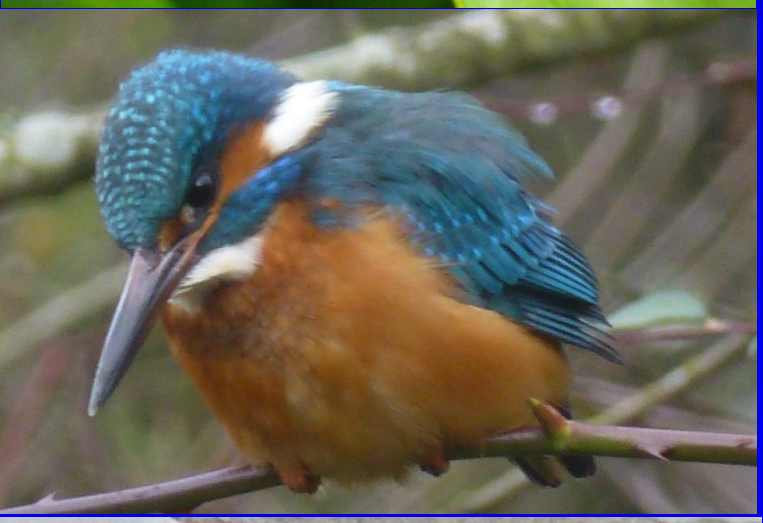

ROYAL BOTANIC GARDEN EDINBURGH

Biodiversity Duty Report 2015-2017

Preamble

Under the Nature Conservation (Scotland) Act (2004), every public body in Scotland is required to further the conservation of biodiversity when carrying out its responsibilities. The Wildlife and Natural Environment (Scotland) Act (2011) further requires all Scottish public bodies to provide, every three years, a publicly available report on the actions they have taken to meet the Scottish Biodiversity Duty.

Biodiversity is at the heart of the work of the Royal Botanic Garden Edinburgh (RBGE). Our web page (http://www.rbge.org.uk/), our annual reports and submissions to the Scottish Biodiversity Strategy, the Convention on Biological Diversity, and the Global Strategy for Plant Conservation are the primary source of details on our biodiversity science, conservation, horticulture, education and public engagement activities.

This report provides an overview of these activities in the period 2015-2017. It also summarises the steps we have taken towards environmentally sustainable management for biodiversity on our own estates.

Royal Botanic Garden Edinburgh Biodiversity Report 2015-2017v1.0; Published 31st December 2017

Front cover: *A selection of wildlife recorded at RBGE Edinburgh in 2015-2017.* Top left Coot (*Fulica atra*). Upper middle left, fly *Bibio lanigerus*. Lower middle left, Kingfisher (*Alcedo atthis*). Bottom left, barkfly *Graphopsocus cruciata*. Top right, Merveille du Jour (*Griposia aprilina*) (Photo Lucy Cooke). Upper middle right, Spider *Aranea diademata* with wasp as prey. Lower middle right, Peacock butterfly (*Inachis io*). Bottom right, head end of caterpillar of Elephant Hawk Moth (*Deilephila elpenor).*Photos Robert Mill except where otherwise credited.

Back cover Grey Heron (*Ardea cinerea*).Photo Robert Mill, RBGE

Introduction

The Royal Botanic Garden Edinburgh (RBGE) is a world renowned scientific institution, a centre for plant science and education, and a public attraction. It extends over four sites:

- **The Royal Botanic Garden Edinburgh** is the base for science research, administration and education. The Edinburgh Garden, located in the Inverleith district of the north of the city, extends over 70 acres of public grounds as well as a Nursery area that serves as a propagation centre for all four sites. The grounds include several wildlife-rich habitats as well as a range of public, research and propagation glasshouses.
- **Benmore Botanic Garden**, near Dunoon in Argyll, is located in a magnificent mountainside setting, steeped in history and surrounded by dramatic scenery. It has an oceanic climate that is mild and wet.
- **Dawyck Botanic Garden**, near Peebles in the Scottish Borders, is one of the world's finest arboreta, and has a continental climate that is cooler in winter and warmer in summer.
- **Logan Botanic Garden**, in the extreme southwest of Scotland, is the country's most exotic garden. It is warmed by the Gulf Stream which allows southern hemisphere plants to flourish in the mild climate.

Mission

The mission of RBGE is ‘to explore, explain and conserve the world of plants for a better future’.

Strategic objectives

- Maintaining and developing our internationally important collections in order to maximise their value as a research, conservation, education, and heritage resource.
- Delivering world leading plant science and conservation programmes to reduce the loss of global biodiversity and to achieve a greater understanding of plants, fungi and environmental sustainability.
- Providing learning and training in horticulture, plant science and biodiversity conservation to stimulate people to appreciate, understand, and to contribute to the conservation of plants and our natural environment.
- Offering a first-class visitor attraction to enable more communities, families and individuals to enjoy and be inspired by our gardens and their facilities, become more environmentally responsible and to support the work of the Royal Botanic Garden Edinburgh.

Governance

The Royal Botanic Garden Edinburgh is a Non-Departmental Public Body sponsored and supported through Grant-in-Aid by the Scottish Government's Environment and Forestry Directorate (ENFOR). It is governed by a Board of Trustees appointed by Scottish Ministers. The RBGE senior management team is headed by the Regius Keeper and Chief Executive Officer, Simon Milne. The organisation comprises over 200 staff.

Biodiversity is a central component of our Corporate Planning. RBGE also produces a dedicated Biodiversity Strategy every 5 years detailing its scientific, horticultural and conservation plans.

To ensure environmentally sustainable business practices the RBGE operates an Environmental Management System that comprises five Working Groups: Biodiversity, Procurement, Transport, Utilities, and Waste. Each group meets regularly throughout the year and the Chairs of each group meet quarterly. There is also an Audit Group that monitors the activities of all five Working Groups, and Area Champions that monitor environmental management over the entire organisation.

RBGE has representation on the committees of the Scottish Biodiversity Strategy (SBS): Environment and Economy Leaders Group- Simon Milne (Regius Keeper); Science Support Group – Prof Pete Hollingsworth (Director of Science); Habitats and Species – Dr Chris Ellis (Head of Cryptogamic Plants and Fungi), Invasive Non-native Species - David Knott (Curator of the Living Collection).

Insects recorded at BioBlitzes. Top: hoverfly *Leucozonia glaucia,* Dawyck, 2015. Bottom, beetle *Elaphrus cupreus,* Benmore, 2016. Photos Robert Mill.

Biodiversity science

Our biodiversity activities are based around the following themes:

Understanding plant and fungal diversity

Accelerating species discovery and the production of identification and knowledge resources: Characterising species at imminent risk of extinction, species of importance to human kind, and diversity in the most poorly known and threatened areas of the world

Responding to global change

Translation of policy-relevant science into conservation practice: We evaluate and then prioritise the species, ecosystems and regions that are most under threat, develop management solutions, and implement recovery and restoration programmes

Building communities

Specialist training and public engagement linking plants to individuals and communities in Scotland and around the world: Building capacity to support conservation programmes, empowering people to understand, cultivate and benefit from plants, and providing accessible environmental education to embed sustainable living into wider society

Our activities focus on:

- Plants and fungi of conservation importance in Scotland
- Biodiversity-rich regions where habitats are threatened including Nepal, SW Asia, China and tropical America and Asia
- Economically important plant groups and species at risk of extinction including the ginger family, legumes, begonias, conifers, the Gesneriaceae and the Sapotaceae

Biodiversity strategies

Our work contributes directly towards the Scottish Biodiversity Strategy, the Sustainable Development Goals (SDG), the Convention on Biology Diversity (CBD) and the Global Strategy for Plant Conservation (GSPC).

The SDG, CBD and the GSPC Targets that our science and conservation work contribute towards are summarised in Table 1.

Our contributions towards the 2020 Challenge for Scotland's Biodiversity are outlined in Scottish Biodiversity Strategy Delivery Agreement.

We also provide input into formal reports on the UK's contribution to the CBD and the GSPC.

We provide input into UK implementation of international biodiversity policy via a consortium with the Natural History Museum London, the Royal Botanic Gardens Kew and RBGE.

Table 1: International biodiversity targets that RBGE's work addresses

SUSTAINABLE DEVELOPMENT GOAL 15: Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss

GSPC T1 (Global Strategy for Plant Conservation Target 1). An online flora of all known plants

GSPC T2. An assessment of the conservation status of all known plant species, to guide conservation action.

GSPC T3. Information, research and associated outputs, and methods necessary to implement the Strategy developed and shared.

GSPC T4. At least 15 per cent of each ecological region or vegetation type secured through effective management and/or restoration.

GSPC T5. At least 75 per cent of the most important areas for plant diversity of each ecological region protected with effective management in place for conserving plants and their genetic diversity.

GSPC T7. At least 75 per cent of known threatened plant species conserved in situ.

GSPC T8. At least 75 per cent of threatened plant species in ex situ collections, preferably in the country of origin, and at least 20 per cent available for recovery and restoration programmes.

GSPC T9: 70 per cent of the genetic diversity of crops including their wild relatives and other socio-economically valuable plant species conserved, while respecting, preserving and maintaining associated indigenous and local knowledge.

GSPC T14: The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programmes.

GSPC T15: The number of trained people working with appropriate facilities sufficient according to national needs, to achieve the targets of this Strategy.

GSPC T16: Institutions, networks and partnerships for plant conservation established or strengthened at national, regional and international levels to achieve the targets of this Strategy.

AICHI T1 (The Convention on Biodiversity's 2020 'Aichi' target 1): By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

AICHI T2: By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

AICHI T5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

AICHI T11: By 2020, at least 17 per cent of terrestrial and inland water areas, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas.

AICHI T12: By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

AICHI T13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

AICHI T14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

AICHI T15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

AICHI T16: By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

AICHI T17: By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

AICHI T18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

AICHI T19: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

AICHI T20: By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels.

Our Scottish Biodiversity work

Our work in Scotland is targeted to three main areas:

- Discovery of and monitoring species in key habitats threatened by climate change, especially those in Scottish snowbeds. This deploys taxonomic expertise to support the use of Scotland's national indicators for climate change adaptation, and ensures biodiversity monitoring within the Scottish Climate Change Adaptation Programme.
- Translocation of threatened Scottish species into new protected sites, to meet objectives under Priority Project 9 of the Scottish Biodiversity Route Map, including the reintroduction of Alpine blue sow-thistle (*Cicerbita alpina*: Schedule 8 species) and threatened oceanic lichens into the Cairngorms National Park, and Loch Lomond and Trossachs National Park, respectively.
- Support for public activities to improve biodiversity awareness and resilience of urban communities contributing to the Edinburgh Living Landscape project: including > 2000 people engaged in a lichen and air pollution survey of Edinburgh streets, greening with butterfly food plants onto Edinburgh roof-space (with Butterfly Conservation), interventions to seed biodiversity onto hard engineered coastal defences, and training of local volunteers in setting-up green-space improvements around city workplaces and social venues, e.g. the Scottish Parliament and Granton hub.

Our international biodiversity work

Our biodiversity work in 35 countries around the world includes:

- Understanding species diversity and distributions to underpin conservation and sustainable use, including the discovery of >70 new plant species since 2015, coordination of the Flora of Nepal programme, and publication of the first comprehensive inventory of woody plant species in neotropical dry forests, and the first verified checklist of the plants of lowland Amazonia.
- Undertaking large scale earth observation and modelling analyses to inform land-use decisions balancing biodiversity conservation and human use of plants, including an assessment of the spread and consequences of rubber plantations in SE Asia, and a global analysis of tree cover change.
- Undertaking large scale DNA sequencing of biodiversity to tell species apart and better understand the relationships among species, with a particular focus on coordination of DNA barcoding of plants, and developing methods for DNA sequencing preserved natural history collections
- Maintaining and developing our globally important National collections as an international biodiversity resource, including our collection of 13.5K living plant species, 3 million preserved herbarium specimens, and our extensive botanical library and archive

Our estates

Within the estate of RBGE itself, we have an Environmental Policy, which aims to enhance our role in promoting and protecting biodiversity through the management of our sites in Scotland.

Protecting biodiversity on our estates

We protect and conserve biodiversity at our four sites, including:

Management of the Scottish Heath Garden area of the Edinburgh site for Odonata (dragonflies and damselflies)

Managing our Edinburgh site in compliance with the Badger Act 1992 to protect the various badger setts within the Garden

Protection and management of a small area of the Edinburgh Garden to protect a small hornwort colony

Management of the Fruit Garden to protect the population of Wool Carder Bee *Anthidium manicatum*. The population has thrived and during the period of this report the species has spread across the northern part of the city of Edinburgh.

Continuing to grow significant proportions of the plant species listed in the Local Biodiversity Action Plans for the four local authorities (Edinburgh, Argyll and Bute, Scottish Borders, and Dumfries and Galloway) where its gardens are located. Currently RBGE grows 100% of the plant species in each of the Edinburgh and Argyll and Bute lists, 53% of the species in the Scottish Borders list and 46% of those in the Dumfries and Galloway list. Full details are given in Annex 2.

· Continued use of owl boxes at Edinburgh—one of these has been used regularly during the period of this Report

Recording biodiversity on our estates

We run a phenology programme with detailed monitoring of flowering times of more than 500 of our plant accessions. We also use our living collection to provide information on emerging pests and disease threats via the International Plant Sentinel Network.

At Edinburgh, recording of birds by Dr Robert Mill goes back to 1997 and there are also older historic records. Recording of other groups of animals began in 2007 and at present the following groups of organisms are recorded on a daily year-round basis : birds, mammals, reptiles and amphibians, butterflies, Hymenoptera (mainly bees, wasps and ants), hoverflies, leaf-mining insects, bugs, beetles, barkflies, springtails

An application to the Small Projects Fund of the Friends of the Royal Botanic Garden Edinburgh at the end of 2014 to purchase two moth traps was successful and the traps were purchased in the spring of 2015. One is mains operated and the other battery operated allowing use anywhere in the Edinburgh Garden and at any of the Regional Gardens. They were trialled at the BioBlitz at Dawyck in 2015. Currently trapping is being done weekly throughout the year and this has resulted in numerous new moth records for the Garden.

In 2011 a list of “Notable Species” relevant to the Scottish Biodiversity Strategy that had been recorded at Edinburgh and Benmore was compiled as an internal report. Since the last Biodiversity Duty Report, this document has been revised and expanded to include lists of Notable Species for all four Gardens. The following Notable Species are listed:

- For Edinburgh: 55 birds, 6 mammals, 4 amphibians, 7 moths, 8 Hymenoptera, 3 flowering plants, 1 hornwort.
- For Benmore: 28 birds, 8 mammals (9 if both pipistrelle bat

species are found to occur), 4 amphibians.

- For Dawyck, 43 birds, 10 mammals (11 if both pipistrelle bat species are found to occur), 2 reptiles, 2 amphibians, 3 flowering plants, 1 moss.
- For Logan, 16 birds, 8 mammals (seven of them bats), 1 butterfly, 3 moths, 3 hornworts (of 4 in the entire UK).

The summary list of Notable Species recorded at the four Gardens is reproduced in this Report as Annex 1.

Wildlife recording up to November 2014 was summarised in the 2011-2014 Biodiversity Duty Report. Up to 6 December 2014, 736 species of animal had been recorded at the Edinburgh site. Continued regular recording has added another 192 species during 2015-17 (50 in 2015, 69 in 2016, 73 at time of writing in 2017). Together with a few previously overlooked records from earlier years, these have brought the total up to 935 species (as at 14 December 2017). These have included significant finds, including first Scottish records for two leafhopper species, *Eupterycyba jucunda* (2015) and *Idiocerus herrichi* (2017). One of our significant finds (Wool Carder Bee *Anthidium manicatum*) has necessitated special management to conserve its population.

The BioBlitzes held at the Edinburgh Garden in 2013 and at Logan Botanic Garden in 2014 have since been followed by similar events at Dawyck Botanic Garden (July 2015) and Benmore Botanic Garden (July 2016). As before, these BioBlitzes were very successful. 561 species of plants, fungi and animals were recorded at Dawyck including Saxon wasp (*Dolichovespula saxonica*), *Andrena coitana* (Small Flecked Mining-bee, a nationally scarce species) and the Nationally Rare and Critically Endangered moss *Orthotrichum pumilum*, previously recorded at only four Scottish localities. *Orthotrichum pumilum* is probably the most significant record to date

at any of our four sites. The BioBlitz at Benmore Botanic Garden was held over two days instead of the usual one because of the remoteness and relatively large size of the site. It yielded the highest total of all four BioBlitzes, with at least 707 species. These included 185 wild vascular plants, 172 bryophytes, 122 fungi, 50 lichens and 68 moths despite both days being unseasonally wet and cool. All four BioBlitzes have also been public engagement successes as well as providing baseline wildlife data that can be used to manage each Garden sensitively with wildlife in mind.

A squirrel hide was erected at Benmore during autumn 2016 and opened to the public on 1 March 2017, allowing people to engage with the activities of iconic Red Squirrels. which can also been seen at Dawyck Botanic Garden.

Environmental sustainability of our estates

Three of our four gardens are recognised by the Green Tourism Scheme: Logan and Dawyck are ‘Gold’, Edinburgh is ‘Silver’.

Dawyck Botanic Garden is the world’s first carbon neutral botanic garden, and this includes a micro-hydro scheme and biomass boiler. Logan Botanic Garden has the first public-access greenhouse powered by air-source heat pumps.

Other initiatives include automated smart meters for close monitoring of all the water, electricity and gas used at Edinburgh; the Botanics Cottage has solar panels installed which are feeding electricity into the national grid; the Alpine House has a rainwater harvesting tank installed under the ground and the water collected is used for the plants rather than using mains water, and all plant material waste is composted and returned to the garden to improve the soil and plant growth.

Two first Scottish records of leafhoppers made at RBGE:
Top—Idiocerus herrichi (Edinburgh, Jan 2017)
Bottom — Eupterycyba jucunda (Edinburgh, Sep 2015)

Mainstreaming

Biodiversity and environmental sustainability are central to our organisational agenda and are embedded within our values, mission and strategic objectives.

Our Environmental Management System working groups are specifically designed to ensure that our operations are aligned to conserve biodiversity and promote environmentally sustainable practices within our business and among our staff. Our public engagement activities also have a strong focus on influencing public understanding in order to mainstream biodiversity conservation and environmental sustainability into wider society.

Pond dipping at Benmore BioBlitz, July 2016

Top: Barkfly *Graphopsocus cruciatus,* Nov 2016

Bottom: *Conops quadrifasciatus* mating, Edinburgh Botanic Garden, Aug 2017 (Photo Lucy Cooke)

Partnership

Partnership working is fundamental to our success. We work with partners in Scotland, the UK and more than 50 countries worldwide to promote awareness and conservation of biodiversity in Scotland and around the world.

Our partnerships include other government funded research organisations and agencies, universities, conservation charities and a diverse set of stakeholders whose work is related to biodiversity and the wider environment. In Scotland we have particularly strong relationships with various natural history societies, to which we provide training and facilities, and in turn benefit from the expertise and data produced by their members.

Examples of partner organisations we work with in Scotland on biodiversity science and conservation include

Biomathematics and Statistics Scotland; British Bryological Society; Botanic Gardens Conservation International; British Lichen Society; British Pteridological Society; BRISC - Biological Recording in Scotland; Botanical Society of Britain and Ireland; Botanical Society of Scotland; Butterfly Conservation, City of Edinburgh Council; ClimateXChange; Edinburgh Ecology Network; Edinburgh Living Landscape, Edinburgh Plant Sciences ; Edinburgh & Lothians Greenspace Trust; Edinburgh University; Edinburgh Natural History Society; Forest Research; Forestry Commission Scotland; Historic Scotland; The iCONic Project; James Hutton Institute; Lothian and Borders Raptor Study Group; National Species Reintroduction Forum; National Tree Collections of Scotland; Perth and Kinross Countryside Trust; PlantLife; Plant Link Scotland; National Museum of Scotland; National Trust for Scotland; Rhododendron Species Conservation Group; Royal Society for the Protection of Birds; Royal Zoological Society of Scotland; Scottish Natural Heritage; Scottish Wildlife Trust; The Conservation Volunteers; The Wildlife Information Centre.

Visitors examine and identify the catch from the Scrape Burn at Dawyck Botanic Garden during the BioBlitz held there in July 2015.

Communication

We undertake many biodiversity communication activities. During 2015-17 our scientific staff published a large number of research papers, biodiversity surveys and reports during; full lists are available on our Web Page (http://www.rbge.org.uk/).

The Botanics Stories blog site (http://stories.rbge.org.uk/) publishes biodiversity-related stories and there is a section devoted to the wildlife of the Gardens.

We use our role as a visitor attraction to engage the public via exhibitions, events, and interpretation within the gardens. Wildlife sightings in the Edinburgh garden are published weekly at the east entrance to the John Hope Gateway.

We have a major role in training, education and capacity building and our course range from primary school children to PhDs. We have particular strengths in horticultural education and in training people to identify and classify plant species. We run an MSc in Biodiversity and Taxonomy of plants. We also run online and blended learning programmes via our PropaGate learning platform (https://onlinecourses.rbge.ac.uk/).

Annex 1

List of Notable Species present or recorded at the four sites of the Royal Botanic Garden Edinburgh

Abbreviations in Listings column: A, Birds of Conservation Concern – Amber List; A&B, Argyll & Bute Local Biodiversity Action Plan; B100, Scottish Borders Biodiversity Action Plan 'Borders 100' species; BF, Scottish Borders BAP Flagship Species; D&G, Dumfries & Galloway Local Biodiversity Action Plan; EBAP, Edinburgh Biodiversity Action Plan; EPS, European Protected Species; R, Birds of Conservation Concern – Red List; RDB CR, (Bryophyte) Red Data Book, Critically Endangered; SBL, Scottish Biodiversity List; UKBAP, United Kingdom Biodiversity Action Plan. Other columns: EBG, Edinburgh Botanic Garden; BBG, Benmore Botanic Garden; DBG, Dawyck Botanic Garden; LBG, Logan Botanic Garden.

Taxonomic Group	Scientific Name	Common Name	Listings	EBG	BBG	DBG	LBG
Birds	*Acanthis cabaret*	Lesser Redpoll	R, UKBAP, EBAP	+		+	
Birds	*Accipiter nisus*	Sparrowhawk	EBAP	+			
Birds	*Alauda arvensis*	Skylark	R, UKBAP, SBL, B100, EBAP	+		+	
Birds	*Alcedo atthis*	Kingfisher	A, SBL, B100, EBAP	+	+	+	
Birds	*Anas clypeata*	Shoveler	A	+			
Birds	*Anas crecca*	Teal	A		+	+	+
Birds	*Anas platyrhynchos*	Mallard	A, EBAP	+	+	+	
Birds	*Anthus pratensis*	Meadow Pipit	A, EBAP	+			
Birds	*Apus apus*	Common Swift	A, SBL, B100,D&G, EBAP	+		+	+
Birds	*Aquila chrysaetos*	Golden Eagle	SBL, A&B		+	+	
Birds	*Aythya fuligula*	Tufted Duck	EBAP	+			
Birds	*Bucephala clangula*	Goldeneye	A	+			
Birds	*Buteo buteo*	Buzzard	EBAP	+			
Birds	*Carduelis cannabina*	Linnet	R, UKBAP, SBL, EBAP	+			
Birds	*Chroicephalus ridi-bundus*	Black-headed Gull	A, UKBAP, SBL,	+	+	+	
Birds	*Cinclus cinclus*	Dipper	A, UKBAP	+	+	+	
Birds	*Circus aeneus*	Marsh Harrier	A				+
Birds	*Circus cyaneus*	Hen Harrier	R, SBL, A&B, B100		+	+	
Birds	*Coccothraustes coc-cothraustes*	Hawfinch	R, UKBAP, SBL	+			+

Annex 1 cont.

Taxonomic Group	Scientific Name	Common Name	Listings	EBG	BBG	DBG	LBG
Birds	*Columba oenas*	Stock Dove	A, D&G, EBAP	+		+	+
Birds	*Corvus cornix*	Hooded Crow	SBL		+	+	
Birds	*Cuculus canorus*	Common Cuckoo	R, UKBAP, A&B	+	+	+	
Birds	*Cygnus cygnus*	Whooper Swan	SBL, EBAP	+			
Birds	*Cygnus olor*	Mute Swan	A, EBAP	+		+	
Birds	*Delichon urbica*	House Martin	A, EBAP	+	+	+	+
Birds	*Emberiza citrinella*	Yellowhammer	R, UKBAP SBL	+			
Birds	*Emberiza schoeniclus*	Reed Bunting	A, UKBAP, SBL, EBAP	+			
Birds	*Erithacus rubecula*	Robin	SBL, EBAP	+	+	+	+
Birds	*Falco columbarius*	Merlin	R, SBL, B100			+	
Birds	*Falco peregrinus*	Peregrine Falcon	SBL, A&B, EBAP	+	+	+	
Birds	*Falco tinnuncuus*	Kestrel	A, SBL, EBAP	+		+	
Birds	*Fringilla montifringilla*	Brambling	SBL, EBAP	+		+	
Birds	*Gallinago gallinago*	Common Snipe	A, EBAP	+			
Birds	*Haematopus ostralegus*	Oystercatcher	A, D&G, EBAP	+		+	+
Birds	*Hirundo rustica*	Barn Swallow	EBAP	+	+		
Birds	*Lagopus lagopus scoticus*	Red Grouse	A, UKBAP			+	
Birds	*Larus argentatus*	Herring Gull	R, SBL, D&G, EBAP	+	+	+	+
Birds	*Larus canus*	Common Gull	A, UKBAP, EBAP	+			
Birds	*Larus fuscus*	Lesser Black-backed Gull	A	+	+		
Birds	*Mergus merganser*	Goosander	EBAP	+			
Birds	*Milvus milvus*	Red Kite	SBL	+		+	
Birds	*Motacilla cinerea*	Grey Wagtail	R	+	+	+	
Birds	*Muscicapa striata*	Spotted Flycatcher	R, UKBAP, SBL, A&B, B100, EBAP	+	+	+	
Birds	*Numenius arquata*	Curlew	R, UKBAP, SBL, B100	+		+	
Birds	*Passer domesticus*	House Sparrow	R, UKBAP, D&G, EBAP	+			+
Birds	*Phalacrocorax carbo*	Cormorant	EBAP	+	+		
Birds	*Phylloscopus sibilatrix*	Wood Warbler	R. UKBAP, SBL, A&B	+	+	+	
Birds	*Phylloscopus trochilus*	Willow Warbler	A	+	+	+	+
Birds	*Pluvialis squatarola*	Grey Plover	A	+			
Birds	*Prunella modularis*	Dunnock	A, UKBAP, EBAP	+	+	+	+
Birds	*Pyrrhula pyrrhula*	Bullfinch	A, UKBAP, SBL, B100, EBAP	+	+	+	+
Birds	*Regulus regulus*	Goldcrest	EBAP	+			
Birds	*Saxicola rubetra*	Whinchat	R			+	
Birds	*Scolopax rusticola*	Woodcock	R, UKBAP, SBL	+		+	

Annex 1 cont.

Taxonomic Group	Scientific Name	Common Name	Listings	EBG	BBG	DBG	LBG
Birds	*Sitta europaea*	Nuthatch	Not listed; recent colonist	+		+	
Birds	*Spinus spinus*	Siskin	SBL	+	+	+	+
Birds	*Strix aluco*	Tawny Owl	A	+	+	+	
Birds	*Sturnus vulgaris*	Starling	R, UKBAP, SBL, EBAP	+			
Birds	*Tetrao tetrix*	Black Grouse	R, UKBAP, SBL, B100			+	
Birds	*Tringa totanus*	Redshank	A	+		+	
Birds	*Turdus iliacus*	Redwing	R, SBL	+	+	+	+
Birds	*Turdus philomelos*	Song Thrush	R, SBL, A&B, D&G, EBAP	+	+	+	+
Birds	*Turdus pilaris*	Fieldfare	R, EBAP	+	+	+	
Birds	*Turdus torquatus*	Ring Ouzel	R, UKBAP, SBL, B100			+	
Birds	*Turdus viscivorus*	Mistle Thrush	R, EBAP	+	+	+	
Mammals (bats)	*Myotis daubentonii*	Daubenton's Bat	EPS, SBL, A&B	?	+	+	+
Mammals (bats)	*Myotis nattereri*	Natterer's Bat	EPS, SBL				+
Mammal s (bats)	*Nyctalus leisleri*	Leisler's Bat	EPS				+
Mammals (bats)	*Nyctalus noctula*	Noctule Bat	EPS, SBL	+			+
Mammals (bats)	*Pipistrellus pipistrellus*	Common Pipistrelle	EPS, SBL	+	?	?	+
Mammals (bats)	*Pipistrellus pygmaeus*	Soprano Pipistrelle	EPS, UKBAP, SBL	+	?	?	+
Mammals (bats)	*Plecotus auritus*	Brown Long-eared Bat	EPS, SBL, A&B, B100	+	+	+	+
Mammals	*Capreolus capreolus*	Roe Deer	SBL		+	+	+
Mammals	*Cervus elaphus*	Red Deer	SBL		+	+	
Mammals	*Erinaceus europaeus*	Hedgehog	UKBAP			+	
Mammals	*Felis sylvestris*	Wildcat	SBL, A&B, B100		+	+	
Mammals	*Lepus europaeus*	Brown Hare	UKBAP, SBL, B100			+	
Mammals	*Lutra lutra*	Otter	EPS, UKBAP, SBL, A&B, B100	+	+	+	
Mammals	*Meles meles*	Badger	SBL, EBAP	+			
Mammals	*Sciurus vulgaris*	Red Squirrel	UKBAP, SBL, A&B, B100		+	+	
Reptiles	*Anguis fragilis*	Slow-worm	UKBAP, SBL, B100		+	+	
Reptiles	*Zootoca vivipara*	Common Lizard	UKBAP			+	
Amphibians	*Bufo bufo*	Common Toad	UKBAP, A&B	+	+	+	
Amphibians	*Lissotriton helveticus*	Palmate Newt	EBAP	+	+		
Amphibians	*Lissotriton vulgaris*	Smooth Newt	EBAP	+	+		
Amphibians	*Rana temporaria*	Common Frog	BF, EBAP	+	+	+	

Annex 1 cont.

Taxonomic Group	Scientific Name	Common Name	Listings	EBG	BBG	DBG	LBG
Butterflies	Celastrina argiolus	Holly Blue	Not listed	+			
Butterflies	*Lasiommata megera*	Wall Brown	SBL				+
Butterflies	*Pararge aegeria*	Speckled Wood	Not listed (recent colonist)	+			
Moths	*Acronicta psi*	Grey Dagger	UKBAP	+			+
Moths	*Allophyes oxyacanthae*	Green Brindled Crescent	UKBAP	+			
Moths	*Amphipyra tragopogonis*	Mouse Moth	UKBAP	+			
Moths	*Athethmia centrago*	Centre-barred Sallow	UKBAP	+			
Moths	*Ecliptoptera silaceata*	Small Phoenix	UKBAP	+			+
Moths	*Eupithecia subumbrata*	Shaded Pug					+ 2014, first VC74 record since 1898
Moths	*Hepialus humuli*	Ghost Moth	UKBAP	+			
Moths	*Hydraecia micacea*	Rosy Rustic	UKBAP	+			
Bees	*Andrena cineraria*	Ashy Mining Bee	SBL	+			
Bees	*Andrena coitana*	Small Flecked Mining-bee				+	
Bees	*Andrena helvola*	Coppice Mining-bee	SBL	+			
Bees	*Anthidium manicatum*	Wool Carder Bee	SBL	+			
Bees	*Bombus monticola*	Bilberry (Mountain) Bumblebee	SBL	+			
Bees	*Bombus muscorum*	Moss Carder Bee	SBL	+			
Bees	*Colletes daviesianus*	Davies' Colletes	SBL, EBAP	+			
Bees	*Lasioglossum villosulum*	Shaggy Furrow-bee	SBL	+			
Bees	*Osmia bicornis*	Red Mason-bee	SBL	+			
Wasps	*Dolichovespula saxonica*	Saxon Wasp	Not listed (recent colonist)			+	+
Lacewings	*Nothochrysa capitata*	Black Lacewing	Not listed	+ (5th Scottish record 2011)			
Barkflies	*Trichopsocus brincki*		Not listed	+ (only Scottish record 2008)			
Leafhoppers	*Eupterycyba jucunda*		Not listed	+ (2015, 1st Scottish record)			
Leafhoppers	*Idiocerus herrichi*		Not listed	+ (2017, 1st Scottish record)			

Annex 1 cont.

Taxonomic Group	Scientific Name	Common Name	Listings	EBG	BBG	DBG	LBG
Flowering plants	*Calluna vulgaris*	Ling	SBL		+	+	
Flowering plants	*Cirsium palustre*	Marsh Thistle	SBL		+		
Flowering plants	*Cirsium vulgare*	Spear Thistle	SBL	+		+	
Flowering plants	*Cirsium arvense*	Field Thistle	SBL	+			
Flowering plants	*Hyacinthoides non-scripta*	Bluebell	SBL	+		+	
Mosses	*Orthotrichum pumilum*	Dwarf Bristle-moss	RDB CR			+ 5th Scottish record; new to Borders	
Hornworts	*Anthoceros agrestis*	Field Hornwort					+
Hornworts	*Anthoceros punctatus*	Dotted Hornwort					+
Hornworts	*Phaeoceros laevis*	Smooth Hornwort		+			+

Annex 2

Wild plant species cultivated by RBGE and listed in the LBAPS of City of Edinburgh, Argyll and Bute, Scottish Borders and Dumfries and Galloway

EDINBURGH AND LOTHIANS BIODIVERSITY ACTION PLAN: 4 species cultivated, of 4 in Plan (100%)

Dianthus deltoides	Maiden Pink
Juniperus communis	Juniper
Silene viscosa	Sticky Catchfly
Sorbus rupicola	Rock Whitebeam

DUMFRIES AND GALLOWAY LOCAL BIODIVERSITY ACTON PLAN: 54 species cultivated (45.7%)

Allium oleraceum	Field Garlic
Alopecurus borealis	Alpine Foxtail
Anagallis arvensis	Scarlet Pimpernel
Brassica oleracea	Wild Cabbage
Campanula glomerata	Clustered Bellflower
Carex vaginata	Sheathed Sedge
Centaurea cyanus	Cornflower
Cerastium alpinum	Alpine Mouse-ear

Chelidonium majus	Greater Celandine
Chenopodium bonus-henricus	Good-King-Henry
Crepis mollis	Northern Hawk's-beard
Crithmum maritimum	Rock Samphire
Dryopteris aemula	Hay-scented Buckler Fern
Equisetum pratense	Shady Horsetail
Eryngium maritimum	Sea-holly
Euphorbia helioscopia	Sun Spurge
Fumaria capreolata	White Ramping-fumitory
Fumaria purpurea	Purple Ramping-fumitory
Galeopsis speciosa	Large-flowered Hemp-nettle
Gnaphalium sylvaticum	Heath Cudweed
Hierochloe odorata	Holy-grass
Hyacinthoides non-scripta	Bluebell
Hymenophyllum wilsonii	Wilson's Filmy-fern
Hyoscyamus niger	Henbane
Hypochaeris glabra	Smooth Cat's-ear
Inula crithmoides	Golden-samphire
Juniperus communis	Juniper
Lathyrus japonicus	Sea Pea
Limonium recurvum subsp. humile	Rock Sea Lavender
Linum perenne	Perennial Flax
Mertensia maritima	Oysterplant
Meum athamanticum	Spignel
Nuphar pumila	Least Water-lily
Osmunda regalis	Royal Fern
Oxytropis halleri	Purple Oxytropis
Papaver argemone	Prickly Poppy

Pilularia globulifera	Pillwort
Platanthera bifolia	Lesser Butterfly-orchid
Platanthera chlorantha	Greater Butterfly-orchid
Polystichum lonchitis	Holly-fern
Pseudorchis albida	Common White Orchid
Pyrola media	Intermediate Wintergreen
Salix lapponum	Downy Willow
Salix myrsinites	Whortle-leaved Willow
Saxifraga hypnoides	Mossy Saxifrage
Scleranthus annuus	Annual Knawel
Silene viscaria	Sticky Catchfly
Sinapis arvensis	Charlock
Stachys arvensis	Field Woundwort
Thelypteris palustris	Marsh Fern
Trollius europaeus	Globeflower
Vicia lutea	Yellow-vetch
Viola tricolor	Wild Pansy
Woodsia ilvensis	Oblong Woodsia

SCOTTISH BORDERS BIODIVERSITY ACTION PLAN: 20 species cultivated (52.6%)

Allium scorodoprasum	Sand Leek
Asplenium septentrionale	Forked Spleenwort
Astragalus danicus	Purple Milk-vetch
Calamagrostis stricta	Narrow Small-reed
Carex vaginata	Sheathed Sedge
Crepis mollis	Northern Hawk's-beard
Dianthus deltoides	Maiden Pink

Fumaria purpurea	Purple Ramping-fumitory
Galeopsis speciosa	Large-flowered Hemp-nettle
Genista anglica	Petty Whin
Helianthemum nummularium	Common Rock-rose
Hierochloe odorata	Holy-grass
Hymenophyllum wilsonii	Wilson's Filmy-fern
Juniperus communis	Juniper
Linnaea borealis	Twinflower
Lychnis flos-cuculi	Ragged Robin
Sedum villosum	Hairy Stonecrop
Silene viscosa	Sticky Catchfly
Trollius europaeus	Globeflower
Vaccinium uliginosum	Bog Blaeberry

ARGYLL AND BUTE LOCAL BIODIVERSITY ACTION: 2 species cultivated (100%)

Trichomanes speciosum	Killarney Fern
Astragalus danicus	Purple Milk-vetch