Provisional WS	A small area of relatively unmodified blanket bog plus wet modified bog and wet heat/acid grassland mosaic, surrounded by *Molinia* dominated marshy grassland.
Water of Coyle/Drongan Wood	Provisional WS	The Water of Coyle has well-wooded steep valley sides including semi-natural, coppice, old plantation and scrub woodland types and a fairly well developed ground flora. Drongan Wood is a remnant of mature semi-natural woodland and consists of dense birch and willow.

Appendix 3 - Location of Ancient Woodland Inventory Sites (AWI)



Appendix 4. Location of Scottish Native and Ancient Woodland Inventory (SNAWI) sites



Appendix 5. List of all protected species in Scotland

Source: http://www.snh.gov.uk/docs/B551085.pdf

Protected species known to occur naturally in Scotland & their protection				
Taxon	**Current taxon name**	**Common name**	**Legislation giving protection**	**Schedule or Annex listing**
Reptile	Vipera berus	Adder	WCA 1981	Schedule 5 [1,4]
Fish	Alosa alosa	Allis shad	HR 1994	Schedule 3
Fish	Alosa alosa	Allis shad	WCA 1981	Schedule 5 [1,2,3]
Vascular Plant	Lychnis alpina	Alpine catchfly	WCA 1981	Schedule 8
Moss	Mielichhoferia mielichhoferi	Alpine copper-moss	WCA 1981	Schedule 8
Vascular Plant	Erigeron borealis	Alpine fleabane	WCA 1981	Schedule 8
Vascular Plant	Gentiana nivalis	Alpine gentian	WCA 1981	Schedule 8
Lichen	Pertusaria bryontha	Alpine moss-pertusaria	WCA 1981	Schedule 8
Vascular Plant	Arabis alpina	Alpine rock-cress	WCA 1981	Schedule 8
Vascular Plant	Cicerbita alpina	Alpine sow-thistle	WCA 1981	Schedule 8
Lichen	Alectona ochroleuca	Alpine sulphur-tresses	WCA 1981	Schedule 8
Vascular Plant	Woodsia alpina	Alpine woodsia	WCA 1981	Schedule 8
Lichen	Nephroma arcticum	Arctic kidney-lichen	WCA 1981	Schedule 8
Fish	Salmo salar (only in fresh water)	Atlantic salmon	HR 1994	Schedule 3
Crustacean	Austropotamobius pallipes	Atlantic stream (white-clawed) crayfish	WCA 1981	Schedule 5 [2,4]
Bird	Recurvirostra avosetta	Avocet	WCA 1981	Schedule 1 (Part I)
Mammal	Meles meles	Badger	PBA 1992	not applicable
Mammal	Meles meles	Badger	WCA 1981	Schedule 6
Moss	Sphagnum balticum	Baltic bog-moss	WCA 1981	Schedule 8
Fish	Barbus barbus	Barbel	HR 1994	Schedule 3
Bird	Tyto alba	Barn owl	WCA 1981	Schedule 1 (Part I)
Bird	Tyto alba	Barn owl	WCA 1981	Schedule 3 (Part I)
Fish	Cetorhinus maximus	Basking shark	WCA 1981	Schedule 5
Mammal	Plecotus auritus	Bat - Brown long-eared	HR 1994	Schedule 2: European protected species
Mammal	Plecotus auritus	Bat - Brown long-eared	WCA 1981	Schedule 6
Mammal	Pipistrellus pipistrellus	Bat - Common pipistrelle	HR 1994	Schedule 2: European protected species
Mammal	Pipistrellus pipistrellus	Bat - Common pipistrelle	WCA 1981	Schedule 6
Mammal	Myotis daubentonii	Bat - Daubenton's	HR 1994	Schedule 2: European protected species
Mammal	Myotis daubentonii	Bat - Daubenton's	WCA 1981	Schedule 6
Mammal	Nyctalus leisleri	Bat - Leisler's	HR 1994	Schedule 2: European protected species
Mammal	Nyctalus leisleri	Bat - Leisler's	WCA 1981	Schedule 6
Mammal	Pipistrellus nathusii	Bat - Nathsius' pipistrelle	HR 1994	Schedule 2: European protected species
Mammal	Pipistrellus nathusii	Bat - Nathsius' pipistrelle	WCA 1981	Schedule 6
Mammal	Nyctalus noctula	Bat - Noctule	HR 1994	Schedule 2: European protected species
Mammal	Nyctalus noctula	Bat - Noctule	WCA 1981	Schedule 6
Mammal	Pipistrellus pygmaeus	Bat - Soprano pipistrelle	HR 1994	Schedule 2: European protected species
Mammal	Pipistrellus pygmaeus	Bat - Soprano pipistrelle	WCA 1981	Schedule 6
Mammal	Myotis mystacinus	Bat - Whiskered	HR 1994	Schedule 2: European protected species
Mammal	Myotis mystacinus	Bat - Whiskered	WCA 1981	Schedule 6
Mammal	Vespertilionidae spp	Bats - All typical species	HR 1994	Schedule 2: European protected species
Mammal	Vespertilionidae spp	Bats - All typical species	WCA 1981	Schedule 6

Mammal	Erignathus barbatus	Bearded seal	HR 1994	Schedule 3
Bird	Panurus biarmicus	Bearded tit	WCA 1981	Schedule 1 (Part I)
Bird	Cygnus columbianus	Bewick's swan	WCA 1981	Schedule 1 (Part I)
Bird	Botaurus stellaris	Bittern	WCA 1981	Schedule 1 (Part I)
Bird	Phoenicurus ochrurus	Black redstart	WCA 1981	Schedule 1 (Part I)
Bird	Turdus merula	Blackbird	WCA 1981	Schedule 3 (Part I)
Bird	Podiceps nigricollis	Black-necked grebe	WCA 1981	Schedule 1 (Part I)
Bird	Limosa limosa	Black-tailed godwit	WCA 1981	Schedule 1 (Part I)
Bird	Gavia arctica	Black-throated diver	WCA 1981	Schedule 1 (Part I)
Moss	Saelania glaucescens	Blue dew-moss	WCA 1981	Schedule 8
Vascular Plant	Phyllodoce caerulea	Blue heath	WCA 1981	Schedule 8
Vascular Plant	Hyacinthoides non-scripta	Bluebell	WCA 1981	Schedule 8 [4]
Bird	Luscinia svecica	Bluethroat	WCA 1981	Schedule 1 (Part I)
Moss	Orthotrichum obtusifolium	Blunt-leaved bristle-moss	WCA 1981	Schedule 8
Moss	Grimmia unicolor	Blunt-leaved grimmia	WCA 1981	Schedule 8
Bird	Fringilla montifringilla	Brambling	WCA 1981	Schedule 1 (Part I)
Bird	Fringilla montifringilla	Brambling	WCA 1981	Schedule 3 (Part I)
Moss	Cyclodictyon laetevirens	Bright-green cave-moss	WCA 1981	Schedule 8
Bird	Pyrrhula pyrrhula	Bullfinch	WCA 1981	Schedule 3 (Part I)
Lichen	Fuscopannaria ignobilis	Caledonian pannaria	WCA 1981	Schedule 8
Bird	Branta canadensis	Canada goose	WCA 1981	Schedule 2
Bird	Tetrao urogallus	Capercaillie	WCA 1981	Schedule 1 (Part I)
Mammal	Tursiops truncatus	Cetacean - Bottlenose dolphin	HR 1994	Schedule 2: European protected species
Mammal	Tursiops truncatus	Cetacean - Bottlenose dolphin	WCA 1981	Schedule 6
Mammal	Delphinus delphis	Cetacean - Common dolphin	WCA 1981	Schedule 6
Mammal	Cetacea	Cetacean - Dolphins, porpoises and whales - All species	HR 1994	Schedule 2: European protected species
Mammal	Phocoena phocoena	Cetacean - Harbour or Common porpoise	HR 1994	Schedule 2: European protected species
Mammal	Phocoena phocoena	Cetacean - Harbour or Common porpoise	WCA 1981	Schedule 6
Bird	Fringilla coelebs	Chaffinch	WCA 1981	Schedule 3 (Part I)
Butterfly	Carterocephalus palaemon	Chequered skipper	WCA 1981	Schedule 5 [4]
Bird	Pyrrhocorax pyrrhocorax	Chough	WCA 1981	Schedule 1 (Part I)
Lichen	Lecanactis hemisphaerica	Churchyard lecanactis	WCA 1981	Schedule 8
Lichen	Heterodermia propagulifera	Collaroid rosette-lichen	WCA 1981	Schedule 8
Amphibian	Rana temporaria	Common frog	WCA 1981	Schedule 5 [4]
Bird	Melanitta nigra	Common scoter	WCA 1981	Schedule 1 (Part I)
Mammal	Phoca vitulina	Common seal	HR 1994	Schedule 3
Bird	Gallinago gallinago	Common snipe	WCA 1981	Schedule 2
Bird	Gallinago gallinago	Common snipe	WCA 1981	Schedule 3 (Part III)
Amphibian	Bufo bufo	Common toad	WCA 1981	Schedule 5 [4]
Bird	Fulica atra	Coot	WCA 1981	Schedule 2
Bird	Fulica atra	Coot	WCA 1981	Schedule 3 (Part III)
Bird	Crex crex	Corncrake	WCA 1981	Schedule 1 (Part I)
Bird	Parus cristatus	Crested tit	WCA 1981	Schedule 1 (Part I)
Bird	Loxia spp	Crossbills (all species)	WCA 1981	Schedule 1 (Part I)
Bird	Sylvia undata	Dartford warbler	WCA 1981	Schedule 1 (Part I)
Vascular Plant	Diapensia lapponica	Diapensia	WCA 1981	Schedule 8
Vascular Plant	Cystopteris dickieana	Dickie's bladder fern	WCA 1981	Schedule 8
Bird	Charadrius morinellus	Dotterel	WCA 1981	Schedule 1 (Part I)
Vascular Plant	Saxifraga cernua	Drooping saxifrage	WCA 1981	Schedule 8
Butterfly	Hamearis lucina	Duke of Burgundy fritillary	WCA 1981	Schedule 5 [4]
Vascular Plant	Gentianella uliginosa	Dune gentian	WCA 1981	Schedule 8
Bird	Prunella modularis	Dunnock	WCA 1981	Schedule 3 (Part I)

Vascular Plant	Eleocharis parvula	Dwarf spike-rush	WCA 1981	Schedule 8
Lichen	Peltigera lepidophora	Ear-lobed dog-lichen	WCA 1981	Schedule 8
Lichen	Gyalecta ulmi	Elm gyalecta	WCA 1981	Schedule 8
Mollusc	Atrina fragilis	Fan mussel	WCA 1981	Schedule 5 [1,2,4,5]
Vascular Plant	Melampyrum arvense	Field cow-wheat	WCA 1981	Schedule 8
Bird	Turdus pilaris	Fieldfare	WCA 1981	Schedule 1 (Part I)
Bird	Regulus ignicapillus	Firecrest	WCA 1981	Schedule 1 (Part I)
Lichen	Bryoria furcellata	Forked hair-lichen	WCA 1981	Schedule 8
Stonewort	Lamprothamnium papulosum	Foxtail stonewort	WCA 1981	Schedule 8
Mollusc	Margaritifera margaritifera	Freshwater pearl mussel	WCA 1981	Schedule 5
Bird	Anas strepera	Gadwall	WCA 1981	Schedule 2
Bird	Anas querquedula	Garganey	WCA 1981	Schedule 1 (Part I)
Lichen	Catolechia wahlenbergii	Goblin lights	WCA 1981	Schedule 8
Bird	Aquila chrysaetos	Golden eagle	WCA 1981	Schedule 1 (Part I)
Bird	Aquila chrysaetos	Golden eagle	WCA 1981	Schedule 4
Lichen	Teloschistes flavicans	Golden hair-lichen	WCA 1981	Schedule 8
Bird	Pluvialis apricaria	Golden plover	WCA 1981	Schedule 2
Bird	Pluvialis apricaria	Golden plover	WCA 1981	Schedule 3 (Part III)
Bird	Bucephala clangula	Goldeneye	WCA 1981	Schedule 1 (Part I)
Bird	Bucephala clangula	Goldeneye	WCA 1981	Schedule 1 (Part II)
Bird	Bucephala clangula	Goldeneye	WCA 1981	Schedule 2
Bird	Carduelis carduelis	Goldfinch	WCA 1981	Schedule 3 (Part I)
Bird	Accipter gentilis	Goshawk	WCA 1981	Schedule 1 (Part I)
Bird	Accipter gentilis	Goshawk	WCA 1981	Schedule 4
Vascular Plant	Lythrum hyssopifolia	Grass-poly	WCA 1981	Schedule 8
Fish	Thymallus thymallus	Grayling	HR 1994	Schedule 3
Amphibian	Triturus cristatus	Great crested newt	HR 1994	Schedule 2: European protected species
Bird	Gavia immer	Great Northern diver	WCA 1981	Schedule 1 (Part I)
Vascular Plant	Rhinanthus angustifolius	Greater yellow-rattle	WCA 1981	Schedule 8
Bird	Tringa ochropus	Green sandpiper	WCA 1981	Schedule 1 (Part I)
Moss	Buxbaumia viridis	Green shield-moss	WCA 1981	Schedule 8
Reptile	Chelonia mydas	Green turtle	HR 1994	Schedule 2: European protected species
Bird	Carduelis chloris	Greenfinch	WCA 1981	Schedule 3 (Part I)
Bird	Tringa nebularia	Greenshank	WCA 1981	Schedule 1 (Part I)
Mammal	Halichoerus grypus	Grey seal	HR 1994	Schedule 3
Bird	Anser anser	Greylag goose	WCA 1981	Schedule 1 (Part I in Outer Hebrides, Caithness & Sutherland and Wester Ross only)
Bird	Anser anser	Greylag goose	WCA 1981	Schedule 1 (Part II in Outer Hebrides, Caithness & Sutherland and Wester Ross only)
Bird	Anser anser	Greylag goose	WCA 1981	Schedule 2
Bird	Falco rusticolus	Gyr falcon	WCA 1981	Schedule 1 (Part I)
Mammal	Phoca groenlandica (otherwise known as Pagophilus groenlandicus)	Harp seal	HR 1994	Schedule 3
Bird	Circus spp	Harriers (all species)	WCA 1981	Schedule 1 (Part I)
Reptile	Eretmochelys imbricata	Hawksbill turtle	HR 1994	Schedule 2: European protected species
Mammal	Erinaceus europaeus	Hedgehog	WCA 1981	Schedule 6
Bird	Circus cyaneus	Hen harrier	WCA 1981	Schedule 1 (Part I)
Bird	Falco subbuteo	Hobby	WCA 1981	Schedule 1 (Part I)
Bird	Pernis apivorus	Honey buzzard	WCA 1981	Schedule 1 (Part I)

Bird	Pernis apivorus	Honey buzzard	WCA 1981	Schedule 4
Bird	Upupa epops	Hoopoe	WCA 1981	Schedule 1 (Part I)
Bird	Corvus monedula	Jackdaw	WCA 1981	Schedule 3 (Part I)
Bird	Garrulus glandarius	Jay	WCA 1981	Schedule 3 (Part I)
Reptile	Lepidochelys kempii	Kemp's ridley turtle	HR 1994	Schedule 2: European protected species
Vascular Plant	Trichomanes speciosum	Killarney fern	HR 1994	Schedule 4: European protected species
Bird	Alcedo atthis	Kingfisher	WCA 1981	Schedule 1 (Part I)
Bird	Calcarius lapponicus	Lapland bunting	WCA 1981	Schedule 1 (Part I)
Vascular Plant	Dactylorhiza traunsteineroides ssp lapponica	Lapland marsh-orchid	WCA 1981	Schedule 8
Butterfly	Coenonympha tullia	Large heath	WCA 1981	Schedule 5 [4]
Moss	Scorpidium turgescens	Large yellow feather-moss	WCA 1981	Schedule 8
Bird	Oceanodroma leucorhoa	Leach's petrel	WCA 1981	Schedule 1 (Part I)
Reptile	Dermochelys coriacea	Leatherback turtle	HR 1994	Schedule 2: European protected species
Liverwort	Adelanthus lindenbergianus	Lindenberg's leafy liverwort	WCA 1981	Schedule 8
Bird	Carduelis cannabina	Linnet	WCA 1981	Schedule 3 (Part I)
Bird	Larus minutus	Little gull	WCA 1981	Schedule 1 (Part I)
Bird	Charadrius dubius	Little ringed plover	WCA 1981	Schedule 1 (Part I)
Bird	Sterna albifrons	Little tern	WCA 1981	Schedule 1 (Part I)
Reptile	Caretta caretta	Loggerhead turtle	HR 1994	Schedule 2: European protected species
Moss	Anomodon longifolius	Long-leaved anomodon	WCA 1981	Schedule 8
Moss	Bryum neodamense	Long-leaved thread-moss	WCA 1981	Schedule 8
Bird	Clangula hyemalis	Long-tailed duck	WCA 1981	Schedule 1 (Part I)
Bird	Pica pica	Magpie	WCA 1981	Schedule 3 (Part I)
Bird	Anas platyrynchos	Mallard	WCA 1981	Schedule 2
Bird	Anas platyrynchos	Mallard	WCA 1981	Schedule 3 (Part III)
Liverwort	Jamesoniella undulifolia	Marsh earwort	WCA 1981	Schedule 8
Butterfly	Euphydryas aurinia	Marsh fritillary	WCA 1981	Schedule 5
Bird	Circus aeruginosus	Marsh harrier	WCA 1981	Schedule 1 (Part I)
Bird	Circus aeruginosus	Marsh harrier	WCA 1981	Schedule 4
Annelid worm	Hirudo medicinalis	Medicinal leech	WCA 1981	Schedule 5
Bird	Larus melanocephalus	Mediterranean gull	WCA 1981	Schedule 1 (Part I)
Bird	Falco columbarius	Merlin	WCA 1981	Schedule 1 (Part I)
Bird	Falco columbarius	Merlin	WCA 1981	Schedule 4
Bird	Circus pygargus	Montagu's harrier	WCA 1981	Schedule 1 (Part I)
Bird	Circus pygargus	Montagu's harrier	WCA 1981	Schedule 4
Bird	Gallinula chloropus	Moorhen	WCA 1981	Schedule 2
Mammal	Lepus timidus	Mountain hare	HR 1994	Schedule 3
Butterfly	Erebia epiphron	Mountain ringlet	WCA 1981	Schedule 5 [4]
Amphibian	Bufo calamita	Natterjack toad	HR 1994	Schedule 2: European protected species
Liverwort	Leiocolea rutheana	Norfolk flapwort	WCA 1981	Schedule 8
Butterfly	Aricia artaxerxes	Northern brown argus	WCA 1981	Schedule 5 [4]
Mollusc	Thyasira gouldi	Northern hatchet-shell	WCA 1981	Schedule 5
Vascular Plant	Hieracium northroense	Northroe hawkweed	WCA 1981	Schedule 8
Vascular Plant	Arenaria norvegica	Norwegian sandwort	WCA 1981	Schedule 8
Fungi	Pitsoporus quercinus	Oak polypore	WCA 1981	Schedule 8
Vascular Plant	Woodsia ilvensis	Oblong woodsia	WCA 1981	Schedule 8
Lichen	Parmentaria chilensis	Oil-stain parmentaria	WCA 1981	Schedule 8
Lichen	Caloplaca luteoalba	Orange-fruited elm-lichen	WCA 1981	Schedule 8
Bird	Pandion haliaetus	Osprey	WCA 1981	Schedule 1 (Part I)
Bird	Pandion haliaetus	Osprey	WCA 1981	Schedule 4

Mammal	Lutra lutra	Otter	HR 1994	Schedule 2: European protected species
Mammal	Lutra lutra	Otter	WCA 1981	Schedule 6
Amphibian	Triturus helveticus	Palmate newt	WCA 1981	Schedule 5 [4]
Butterfly	Boloria euphrosyne	Pearl-bordered fritillary	WCA 1981	Schedule 5 [4]
Bird	Falco perigrinus	Peregrine falcon	WCA 1981	Schedule 1 (Part I)
Bird	Falco perigrinus	Peregrine falcon	WCA 1981	Schedule 4
Liverwort	Petalophyllum ralfsii	Petalwort	WCA 1981	Schedule 8
Vascular Plant	Crassula aquatica	Pigmyweed	WCA 1981	Schedule 8
Mammal	Martes martes	Pine marten	HR 1994	Schedule 3
Mammal	Martes martes	Pine marten	WCA 1981	Schedule 5
Mammal	Martes martes	Pine marten	WCA 1981	Schedule 6
Bird	Anser brachyrhynchus	Pink-footed goose	WCA 1981	Schedule 2
Bird	Anas acuta	Pintail	WCA 1981	Schedule 1 (Part I)
Bird	Anas acuta	Pintail	WCA 1981	Schedule 1 (Part II)
Bird	Anas acuta	Pintail	WCA 1981	Schedule 2
Bird	Anas acuta	Pintail	WCA 1981	Schedule 3 (Part III)
Bird	Aythya ferina	Pochard	WCA 1981	Schedule 2
Bird	Aythya ferina	Pochard	WCA 1981	Schedule 3 (Part III)
Liverwort	Gymnomitrion apiculatum	Pointed frostwort	WCA 1981	Schedule 8
Moss	Hygrohypnum polare	Polar feather-moss	WCA 1981	Schedule 8
Mammal	Mustela putorius (otherwise known as Putorius putorius)	Polecat	HR 1994	Schedule 3
Vascular Plant	Homogyne alpina	Purple colts-foot	WCA 1981	Schedule 8
Bird	Ardea purpurea	Purple heron	WCA 1981	Schedule 1 (Part I)
Bird	Calidris maritima	Purple sandpiper	WCA 1981	Schedule 1 (Part I)
Bird	Coturnix coturnix	Quail	WCA 1981	Schedule 1 (Part I)
Lichen	Pseudocyphellaria lacerata	Ragged pseudocyphellaria	WCA 1981	Schedule 8
Bird	Milvus milvus	Red kite	WCA 1981	Schedule 1 (Part I)
Mammal	Sciurus vulgaris	Red squirrel	WCA 1981	Schedule 5
Mammal	Sciurus vulgaris	Red squirrel	WCA 1981	Schedule 6
Bird	Lanius collurio	Red-backed shrike	WCA 1981	Schedule 1 (Part I)
Bird	Phalaropus lobatus	Red-necked phalarope	WCA 1981	Schedule 1 (Part I)
Bird	Carduelis flammea	Redpoll	WCA 1981	Schedule 3 (Part I)
Bird	Gavia stellata	Red-throated diver	WCA 1981	Schedule 1 (Part I)
Bird	Turdus illiacus	Redwing	WCA 1981	Schedule 1 (Part I)
Bird	Emberiza schoeniclus	Reed bunting	WCA 1981	Schedule 3 (Part I)
Mammal	Phoca hispida (otherwise known as Pusa hispida)	Ringed seal	HR 1994	Schedule 3
Lichen	Collema dichotomum	River jelly-lichen	WCA 1981	Schedule 8
Fish	Lampetra fluviatilis	River lamprey	HR 1994	Schedule 3
Vascular Plant	Potentilla rupestris	Rock cinquefoil	WCA 1981	Schedule 8
Bird	Sterna dougallii	Roseate tern	WCA 1981	Schedule 1 (Part I)
Bird	Carpodacus erythrinus	Rosefinch	WCA 1981	Schedule 1 (Part I)
Vascular Plant	Althaea hirsuta	Rough marsh-mallow	WCA 1981	Schedule 8
Bird	Philomachus pugnax	Ruff	WCA 1981	Schedule 1 (Part I)
Lichen	Psora rubiformis	Rusty alpine spora	WCA 1981	Schedule 8
Bird	Aythya marila	Scaup	WCA 1981	Schedule 1 (Part I)
Moss	Bryum schleicheri	Schleicher's thread-moss	WCA 1981	Schedule 8
Bird	Serinus serinus	Serin	WCA 1981	Schedule 1 (Part I)
Vascular Plant	Hieracium zetlandicum	Shetland hawkweed	WCA 1981	Schedule 8
Bird	Eremophila alpestris	Shore lark	WCA 1981	Schedule 1 (Part I)
Bird	Anas clypeata	Shoveler	WCA 1981	Schedule 2
Bird	Anas clypeata	Shoveler	WCA 1981	Schedule 3 (Part III)
Mammal	Sorex spp	Shrews (all species)	WCA 1981	Schedule 6
Bird	Carduelis spinus	Siskin	WCA 1981	Schedule 3 (Part I)

Bird	Podiceps auritus	Slavonian grebe	WCA 1981	Schedule 1 (Part I)
Moss	Hamatocaulis (Drepanocladus) vernicosus	Slender green feather-moss	WCA 1981	Schedule 8
Vascular Plant	Najas flexilis	Slender naiad	HR 1994	Schedule 4: European protected species
Moth	Zygaena loti scotica	Slender Scotch burnet	WCA 1981	Schedule 5 [3]
Reptile	Anguis fragilis	Slow Worm	WCA 1981	Schedule 5 [1, 4]
Vascular Plant	Alyssum alyssoides	Small Alison	WCA 1981	Schedule 8
Butterfly	Cupido minimus	Small blue	WCA 1981	Schedule 5 [4]
Vascular Plant	Pulicaria vulgaris	Small fleabane	WCA 1981	Schedule 8
Vascular Plant	Ononis reclinata	Small restharrow	WCA 1981	Schedule 8
Amphibian	Triturus vulgaris	Smooth newt	WCA 1981	Schedule 5 [4]
Bird	Plectrophenax nivalis	Snow bunting	WCA 1981	Schedule 1 (Part I)
Lichen	Caloplaca nivalis	Snow caloplaca	WCA 1981	Schedule 8
Bird	Nyctea scandiaca	Snowy owl	WCA 1981	Schedule 1 (Part I)
Bird	Turdus philomelos	Song thrush	WCA 1981	Schedule 3 (Part I)
Bird	Platalea leucorodea	Spoonbill	WCA 1981	Schedule 1 (Part I)
Bird	Porzana porzana	Spotted crake	WCA 1981	Schedule 1 (Part I)
Bird	Sturnus vulgaris	Starling	WCA 1981	Schedule 3 (Part I)
Vascular Plant	Chenopodium vulvaria	Stinking goosefoot	WCA 1981	Schedule 8
Fish	Acipenser sturio	Sturgeon	HR 1994	Schedule 2: European protected species
Moth	Zygaena lonicerae jocelynae	Talisker burnet	WCA 1981	Schedule 5 [3]
Lichen	Lecanora achariana	Tarn lecanora	WCA 1981	Schedule 8
Bird	Anas crecca	Teal	WCA 1981	Schedule 2
Bird	Anas crecca	Teal	WCA 1981	Schedule 3 (Part III)
Bird	Calidris temminckii	Temminck's stint	WCA 1981	Schedule 1 (Part I)
Lichen	Catapyrenium psoromoides	Tree catapyrenium	WCA 1981	Schedule 8
Bird	Aythya fuligula	Tufted duck	WCA 1981	Schedule 2
Bird	Aythya fuligula	Tufted duck	WCA 1981	Schedule 3 (Part III)
Vascular Plant	Saxifraga cespitosa	Tufted saxifrage	WCA 1981	Schedule 8
Liverwort	Geocalyx graveolens	Turpswort	WCA 1981	Schedule 8
Fish	Alosa fallax	Twaite shad	HR 1994	Schedule 3
Fish	Alosa fallax	Twaite shad	WCA 1981	Schedule 5 [3]
Bird	Carduelis flavirostris	Twite	WCA 1981	Schedule 3 (Part I)
Lichen	Cladonia trasii	Upright mountain-cladonia	WCA 1981	Schedule 8
Moss	Hypnum vaucheri	Vaucher's feather-moss	WCA 1981	Schedule 8
Bird	Melanitta fusca	Velvet scoter	WCA 1981	Schedule 1 (Part I)
Fish	Coregonus albula	Vendace	HR 1994	Schedule 3
Fish	Coregonus albula	Vendace	WCA 1981	Schedule 5
Reptile	Zootoca vivipara	Viviparous lizard	WCA 1981	Schedule 5 [1, 4]
Mammal	Arvicola terrestris	Water vole	WCA 1981	Schedule 5 [3, 5]
Vascular Plant	Hieracium attenuatifolium	Weak-leaved hawkweed	WCA 1981	Schedule 8
Bird	Numenius phaeopus	Whimbrel	WCA 1981	Schedule 1 (Part I)
Bird	Gavia adamsii	White-billed diver	WCA 1981	Schedule 1 (Part I)
Fish	Coregonus lavaretus	Whitefish	HR 1994	Schedule 3
Fish	Coregonus lavaretus	Whitefish	WCA 1981	Schedule 5
Bird	Anser albifrons	White-fronted goose	WCA 1981	Schedule 2
Bird	Haliaeetus albicilla	White-tailed eagle	WCA 1981	Schedule 1 (Part I)
Bird	Haliaeetus albicilla	White-tailed eagle	WCA 1981	Schedule 1A
Bird	Haliaeetus albicilla	White-tailed eagle	WCA 1981	Schedule 4
Bird	Haliaeetus albicilla	White-tailed eagle	WCA 1981	Schedule A1
Bird	Cygnus cygnus	Whooper swan	WCA 1981	Schedule 1 (Part I)
Vascular Plant	Polygonatum verticillatum	Whorled Solomon's-seal	WCA 1981	Schedule 8
Bird	Anas penelope	Wigeon	WCA 1981	Schedule 2

Bird	Anas penelope	Wigeon	WCA 1981	Schedule 3 (Part III)
Mammal	Felis silvestris	Wildcat	HR 1994	Schedule 2: European protected species
Mammal	Felis silvestris	Wildcat	WCA 1981	Schedule 6
Bird	Tringa glareola	Wood sandpiper	WCA 1981	Schedule 1 (Part I)
Bird	Scolopax rusticola	Woodcock	WCA 1981	Schedule 2
Bird	Scolopax rusticola	Woodcock	WCA 1981	Schedule 3 (Part III)
Bird	Columba palumbus	Woodpigeon	WCA 1981	Schedule 3 (Part II)
Bird	Jynx torquilla	Wryneck	WCA 1981	Schedule 1 (Part I)
Vascular Plant	Saxifraga hirculus	Yellow marsh saxifrage	HR 1994	Schedule 4: European protected species
Bird	Emberiza citrinella	Yellowhammer	WCA 1981	Schedule 3 (Part I)
Vascular Plant	Epipactis youngiana	Young's helleborine	WCA 1981	Schedule 8

Key

WCA 1981	Wildlife & Countryside Act 1981 (as amended in Scotland)	
	Schedule 1 (Part I)	Birds protected by special penalities
	Schedule 1 (Part II)	Birds protected by special penalities during the closed season
	Schedule 1A	Birds that may not be intentionally or recklessly harassed at any time
	Schedule A1	Birds whose habitually used nests may not be intentionally or recklessly damaged, destroyed or otherwise interfered with when not in use
	Schedule 2	Birds which may be killed or taken outside the closed season
	Schedule 3 (Part I)	Birds which may be sold at all times if ringed and kept in captivity
	Schedule 3 (Part II)	Birds that may be sold dead at all times
	Schedule 3 (Part III)	Birds that may be sold dead from 1 September to 28 February
	Schedule 4	Birds that must be registered and ringed if kept in captivity
	Schedule 5	Protected animals
	Schedule 6	Animals protected from prohibited methods of capture
	Schedule 8	Protected plants
HR 1994	Habitats Regulations 1994 (as amended in Scotland)	
PBA 1992	Protection of Badgers Act 1992	

[1] Protected against killing and injuring
[2] Protected against taking
[3] Protected against damage to, destruction of, obstruction of access to any structure or place used for shelter or protection. Also protected against disturbance whilst occupying such structures.
[4] Protected against selling, offering or advertising for sale, possessing or transporting for the purpose of sale
[5] Protected against possession or control (live or dead animal, part or derivative)
[p] Proposed for full protection
[#] Protected in England & Wales only (a species believed to have been introduced to Scotland)
[*] The locations in Scotland where these species are currently known to exist are believed to be the results of introductions and therefore the provisions of the Habitats Directive are considered not to apply to them

Appendix 6. List of Ayrshire Flora

All 1224 recorded taxa for Ayrshire - Vice County 75
Native - *Neophyte* - Archaeophyte - Casual*

-
- *Acer campestre (199199)*
- *Acer platanoides (199199)*
- *Acer pseudoplatanus (199199)*
- ***Achillea millefolium** (199199)*
- ***Achillea ptarmica** (199199)*
- *Aconitum lycoctonum subsp. vulparia (199761)*
- *Aconitum x cammarum (972389)*
- *Acorus calamus* (976076)*
- *Adonis annua (199669)*
- ***Adoxa moschatellina** (199199)*
- *Aegopodium podagraria (199199)*
- *Aesculus hippocastanum (972524)*
- ***Aethusa cynapium subsp. cynapium** (972524)*
- ***Agrimonia eupatoria** (199199)*
- ***Agrimonia procera** (199670)*
- *Agrostemma githago (972531)*
- ***Agrostis capillaris** (199199)*
- *Agrostis scabra (199671)*
- ***Agrostis stolonifera** (199199)*
- ***Agrostis vinealis** (199199)*
- ***Aira caryophyllea** (972524)*
- ***Aira praecox** (972524)*
- ***Ajuga reptans** (199199)*
- ***Alchemilla filicaulis subsp. vestita** (199199)*
- ***Alchemilla glabra** (199199)*
- *Alchemilla mollis (972524)*
- ***Alchemilla xanthochlora** (199199)*
- ***Alisma lanceolatum** (972310)*
- ***Alisma plantago-aquatica** (199199)*
- ***Alliaria petiolata** (972524)*
- *Allium carinatum (972527)*
- *Allium paradoxum (972524)*
- *Allium schoenoprasum* (972524)*
- ***Allium scorodoprasum** (976076)*
- ***Allium ursinum** (972311)*
- ***Allium vineale** (199199)*
- ***Alnus glutinosa** (199199)*
- ***Alopecurus geniculatus** (199199)*
- *Alopecurus myosuroides (976076)*
- ***Alopecurus pratensis***
- ***Filipendula vulgaris (972297)***
- ***Fragaria ananassa (972524)***
- ***Fragaria moschata (972524)***
- ***Fragaria vesca (199199)***
- ***Frangula alnus (972524)***
- ***Fraxinus excelsior (199199)***
- ***Fuchsia magellanica (972524)***
- ***Fumaria capreolata subsp. babingtonii (972344)***
- ***Fumaria muralis (972524)***
- ***Fumaria officinalis subsp. officinalis (972524)***
- ***Fumaria officinalis subsp. wirtgenii (972275)***
- ***Gagea lutea (972218)***
- ***Galanthus nivalis (199199)***
- ***Galeopsis bifida (972529)***
- ***Galeopsis speciosa (972524)***
- ***Galeopsis tetrahit (199199)***
- ***Galinsoga parviflora (199199)***
- ***Galinsoga quadriradiata (199199)***
- ***Galium aparine (199199)***
- ***Galium boreale (972524)***
- ***Galium mollugo (972524)***
- ***Galium odoratum (199199)***
- ***Galium palustre subsp. palustre (199199)***
- ***Galium saxatile (199199)***
- ***Galium spurium* (972550)***
- ***Galium sterneri (199199)***
- ***Galium tricornutum* (972550)***
- ***Galium uliginosum (972524)***
- ***Galium verum (199199)***
- ***Galium x pomeranicum (199199)***
- ***Gaultheria shallon (199199)***
- ***Gentianella campestris (972524)***
- ***Geranium columbinum (976076)***
- ***Geranium dissectum (972524)***
- ***Geranium endressii (972524)***
- ***Geranium lucidum (199199)***
- ***Geranium molle (199199)***
- ***Geranium phaeum (972524)***
- ***Geranium pratense (199199)***
- ***Geranium pusillum (972295)***
- ***Geranium pyrenaicum* (199199)***
- ***Geranium robertianum (199199)***
- ***Potentilla anglica (972311)***
- ***Potentilla anserina (199199)***
- ***Potentilla erecta subsp. erecta (199199)***
- ***Potentilla norvegica (199199)***
- ***Potentilla palustris (199199)***
- ***Potentilla reptans (972524)***
- ***Potentilla sterilis (199199)***
- ***Potentilla x suberecta (199199)***
- ***Primula veris (972524)***
- ***Primula vulgaris (199199)***
- ***Prunella vulgaris (199199)***
- ***Prunus avium (199199)***
- ***Prunus domestica (199199)***
- ***Prunus padus (199199)***
- ***Prunus spinosa (199199)***
- ***Pseudorchis albida (972524)***
- ***Pteridium aquilinum subsp. aquilinum (199199)***
- ***Puccinellia distans subsp. distans (199199)***
- ***Puccinellia maritima (972527)***
- ***Pulicaria dysenterica (199199)***
- ***Pulmonaria officinalis (199199)***
- ***Pyrola media (972428)***
- ***Pyrola minor (972526)***
- ***Pyrola rotundifolia subsp. rotundifolia (972543)***
- ***Quercus petraea (972524)***
- ***Quercus robur (199199)***
- ***Quercus x rosacea (199199)***
- ***Radiola linoides (972340)***
- ***Ranunculus acris (199199)***
- ***Ranunculus aquatilis (972524)***
- ***Ranunculus arvensis (972579)***
- ***Ranunculus auricomus (972526)***
- ***Ranunculus baudotii (199199)***
- ***Ranunculus bulbosus (199199)***
- ***Ranunculus ficaria subsp. bulbilifer (199199)***
- ***Ranunculus ficaria subsp. ficaria (199199)***
- ***Ranunculus flammula subsp. flammula (199199)***
- ***Ranunculus hederaceus (972524)***
- ***Ranunculus lingua (972310)***
- ***Ranunculus omiophyllus (972524)***
- ***Ranunculus peltatus (972340)***
- ***Ranunculus repens (199199)***
- ***Ranunculus sardous* (972376)***
- ***Ranunculus sceleratus (972527)***

(199199)
- Alstroemeria aurea (972524)
- Ambrosia psilostachya (972536)
- Ammi majus* (972427)
- **Ammophila arenaria** (199199)
- **Anagallis arvensis subsp. arvensis** (972530)
- **Anagallis minima** (976076)
- **Anagallis tenella** (972524)
- Anchusa arvensis (972524)
- **Andromeda polifolia** (972524)
- **Anemone nemorosa** (199199)
- **Angelica sylvestris** (199199)
- Anisantha sterilis (972524)
- **Antennaria dioica** (972311)
- Anthemis arvensis (976076)
- **Anthoxanthum odoratum** (199199)
- Anthriscus caucalis* (976076)
- Anthriscus cerefolium (199672)
- **Anthriscus sylvestris** (199199)
- **Anthyllis vulneraria subsp. lapponica** (972300)
- **Anthyllis vulneraria subsp. vulneraria** (199199)
- **Aphanes arvensis** (199199)
- **Aphanes australis** (972524)
- **Apium inundatum** (972524)
- Aquilegia vulgaris (976076)
- **Arabidopsis thaliana** (199199)
- **Arabis hirsuta** (976076)
- **Arctium nemorosum** (199199)
- Aremonia agrimonioides (972524)
- Arenaria balearica (972546)
- **Arenaria serpyllifolia** (972524)
- Arisarum proboscideum (972428)
- **Armeria maritima subsp. maritima** (199199)
- Armoracia rusticana (199199)
- **Arrhenatherum elatius** (199199)
- Artemisia absinthium (972524)
- Artemisia stelleriana (972377)
- Artemisia vulgaris (199199)
- Arum italicum subsp. italicum (199673)
- Arum maculatum (199199)
- Asarum europaeum (972544)
- Asperugo procumbens* (972579)
- **Asplenium adiantum-nigrum** (972524)
- **Geranium sanguineum (972311)**
- **Geranium sylvaticum (972524)**
- **Geum macrophyllum (972524)**
- **Geum rivale (199199)**
- **Geum urbanum (199199)**
- **Geum x intermedium (199199)**
- **Glaucium flavum (976076)**
- **Glaux maritima (199199)**
- **Glechoma hederacea (199199)**
- **Glyceria declinata (199199)**
- **Glyceria fluitans (199199)**
- **Glyceria maxima (972310)**
- **Gnaphalium sylvaticum (972389)**
- **Gnaphalium uliginosum (199199)**
- **Goodyera repens (199199)**
- **Groenlandia densa (972490)**
- **Gunnera tinctoria (972376)**
- **Gymnadenia conopsea (972524)**
- **Gymnocarpium dryopteris (199199)**
- **Hammarbya paludosa (972524)**
- **Hebe x franciscana (199199)**
- **Hedera helix subsp. helix (199199)**
- **Hedera helix subsp. hibernica (972524)**
- **Helianthemum nummularium (199199)**
- **Helianthus annuus (199199)**
- **Helianthus x laetiflorus (972524)**
- **Helictotrichon pratense (199199)**
- **Helictotrichon pubescens (199199)**
- **Helleborus viridis subsp. occidentalis* (976076)**
- **Hemerocallis fulva (972524)**
- **Hemerocallis lilioasphodelus (199199)**
- **Heracleum mantegazzianum (199199)**
- **Heracleum sphondylium subsp. sphondylium (199199)**
- **Heracleum sphondylium x mantegazzianum (972297)**
- **Hesperis matronalis (972524)**
- **Hieracium anglicum (972328)**
- **Hieracium argenteum (972328)**
- **Hieracium caledonicum (972328)**
- **Raphanus raphanistrum subsp. maritimus (199199)**
- **Raphanus raphanistrum subsp. raphanistrum (972524)**
- **Rapistrum rugosum subsp. linnaeanum (199678)**
- **Reseda alba (972541)**
- **Reseda lutea (972524)**
- **Reseda luteola (972524)**
- **Rheum x hybridum (972524)**
- **Rhinanthus minor (199199)**
- **Rhododendron ponticum (199199)**
- **Rhynchospora alba (972531)**
- **Ribes alpinum (199199)**
- **Ribes nigrum (199199)**
- **Ribes rubrum (199199)**
- **Ribes uva-crispa (972524)**
- **Rorippa amphibia (972529)**
- **Rorippa microphylla (972524)**
- **Rorippa nasturtium-aquaticum (199199)**
- **Rorippa palustris (199199)**
- **Rorippa sylvestris (972524)**
- **Rorippa x anceps (972537)**
- **Rorippa x sterilis (199199)**
- **Rosa arvensis (972310)**
- **Rosa caesia subsp. caesia (199199)**
- **Rosa caesia subsp. vosagiaca (972524)**
- **Rosa canina (972524)**
- **Rosa 'Hollandica' (199199)**
- **Rosa mollis (972375)**
- **Rosa rubiginosa (972524)**
- **Rosa rugosa (972524)**
- **Rosa sherardii (972524)**
- **Rosa spinosissima (199199)**
- **Rosa x sabinii (972458)**
- **Rubus armeniacus (200200)**
- **Rubus armipotens (200200)**
- **Rubus cardiophyllus (200200)**
- **Rubus chamaemorus (972524)**
- **Rubus dasyphyllus (972524)**
- **Rubus drejeri (200200)**
- **Rubus dumnoniensis (200200)**
- **Rubus elegantispinosus (972524)**
- **Rubus errabundus (199705)**
- **Rubus fissus (200200)**
- **Rubus furvicolor (972524)**
- **Rubus hebridensis (199705)**
- **Rubus idaeus (199199)**
- **Rubus infestus (200200)**
- **Rubus laciniatus (200200)**
- **Rubus lanaticaulis (200200)**
- **Rubus latifolius (200200)**
- **Rubus leptothyrsos (200200)**
- **Rubus lindebergii (200200)**
- **Rubus lindleianus (200200)**

- ***Asplenium marinum*** *(972311)*
- ***Asplenium ruta-muraria*** *(199199)*
- ***Asplenium trichomanes subsp. quadrivalens*** *(199199)*
- ***Asplenium trichomanes subsp. trichomanes*** *(972218)*
- ***Asplenium viride*** *(972524)*
- *Aster lanceolatus (199199)*
- *Aster novi-belgii (972524)*
- ***Aster tripolium*** *(972527)*
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- **Taraxacum croceiflorum (199635)**
- **Taraxacum dahlstedtii (199635)**
- **Taraxacum degelii (199635)**
- **Taraxacum drucei (199635)**
- **Taraxacum duplidentifrons (199635)**
- **Taraxacum ekmanii (199635)**
- **Taraxacum euryphyllum (199635)**
- **Taraxacum faeroense (199635)**
- **Taraxacum fulviforme (199635)**
- **Taraxacum gelertii (199635)**
- **Taraxacum glauciniforme (199635)**
- **Taraxacum haematicum (199635)**
- **Taraxacum hamatum (199635)**
- **Taraxacum haworthianum (199635)**
- **Taraxacum huelphersianum (199635)**
- **Taraxacum insigne (199635)**
- **Taraxacum lacistophyllum (199635)**
- **Taraxacum landmarkii (199635)**
- **Taraxacum laticordatum (199635)**
- **Taraxacum lingulatum**

- ***Clinopodium vulgare*** *(976076)*
- ***Cochlearia danica*** *(972294)*
- ***Cochlearia officinalis subsp. officinalis*** *(199199)*
- ***Cochlearia pyrenaica subsp. alpina*** *(199674)*
- ***Coeloglossum viride*** *(972524)*
- ***Coincya monensis subsp. monensis*** *(972527)*
- *Conium maculatum (972524)*
- ***Conopodium majus*** *(199199)*
- *Convallaria majalis (976076)*
- ***Convolvulus arvensis*** *(972524)*
- ***Corallorhiza trifida*** *(972524)*
- *Coronopus didymus* (972532)*
- *Coronopus squamatus (199199)*
- ***Corylus avellana*** *(199199)*
- *Cotoneaster bullatus (972376)*
- *Cotoneaster horizontalis (972532)*
- *Cotoneaster simonsii (972524)*
- ***Crambe maritima*** *(972376)*
- ***Crataegus monogyna*** *(199199)*
- ***Crepis capillaris*** *(199199)*
- ***Crepis paludosa*** *(199199)*
- ***Crithmum maritimum*** *(972337)*
- *Crocosmia paniculata (972524)*
- *Crocosmia pottsii (199199)*
- *Crocosmia x crocosmiiflora (199199)*
- ***Cruciata laevipes*** *(972524)*
- ***Cryptogramma crispa*** *(199199)*
- *Cuscuta campestris* (972538)*
- *Cymbalaria muralis subsp. muralis (199199)*
- *Cymbalaria pallida (199199)*
- ***Cynosurus cristatus*** *(199199)*
- ***Cystopteris fragilis*** *(972524)*
- ***Cytisus scoparius subsp. scoparius*** *(199199)*
- ***Dactylis glomerata*** *(199199)*
- ***Dactylorhiza fuchsii*** *(972524)*
- ***Dactylorhiza incarnata subsp. incarnata*** *(199199)*
- ***Dactylorhiza incarnata subsp. pulchella*** *(972490)*
- ***Dactylorhiza maculata subsp. ericetorum*** *(972524)*
- ***Dactylorhiza purpurella subsp. purpurella*** *(972524)*
- ***Dactylorhiza x venusta*** *(199199)*
- ***Danthonia decumbens (972340)***
- ***Medicago sativa subsp. falcata (972524)***
- ***Melampyrum pratense subsp. pratense (972526)***
- ***Melica nutans (972526)***
- ***Melica uniflora (199199)***
- ***Melilotus albus* (972524)***
- ***Melilotus altissimus (972294)***
- ***Melilotus indicus* (972579)***
- ***Melilotus officinalis* (972524)***
- ***Mentha aquatica (199199)***
- ***Mentha arvensis (199199)***
- ***Mentha spicata (199199)***
- ***Mentha x verticillata (972524)***
- ***Mentha x villosa (972524)***
- ***Menyanthes trifoliata (199199)***
- ***Mercurialis annua (972542)***
- ***Mercurialis perennis (199199)***
- ***Mertensia maritima (972262)***
- ***Meum athamanticum (972524)***
- ***Milium effusum (972526)***
- ***Mimulus guttatus (199199)***
- ***Mimulus moschatus (972217)***
- ***Mimulus moschatus* (972524)***
- ***Mimulus x robertsii (972281)***
- ***Minuartia verna (972337)***
- ***Moehringia trinervia (199199)***
- ***Molinia caerulea subsp. caerulea (199199)***
- ***Montia fontana (199199)***
- ***Montia fontana subsp. variabilis (199219)***
- ***Mycelis muralis (976076)***
- ***Myosotis arvensis (199199)***
- ***Myosotis discolor (972524)***
- ***Myosotis laxa subsp. caespitosa (972524)***
- ***Myosotis ramosissima (972340)***
- ***Myosotis scorpioides (199199)***
- ***Myosotis secunda (972524)***
- ***Myrica gale (972529)***
- ***Myriophyllum alterniflorum (972533)***
- ***Myriophyllum spicatum (972534)***
- ***Myrrhis odorata (199199)***
- ***Narcissus poeticus (199199)***
- ***Narcissus pseudonarcissus (972524)***
- ***Nardus stricta (199199)***
- ***Narthecium ossifragum (199635)***
- ***Taraxacum maculosum (199635)***
- ***Taraxacum nordstedtii (972524)***
- ***Taraxacum oxoniense (199635)***
- ***Taraxacum platyglossum (199635)***
- ***Taraxacum polyodon (199635)***
- ***Taraxacum proximum (199635)***
- ***Taraxacum stictophyllum (199635)***
- ***Taraxacum subbracteatum (199635)***
- ***Taraxacum tanyphyllum (199635)***
- ***Taraxacum undulatiflorum (199635)***
- ***Taraxacum unguilobum (199635)***
- ***Taraxacum vastisectum (199635)***
- ***Teesdalia nudicaulis (972527)***
- ***Tellima grandiflora (972524)***
- ***Teucrium scorodonia (199199)***
- ***Thalictrum alpinum (972524)***
- ***Thalictrum minus (972524)***
- ***Thlaspi arvense (972524)***
- ***Thlaspi caerulescens (972381)***
- ***Thymus polytrichus subsp. britannicus (199199)***
- ***Tilia x europaea* (199199)***
- ***Tolmiea menziesii (199199)***
- ***Torilis japonica (199199)***
- ***Tradescantia virginiana (972524)***
- ***Tragopogon porrifolius* (199199)***
- ***Tragopogon pratensis subsp. minor (972524)***
- ***Trichophorum cespitosum subsp. germanicum (199199)***
- ***Trientalis europaea (972531)***
- ***Trifolium arvense (199199)***
- ***Trifolium campestre (972524)***
- ***Trifolium dubium (199199)***
- ***Trifolium hybridum (972524)***
- ***Trifolium medium (199199)***
- ***Trifolium micranthum (972524)***
- ***Trifolium ornithopodioides (972217)***
- ***Trifolium pratense (199199)***
- ***Trifolium repens (199199)***
- ***Trifolium striatum (972311)***
- ***Triglochin maritimum (972527)***
- ***Triglochin palustre (199199)***
- ***Tripleurospermum inodorum (199199)***
- ***Tripleurospermum maritimum (199199)***
- ***Trisetum flavescens subsp. flavescens (199199)***

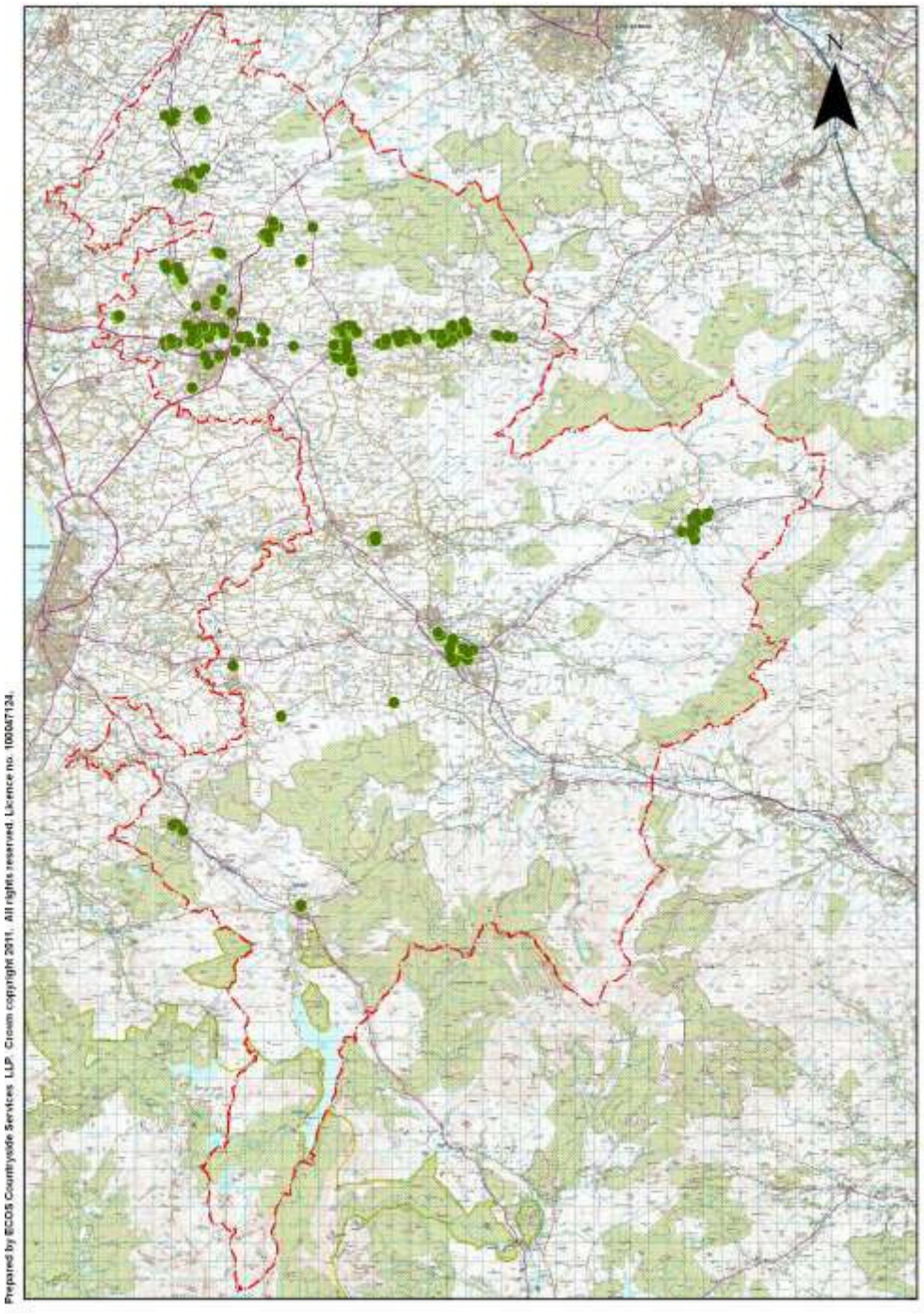
(972310)
- Datura stramonium* (972524)
- Daucus carota subsp. carota (199199)
- Deschampsia cespitosa subsp. parviflora (972524)
- Deschampsia flexuosa (199199)
- Dianthus deltoides (972217)
- Digitalis purpurea (199199)
- Diphasiastrum alpinum (199199)
- Diplotaxis muralis (972524)
- Diplotaxis tenuifolia (972415)
- Dipsacus fullonum (972524)
- Doronicum pardalianches (972340)
- Doronicum plantagineum (972524)
- Drosera anglica (972531)
- Drosera intermedia (972531)
- Drosera rotundifolia (199199)
- Dryopteris aemula (976076)
- Dryopteris affinis subsp. affinis (972524)
- Dryopteris affinis subsp. borreri (972297)
- Dryopteris affinis subsp. cambrensis (972297)
- Dryopteris carthusiana (972310)
- Dryopteris dilatata (972310)
- Dryopteris filix-mas (199199)
- Dryopteris oreades (972524)
- Echinops exaltatus (972553)
- Echinops sphaerocephalus (972548)
- Echium vulgare (972527)
- Elatine hexandra (972524)
- Elatine hydropiper (972490)
- Eleocharis acicularis (972535)
- Eleocharis multicaulis (972524)
- Eleocharis palustris subsp. vulgaris (199199)
- Eleocharis quinqueflora (199199)
- Eleocharis uniglumis (972524)
- Eleogiton fluitans (976076)
- Elodea canadensis (972524)
- Elodea nuttallii (972529)
- Elymus caninus (199199)
- Elytrigia juncea subsp. boreoatlantica (199199)
- Elytrigia repens (199199)
- Elytrigia x laxa (972524)
- Empetrum nigrum subsp. nigrum (199199)
- Epilobium brunnescens (972524)
- (199199)
- Neottia nidus-avis (199199)
- Nertera granadensis (972549)
- Nicotiana alata (199199)
- Nuphar lutea (972310)
- Nuphar x spenneriana (972490)
- Nymphaea alba subsp. alba (199199)
- Odontites vernus subsp. serotinus (972524)
- Oenanthe crocata (199199)
- Oenanthe lachenalii (972524)
- Oenothera biennis (972524)
- Oenothera glazioviana (972295)
- Omphalodes verna (199199)
- Ononis repens subsp. repens (972524)
- Ophioglossum vulgatum (972524)
- Orchis mascula (972526)
- Orchis morio (972351)
- Oreopteris limbosperma (199199)
- Origanum vulgare (976076)
- Ornithogalum angustifolium (972524)
- Ornithopus perpusillus (972527)
- Orobanche minor (972295)
- Osmunda regalis (972524)
- Oxalis acetosella (199199)
- Oxalis articulata (972297)
- Oxalis corniculata (199199)
- Panicum miliaceum* (199199)
- Papaver argemone (976076)
- Papaver dubium subsp. dubium (972524)
- Papaver rhoeas (972524)
- Papaver somniferum (199199)
- Parapholis strigosa (972524)
- Parentucellia viscosa (199199)
- Parietaria judaica (972524)
- Paris quadrifolia (972526)
- Parnassia palustris (199199)
- Pastinaca sativa* (972524)
- Pedicularis palustris (972524)
- Pedicularis sylvatica subsp. sylvatica (972524)
- Pentaglottis sempervirens (199199)
- Persicaria amphibia (199199)
- Persicaria bistorta (199199)
- Persicaria campanulata (972524)
- Persicaria hydropiper (199199)
- Triticum aestivum* (972524)
- Trollius europaeus (972526)
- Tropaeolum majus* (199199)
- Tropaeolum speciosum (972532)
- Tussilago farfara (199199)
- Typha latifolia (972527)
- Ulex europaeus (199199)
- Ulex gallii (972524)
- Ulmus glabra (199199)
- Ulmus procera* (199199)
- Umbilicus rupestris (199199)
- Urtica dioica subsp. dioica (199199)
- Urtica urens (199199)
- Utricularia minor (199199)
- Utricularia stygia (972524)
- Utricularia vulgaris agg. (972524)
- Vaccinium myrtillus (199199)
- Vaccinium oxycoccos (199199)
- Vaccinium vitis-idaea (199199)
- Valeriana dioica (199669)
- Valeriana officinalis (199199)
- Valeriana pyrenaica (972524)
- Valerianella locusta (972524)
- Verbascum nigrum (972524)
- Verbascum phlomoides (972524)
- Verbascum thapsus (972524)
- Veronica agrestis (972524)
- Veronica anagallis-aquatica (972524)
- Veronica arvensis (199199)
- Veronica beccabunga (199199)
- Veronica chamaedrys (199199)
- Veronica filiformis (199199)
- Veronica hederifolia subsp. lucorum (972297)
- Veronica montana (199199)
- Veronica officinalis (199199)
- Veronica peregrina (199199)
- Veronica persica (972524)
- Veronica polita (972524)
- Veronica scutellata (972528)
- Veronica serpyllifolia subsp. serpyllifolia (199199)
- Viburnum lantana (199199)
- Viburnum opulus (972526)
- Vicia bithynica* (976076)
- Vicia cracca (199199)
- Vicia hirsuta (972524)
- Vicia lathyroides (972524)
- Vicia lutea (972428)
- Vicia orobus (972524)
- Vicia sativa subsp. nigra (199199)
- Vicia sepium (199199)
- Vicia sylvatica (972311)

- *Epilobium ciliatum (972524)*
- ***Epilobium hirsutum** (199199)*
- ***Epilobium montanum** (199199)*
- ***Epilobium obscurum** (199199)*
- ***Epilobium palustre** (199199)*
- ***Epilobium parviflorum** (199199)*
- ***Epilobium roseum** (199199)*
- ***Epipactis helleborine** (199199)*
- ***Equisetum arvense** (199199)*
- ***Equisetum fluviatile** (199199)*
- ***Equisetum hyemale** (972526)*
- ***Equisetum palustre** (199199)*
- ***Equisetum pratense** (972545)*
- ***Equisetum sylvaticum** (199199)*
- ***Equisetum telmateia** (972311)*
- ***Equisetum x litorale** (972524)*
- ***Erica cinerea** (199199)*
- ***Erica tetralix** (199199)*
- *Erigeron acer (972377)*
- *Erigeron glaucus (972524)*
- ***Eriophorum angustifolium** (199199)*
- ***Eriophorum latifolium** (972524)*
- ***Eriophorum vaginatum** (199199)*
- *Erodium cicutarium (972293)*
- *Erodium moschatum (199675)*
- ***Erophila glabrescens** (972524)*
- ***Eryngium maritimum** (199199)*
- *Erysimum cheiranthoides (972524)*
- *Erysimum cheiri (976076)*
- *Escallonia macrantha (972524)*
- *Euonymus europaeus (199199)*
- ***Eupatorium cannabinum** (199199)*
- *Euphorbia exigua (976076)*
- *Euphorbia helioscopia (199199)*
- *Euphorbia lathyris (972427)*
- *Euphorbia peplus (972524)*
- ***Euphrasia arctica subsp. borealis** (972524)*
- ***Euphrasia confusa** (972332)*
- ***Euphrasia micrantha** (199199)*
- ***Euphrasia nemorosa** (972524)*
- ***Euphrasia scottica** (199199)*
- ***Persicaria lapathifolia (199199)***
- ***Persicaria maculosa (199199)***
- ***Persicaria minor (972299)***
- ***Persicaria vivipara (900000)***
- ***Persicaria wallichii (972524)***
- ***Petasites albus (972524)***
- ***Petasites fragrans (972524)***
- ***Petasites hybridus (199199)***
- ***Petasites japonicus (972300)***
- ***Peucedanum ostruthium (976076)***
- ***Phalaris arundinacea (199199)***
- ***Phalaris canariensis* (972524)***
- ***Phegopteris connectilis (199199)***
- ***Phleum bertolonii (199199)***
- ***Phleum pratense (199199)***
- ***Phragmites australis (972528)***
- ***Phyllitis scolopendrium (199199)***
- ***Physalis peruviana* (199199)***
- ***Picea sitchensis (972524)***
- ***Picris hieracioides (199678)***
- ***Pilosella aurantiaca subsp. aurantiaca (972328)***
- ***Pilosella aurantiaca subsp. carpathicola (972389)***
- ***Pilosella officinarum (199199)***
- ***Pilosella praealta subsp. praealta (972328)***
- ***Pilularia globulifera (972297)***
- ***Pimpinella saxifraga (199199)***
- ***Pinguicula lusitanica (976076)***
- ***Pinguicula vulgaris (199199)***
- ***Pinus sylvestris (199199)***
- ***Plantago coronopus (199199)***
- ***Plantago lanceolata (199199)***
- ***Plantago major subsp. major (199199)***
- ***Plantago maritima (199199)***
- ***Plantago media* (976076)***
- ***Platanthera bifolia (972531)***
- ***Platanthera chlorantha (972310)***
- ***Poa angustifolia (972300)***
- ***Poa annua (199199)***
- ***Poa chaixii (972524)***
- ***Poa compressa (972524)***
- ***Poa humilis (199199)***
- ***Poa nemoralis (972524)***
- ***Poa pratensis (199199)***
- ***Poa trivialis (199199)***
- ***Polemonium caeruleum***
- ***Vicia tetrasperma* (972340)***
- ***Vinca major (199199)***
- ***Vinca minor (972524)***
- ***Viola arvensis (972524)***
- ***Viola canina (972524)***
- ***Viola lutea (972525)***
- ***Viola odorata (199199)***
- ***Viola palustris (199199)***
- ***Viola riviniana (199199)***
- ***Viola tricolor subsp. curtisii (972524)***
- ***Viola tricolor subsp. tricolor (972524)***
- ***Viola x intersita (972299)***
- ***Viola x wittrockiana* (972524)***
- ***Vulpia bromoides (199199)***
- ***Wahlenbergia hederacea (976076)***
- ***X Dactylodenia st-quintinii (199199)***
- ***X Festulolium holmbergii (199199)***
- ***Zannichellia palustris (972524)***
- ***Zea mays* (199678)***
- ***Zostera marina (972340)***
- ***Zostera noltei (972524)***

- ***Euphrasia tetraquetra*** *(972524)*
- *Fagopyrum esculentum (972547)*
- *Fagus sylvatica (199199)*
- *Fallopia baldschuanica (972524)*
- *Fallopia convolvulus (199199)*
- *Fallopia japonica (199199)*
- *Fallopia sachalinensis (199199)*
- *Fallopia x bohemica (199629)*
- ***Festuca altissima*** *(972524)*
- ***Festuca arenaria*** *(972399)*
- ***Festuca arundinacea*** *(199199)*
- ***Festuca filiformis*** *(972297)*
- ***Festuca gigantea*** *(199199)*
- ***Festuca ovina subsp. ophioliticola*** *(199676)*
- ***Festuca pratensis*** *(199199)*
- ***Festuca rubra subsp. arctica*** *(972524)*
- ***Festuca rubra subsp. juncea*** *(972524)*
- ***Festuca rubra subsp. litoralis*** *(972524)*
- ***Festuca rubra subsp. rubra*** *(199199)*
- ***Festuca vivipara*** *(199199)*
- *Ficus carica (972524)*
- ***Filago minima*** *(972524)*
- ***Filago vulgaris*** *(972575)*
- ***Filipendula ulmaria*** *(199199)*
- ***(972529)***
- ***Polygala serpyllifolia (199199)***
- ***Polygala vulgaris subsp. vulgaris (199199)***
- ***Polygonatum x hybridum (199199)***
- ***Polygonum arenastrum (199199)***
- ***Polygonum aviculare (199199)***
- ***Polygonum oxyspermum subsp. raii (972524)***
- ***Polypodium cambricum (972281)***
- ***Polypodium interjectum (199199)***
- ***Polypodium vulgare (199199)***
- ***Polypodium x mantoniae (972295)***
- ***Polystichum aculeatum (199199)***
- ***Polystichum setiferum (972311)***
- ***Populus tremula (199199)***
- ***Populus x canadensis* (976076)***
- ***Populus x canescens* (972524)***
- ***Potamogeton alpinus (199199)***
- ***Potamogeton berchtoldii (972329)***
- ***Potamogeton crispus (972329)***
- ***Potamogeton filiformis (972329)***
- ***Potamogeton gramineus (972524)***
- ***Potamogeton natans (972329)***
- ***Potamogeton obtusifolius (972329)***
- ***Potamogeton pectinatus (199199)***
- ***Potamogeton perfoliatus (972524)***
- ***Potamogeton polygonifolius (972329)***
- ***Potamogeton pusillus (972329)***
- ***Potamogeton x griffithii (972551)***
- ***Potamogeton x nitens (199199)***
- ***Potamogeton x sparganiifolius (972551)***

Appendix 7 - Locations of East Ayrshire Tree Preservation Orders (TPOs)

As provided by East Ayrshire Council, November 2014.



East Ayrshire Council
Comhairle Shiorrachd Inbhir Àir an Ear

Planning & Economic Development
The Johnnie Walker Bond, 15 Strand Street
Kilmarnock, East Ayrshire KA1 1HU

www.east-ayrshire.gov.uk