



FIFE **LOCAL** **BIODIVERSITY** **ACTION PLAN**

2013-2018 FOURTH EDITION

BIODIVERSITY IS ALL OF LIFE. IT IS THE WONDERFUL VARIETY OF LIVING THINGS YOU SEE AROUND YOU. IT IS ALSO OUR LIFE, AS BIODIVERSITY IS FUNDAMENTAL TO OUR HEALTH, WEALTH AND WELLBEING



WHAT IS BIODIVERSITY?

Biodiversity is all of life. It is the wonderful variety of living things you see around you. It is also our life, as biodiversity is fundamental to our health, wealth and wellbeing.

WHAT IS THE FIFE LBAP?

The Local Biodiversity Action Plan (LBAP) sets out nature conservation priorities and projects for Fife for 2013-2018. It will help to improve the condition of habitats and protect species. It will contribute to restoring and enhancing landscapes. The LBAP will help further our understanding of nature and tackle locally some of the threats that face biodiversity. It will enable local people to take part in conservation initiatives on their doorstep and help raise awareness about the value of the environment. In doing the above, the Fife LBAP will improve people's quality of life in Fife.

WHO IS IT FOR?

The Fife LBAP is for everyone who lives and works in Fife, or enjoys visiting the Kingdom. Delivery is led by the Fife Biodiversity Partnership, but anyone can take part, and many will benefit from actions, including individuals, local community groups, landowners, land managers, businesses, statutory and voluntary organisations, planners and developers. All of our actions can make a difference. And many simple actions, when put together, can change a lot. We all make use of our environment, so it is in our interest to look after it and take account of biodiversity in our actions.

HOW CAN YOU GET INVOLVED?

Anyone can get involved in protecting and enhancing biodiversity. The more people get involved, the more of a difference we can make. Whether you're interested in creating a space for wildlife in your garden or on your farm, helping to clean up a beach or plant a woodland, or getting involved in a community conservation project, we'd be delighted to hear from you.



THIS ACTION PLAN WILL HELP TO IMPROVE THE CONDITION OF HABITATS AND PROTECT SPECIES

It will contribute to restoring and enhancing landscapes

It will improve people's quality of life



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WELCOME TO THE FOURTH EDITION OF THE FIFE LOCAL BIODIVERSITY ACTION PLAN

CONTENTS

FOREWORD	2
1 Biodiversity is Life	4
2 Biodiversity in Fife	7
3 Thinking Global, Acting Local- LBAPs in Context	10
4 Landscapes and Ecosystems - Thinking Big	14
5 This Edition of the Fife Local Biodiversity Action Plan	16
6 UPLAND ECOSYSTEM	18
7 FRESHWATER & WETLAND ECOSYSTEM	20
8 LOWLAND & FARMLAND ECOSYSTEM	24
9 WOODLAND ECOSYSTEM	28
10 MARINE & COASTAL ECOSYSTEM	32
11 AWARENESS RAISING & EDUCATION	36
APPENDICES	37
1 Maps of ecosystems	37
2 Summary table of projects	48
3 Summary of Fife LBAP priority habitats and species	62
4 Partner organisations	63
5 Acronyms	64
6 Photography credits	64
REFERENCES	65

THE PLAN WILL HELP THE PEOPLE OF FIFE PLAY THEIR PART IN THE NEW 2020 CHALLENGE FOR SCOTLAND'S BIODIVERSITY, PUBLISHED BY THE SCOTTISH GOVERNMENT IN JUNE 2013 AS AN AMBITIOUS STRATEGY TO PROTECT AND RESTORE SCOTLAND'S BIODIVERSITY.

FOREWORD

Welcome to the new Fife Local Biodiversity Action Plan. This plan aims to support and direct biodiversity action in Fife over the next five years, involving individuals, organisations, local government and departments, NGOs and the business sector, all working together as members of the Fife Biodiversity Partnership.

The plan will help the people of Fife play their part in the new 2020 Challenge for Scotland's Biodiversity, published by the Scottish Government in June 2013 as an ambitious strategy to protect and restore Scotland's biodiversity.

Together we hope to continue to help tackle the key pressures affecting biodiversity in Scotland. This will include work related to:

PROTECTED SPECIES AND AREAS

The cornerstones of how we protect and enhance our natural heritage

ECOSYSTEMS AND GREEN INFRASTRUCTURE

Aiming to reduce habitat fragmentation

FORESTRY AND AGRICULTURE

Improving how we manage these significant areas of land both productively and sustainably

SUSTAINABLE USE OF RESOURCES

How we encourage best practice across all sectors of society

INVASIVE NON-NATIVE SPECIES

How we tackle the problem of non-native species in the environment

The challenge is to put biodiversity at the heart of all we do in Scotland, and we are beginning to see many successes. An example of this is here in Fife, where we have seen a marked change in the way many of our greenspaces are managed for biodiversity, which is in a large part due to the work of the Fife Biodiversity Partnership through sharing good practice amongst stakeholders and taking bold moves to make change happen.

I hope that you can help us with this challenge, and if you are interested in finding out more about biodiversity action then please go to <http://www.biodiversityscotland.gov.uk/doing/framework/strategy/> or contact the Fife Biodiversity Partnership at nature.info@fife.gov.uk

KEITH DALGLEISH
Chair, Fife Biodiversity Partnership



BIODIVERSITY IS LIFE

Biodiversity is the variety of life on earth. It includes the wonderful diversity of living things around us. Think of the incredible variety of mammals, birds, plants, fish, amphibians, reptiles, invertebrates, fungi and micro-organisms.

And you are part of that biodiversity, too.

“

This concept of biodiversity embraces all living things, from the tiniest garden ant to the Caledonian granny pine. Biodiversity is everywhere, in window box and wildwood, in roadside and rainforest, in snowfield and seaside and sky.

It is part of the natural heritage we have all inherited. In Scotland, we have a bountiful share of this richness; but we must not take it for granted. We depend on biodiversity for our quality of life. What we don't save now, our children and grandchildren will have to pay for later.

Magnus Magnusson KBE

Scotland's Biodiversity: It's In Your Hands, (2004)

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BIODIVERSITY IS A FUNDAMENTAL PART OF OUR EVERYDAY LIVES

Biodiversity has intrinsic value – it is valuable in its own right. Over 1.75 million species have been identified on earth, but scientists estimate there could be as many as 14 million! In Scotland, we have around 90,000 species¹. The biodiversity we see today is the fruit of billions of years of evolution. Indeed, most of it has been around far longer than we have. This natural wonder is worth protecting in itself.

Biodiversity is also fundamental in our everyday lives. Our social, economic and emotional wellbeing depends on it. Biodiversity provides us with food, fuel, clean water, health, wealth and other vital services. It enriches our lives and is part of our history and culture.

For instance, the oxygen we breathe is produced by plants. Fungi and invertebrates help make the soil we grow our crops in. Bacteria help break down our waste. Biodiversity provides us with the food we eat as well as the materials in our everyday lives, such as textiles, fuel and paper products. Most of our medicines have their origins in biodiversity, such as the cardiac stimulant Digoxin which comes from the common foxglove *Digitalis purpurea*.

ECOSYSTEM SERVICES

The earth's living systems, called ecosystems, underpin all human life and activities. The benefits they provide are called 'ecosystem goods and services', and these are vital to sustaining wellbeing and future economic and social development.

Provisioning services supply the goods themselves, such as food including cereals, vegetables and meat, clean water, timber, fuel and fibre, such as sheep's wool.

For example, Scotland's fishing and aquaculture industry is worth £1 billion⁴. In 2011, catches in Pittenweem alone – made up mostly of prawns – were worth £4.5 million⁵. The 120 fishing vessels in the Pittenweem district employed 165 fishermen in that year⁶.

Regulating services govern climate and rainfall, air quality, erosion control, water purification, pest and disease control, and pollination, to name a few.

For example, insect pollination services in Scotland are estimated at £43 million per year⁷. Crop pollination is a vital service in Fife, which has the highest proportion of land under cultivation of any region in Scotland.

Cultural services are the non-material benefits we get from ecosystems, including inspiration, recreation and emotional enrichment. Scotland's wildlife and landscapes are well-loved by locals and visitors alike.

Statistics suggest 40% of tourism spending in Scotland is on nature-based activities, and the value of wildlife tourism is estimated at over £270 million⁸. Fife has for six years running been the most popular outdoor destination in Scotland, with an estimated 26.5 million visits to its coast and countryside each year⁹.

Supporting services are necessary for the production of all other ecosystem services and underpin growth and production. They include soil formation, photosynthesis, water and nutrient cycling. It is difficult to put a monetary value on many of these services, such as the oxygen we breathe¹⁰. Water is also essential for life, and in Scotland lochs store almost 35 billion cubic metres and soils up to 42 billion cubic metres¹¹. In Fife, the Lomond Hills reservoirs supply drinking water to central Fife.

Investing in our natural capital is important for our welfare and long-term survival. It will also help us save money in the long run.

Based on 'Ecosystem Goods and Services', European Commission (2009)

¹Scotland's Biodiversity – It's In Your Hands (2004)

⁴Scottish Government www.scotland.gov.uk/Topics/marine

⁵Food From Fife www.foodfromfife.co.uk/23/36/0/Facts-Andamp-Figures.aspx

⁶UK National Ecosystem Assessment (2011)

<http://uknea.unep-wcmc.org>

⁷Scotsman www.scotsman.com/lifestyle/heritage/red_squirrel_ousts_nessie_as_loch_ness_s_main_attraction_1_2593299

⁸Scotsman www.scotsman.com/lifestyle/heritage/red_squirrel_ousts_nessie_as_loch_ness_s_main_attraction_1_2593299

⁹Scottish Recreation Survey: annual summary report 2011 (2012)

¹⁰Scottish Recreation Survey: annual summary report 2011 (2012)

¹¹2020 Challenge for Scotland's Biodiversity (2013)

WE ARE LOSING BIODIVERSITY AT AN ALARMING RATE

Scientists estimate that worldwide 150 to 200 species are lost every 24 hours². It is human activity that is causing this greatly accelerated loss. Human activities have multiplied extinctions of species by 50-1,000 times in the last 100 years³.

The destruction of habitats is the number one cause of species extinction. Think of the vast area in the UK that has been taken up by settlements, farmland, forestry and roads. The cumulative impacts of development have been great. Introduced invasive species, pollution, population growth and over-consumption are also to blame.

What many of us don't realise is that we are in fact harming ourselves by damaging the biodiversity we rely on.

DOING NOTHING IS NOT AN OPTION

We have to act urgently to protect biodiversity and safeguard our future. Each ecosystem is finely balanced, and if one or more species is lost, the function of the whole ecosystem can become disturbed. A degraded ecosystem will no longer be able to provide the benefits and services that we rely on. Our quality of life will suffer, so it is in our interest to manage for biodiversity.

Bees are a good example of this. These industrious pollinators are important for not only many commercial crops but also wild plants, so they play a role in maintaining healthy ecosystems. Loss of pollinators from pressures such as land use intensification and habitat destruction could have significant repercussions for ecosystem functioning and human health.

²Biodiversity Is Life (2010)

³Ecosystem Goods and Services (2009)

DOING NOTHING IS NOT AN OPTION



A degraded ecosystem will no longer be able to provide the benefits and services that we rely on



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BIODIVERSITY IN FIFE



We are fortunate to have a rich diversity of life on our doorstep. From the red grouse on the blustery peaks of the Lomond Hills to the red squirrels in our woodlands, the bumblebees that busily pollinate our meadows to the seals that play in our seas, Fife is full of fantastic wildlife.

Fife's natural heritage is extremely diverse, in part because of the influence of coastal factors and surrounding hills, as well as local geological features and landforms. When combined, these characteristics produce a richly varied tapestry of habitats, home to a wealth of species.

The Kingdom supports 26 species of European importance, including the otter, great crested newt and six types of bat on land, as well as many types of whales, dolphins and porpoises in our seas. We have over 150 UK Biodiversity Action Plan species. Iconic Scottish species such as salmon, dolphins and puffins make up the 262 species on the Scottish Biodiversity List known to occur in Fife. We also have rarities, such as white-tailed eagle and the only east coast population of the unusual Thyme broomrape.

Fife has a great diversity of habitats for a relatively small region. We can start by hillwalking through heather moorland, meander round upland lochs and follow a burn down into the lowlands, go for a stroll in a wood, walk the dog through a meadow, sit in a park or garden to watch the birds, and end up with sand between our toes at the seaside.

UPLAND

Comprised predominantly of the Lomond, Benarty, Glenduckie and Cleish Hills, distinctive habitats include heather moorland, upland calcareous grassland and blanket bog.

LOWLAND AND FARMLAND

This ecosystem contains a broad mix of habitats, including species-rich grassland, field margins and boundaries, urban greenspace and traditional orchards. These habitats are particularly important in our intensively farmed and urban landscapes.

Fife's protected species at a glance:

26 EUROPEAN PROTECTED SPECIES

113 NATIONAL PROTECTED SPECIES

150 UK BIODIVERSITY ACTION PLAN SPECIES

262 SCOTTISH BIODIVERSITY LIST SPECIES



THE DIVERSITY OF LIFE IN FIFE

- 3500** Insects
- 1550** Marine Invertebrates
- 500** Terrestrial Invertebrates*
- 200** Freshwater Invertebrates*
- 1428** Higher Plants
- 1087** Fungi
- 458** Mosses And Liverworts
- 400** Algae
- 350** Lichens
- 346** Birds
- 159** Fish
- 37** Terrestrial Mammals
- 20** Marine Mammals
- 5** Amphibians
- 2** Reptiles

Approximate number of species known to occur in Fife, from Corbet (1998) and Fife Nature Records Centre
*excluding insects

WOODLAND

Woodlands of all types make up 11% of Fife's land area. Only 1% of this woodland is ancient, covering approximately 190 hectares. Well-managed plantations such as Tentsmuir and Devilla Forests, as well as urban woodlands, are of local importance. Remnant native aspen populations are also of conservation interest.

FRESHWATER AND WETLAND

Fife has three main river systems, the Eden, Leven and Ore. As well as its watercourses, there are an estimated 400 waterbodies ranging in size from small ponds to large lochs and reservoirs. Wetland habitats include marsh, reedbeds and lowland raised bogs.

MARINE AND COASTAL

Fife has 179 kilometres of coastline, with cliff, strandline, sand dune, saltmarsh and intertidal habitats. The peninsula is bounded by the internationally important Firth of Forth, Firth of Tay and Eden estuaries. These are exceptionally valuable for their wintering wildfowl and wading birds and breeding and migratory seabirds. The shallow seas at St Andrews and Largo Bays provide some of the richest feeding grounds for fish and seabirds in the country.

Many areas in Fife have a special conservation status because they are home to some of our most valuable wildlife, habitats, geology and scenery. There are over 150 sites with natural heritage designations covering almost 65,000 hectares⁴.



FIFE'S PROTECTED AREAS AT A GLANCE

International designations

- 4 Special Protection Areas (SPA)
- 2 Special Areas of Conservation (SAC)
- 3 Ramsar Sites

National designations

- 2 National Nature Reserves (NNR)
- 54 Sites of Special Scientific Interest (SSSI)

Local designations

- 7 Local Nature Reserves (LNR)
- 1 Regional Park
- 3 Country Parks

Non-statutory designations

- 10 Scottish Wildlife Trust Reserves
- 82 Wildlife Sites
- 7 Regionally Important Geological and Geomorphological Sites (RIGS)

⁴Natural Heritage Designations in Fife: A Guide (2005)

As such, Fife makes an important contribution to Scottish, UK and international biodiversity. This rich diversity is highly valued by people. From 2005 to 2011, Fife has consistently been the most popular outdoor destination in Scotland, with an estimated 26.5 million visits to its coast and countryside each year ^{5,7}.

But we must also remember that through human activity we have heavily modified Fife's landscape. This has meant a significant loss of biodiversity to urbanisation, industrialisation and agriculture. Arable land takes up 65% of the area of Fife, the highest proportion of land under cultivation of any region in Scotland. Urban areas take up a further 10% and roads criss-cross the Kingdom.

As a result, remaining natural habitats are small in size and highly fragmented. We are left with pockets of vulnerable habitat which struggle to function as islands in an increasingly degraded environment.

There continue to be strong development pressures on land for industrial regeneration, housing and recreation. Climate change, intensive farming, pollution and non-native invasive species also pose a serious threat.

As long as this is the case, we need to continue to take local action to safeguard our biodiversity and our quality of life.

⁵Scottish Recreation Survey: annual summary report 2008 (2010)

⁷Scottish Recreation Survey: annual summary report 2011 (2012)

FIFE HAS SEEN SIGNIFICANT LOSS OF BIODIVERSITY TO URBANISATION, INDUSTRIALISATION AND AGRICULTURE. WE NEED TO CONTINUE TO TAKE LOCAL ACTION TO SAFEGUARD OUR BIODIVERSITY AND OUR QUALITY OF LIFE

THINKING GLOBAL, ACTING LOCAL - LBAPS IN CONTEXT



INTERNATIONAL

One of the most important international instruments to protect biodiversity and ensure it is used sustainably is the Convention on Biological Diversity. It was inspired by the world community's growing commitment to sustainable development. Adopted in 1992 in Rio, it has been ratified by 168 countries.

BIODIVERSITY IS A KEY INDICATOR OF SUCCESS IN ACHIEVING SUSTAINABLE DEVELOPMENT.

Co-ordinated action at an international scale is important. It ensures that migratory species, such as swallows and leatherback turtles, are adequately protected. It enables national protection of species that are not common in other countries. For instance, Scotland is internationally important for its heather moorland and lowland raised bog.

NATIONAL

The Convention on Biological Diversity asks all of its signatories to develop a national biodiversity strategy and action plan. 'Biodiversity, the UK Steering Group's Report: Meeting the Rio Challenge' was published by the government in 1995. This report formed the basis for the first Local Biodiversity Action Plans. Since then, Scotland has published 'Scotland's Biodiversity: It's In Your Hands', followed by a supplementary document in 2013 to address international developments, '2020 Challenge for Scotland's Biodiversity: a strategy for the conservation and enhancement of biodiversity in Scotland'.

These two documents are together known as the Scottish Biodiversity Strategy, which aims to:

Protect and restore biodiversity on land and in our seas, and to support healthier ecosystems

Connect people with the natural world, for their health and wellbeing and to involve them more in decisions about their environment

Maximise the benefits for Scotland of a diverse natural environment and the services it provides, contributing to sustainable economic growth

LOCAL

To help deliver national biodiversity objectives, Scotland is split into 25 local biodiversity plan areas. Local plans identify actions to help protect priority species and habitats as well as those that are cherished and valued locally. The first Fife LBAP was published in 1997. We are now on the fourth edition.

Other local policies and plans also contribute towards protecting biodiversity. For instance, the Local Development Plan plays a key role in the protection of habitats, mitigating the effect of development on biodiversity, and identifying opportunities for the provision of habitat and reduction of fragmentation.

IT IS AT THIS LOCAL LEVEL THAT IMPLEMENTATION TAKES PLACE AND WHERE WE SEE THINGS HAPPEN ON THE GROUND.

DO A LITTLE, CHANGE A LOT

“Our individual actions may seem insignificant and unimportant when set against the great environmental issues of our time, but remember that the issues we face today are precisely the result of millions of small actions”

Scotland's Biodiversity: It's In Your Hands (2004)

We all have a role to play in looking after our environment. Here are some examples of actions from a volunteer, Council employee, business, homeowner, farmer and community group.



IAN LEWIS

Glenrothes, Volunteer for Fife Coast & Countryside Trust and Fife Amphibian & Reptile Group

Volunteers play a very important role in helping us to protect, improve and learn about our local environment.

Ian has made a big contribution to conservation in Fife over the last five years, from monthly wetland bird surveys in the Lomond Hills, which contribute to a national monitoring scheme, to his huge input to the Fife Coast & Countryside Trust photo library. A committee member of the Fife Amphibian & Reptile Group, Ian is also regularly out with a spade and wellies restoring and creating ponds for wildlife.

“I have found volunteering with FCCT and FARG to be the perfect therapy after a long period of ill health. I get a real buzz from being in the great outdoors, doing things that really make a difference and getting that feeling of giving something back to my community. Fife's biodiversity is phenomenal, as I've learned over the last five years, and it's great to be a small part of promoting and conserving it.”



SCOTT CLELLAND

Team Leader for the Kirkcaldy area, Parks & Countryside, Fife Council

Dunnikier Park is an important area of greenspace for the people of Kirkcaldy. Much of the area was maintained as amenity grassland with little wildlife value.

Fife Council's Parks team in partnership with a number of local groups decided to create a haven for wildlife which visitors could also enjoy. Ponds were created, wildflower meadows sown, woodland and an orchard planted. A key priority was to engage with local schools and provide a facility for their activities. As wildlife starts moving in, pupils from nearby Kirkcaldy High School will keep an eye on the oasis and monitor the increasing number of species.

“In Kirkcaldy, we are proud of our diverse range of parks, open spaces, woodlands and coastal fringe. Working with a variety of interested groups we all work hard to improve the quality and accessibility of our facilities ensuring we provide a positive impact on the wellbeing of the local community. The value of these local places can be enhanced substantially by the understanding of conservation and habitat creation, whether it is the installation of a bird box or the creation of a bog area. Adding wildlife value to our green open spaces can be an exciting opportunity for individuals to get involved in making a difference to how we manage our environment. I have no doubt that this approach will stimulate a change in how we work with communities throughout Fife.”



RICHARD SMITH

Homeowner, Saline

“I'm always amazed how much natural drama you can see from the kitchen window. It could be a sparrowhawk swooping through the garden or fighting hedgehogs competing over territory. The garden has had over forty species of bird and now that I'm moth trapping, a hidden world has been opened up which I never knew was there!”

Nearly a third of Fife's settlements are made up of gardens. This makes them valuable oases for wildlife, and their importance has increased as space for wildlife in the wider countryside has declined.

Gardens could be the biggest nature reserve in Britain! Little changes can make a big difference for wildlife, all the more so if many of us make these changes. Richard has planted shrubs with berries for the birds. He ensures that the plants in the garden have a long flowering season; from winter through to autumn there is always something in bloom with nectar for wildlife. A corner provides shelter for small mammals and insects, with a wildflower area and piles of branches and leaves. There's a garden pond where frogs, toads and newts have moved in. Nest boxes for birds, bats and hedgehogs are dotted about, too. Richard's latest addition is a green roof on his work shed to encourage bees and butterflies.



PATRICK BOWDEN-SMITH

Farmer, East Neuk of Fife

“We practice multi-purpose land management where every action has several positive knock on effects, and this in turn means that we operate a more diverse, interesting and above all sustainable system where everything benefits. We are not afraid to think out of the box and experiment with new ideas and technology, therefore also providing a valuable demonstration and teaching resource for all to share.”

Pittarhie Farm adopts a 'whole farm' approach and aims to be diverse, productive and sustainable.

Over the years, the family has transformed their land into an area that helps conserve and enhance wildlife and natural resources, without detriment to the viability of the farming operation. Projects have included a home-made integrated drainage system, a wetland and nitrate filters, burn restoration, wildflower meadow margins and planting of hedgerows for wildlife corridors. The farm supports a rich diversity of wildlife, including sea trout, otter, brown hare and a wealth of birds.



CHRISTINE GRAHAM

Quality Manager, Noble Foods, Thornton

At the beginning of 2012, Noble Foods at Thornton decided to take action to improve their grounds for biodiversity.

Staff formed an enthusiastic group which gets together twice a month. Projects have included the creation of a wildflower meadow, a woodland walk sown with native bluebell seeds, a pond survey, and a staff bird box building competition. In 2013, nine of the twenty boxes were used and the site's pond supported breeding swans, ducks and coots. A circular path has been cut through the grounds for lunchtime walks and wildlife watching, and new picnic benches allow outdoor breaks. Staff even come in at weekends to enjoy the area! The group now plans to build a bird hide.

“Staff engagement has really flourished with the project and all are very keen. The grounds are now being used at break times and we had a Staff Fun Day on a Saturday where employees' children and grandchildren were invited on to the site. This included an organised walk through the biodiversity area and we received a lot of good feedback. Our rearing farms have been inspired to establish similar projects on their land. They've been invited to join the biodiversity group as they want to use some of our work to help them.”



STAN WELCH

Chair, West Fife Woodlands

“Since the group was formed at the end of 2006 it has worked tirelessly to improve paths across West Fife's woodlands. This has been achieved by a combination of securing lottery funding to employ a contractor to create new multi-user paths and the use of volunteers at the group's popular woodland workouts. The work of volunteers is essential to maintain paths which otherwise would quickly become overgrown. The group also has permission from Forestry Commission Scotland and Fife Council to carry out minor woodland management in their woodlands. This is carried out sensitively with improving the biodiversity of the area always in mind. We have also worked with FCS to create a community woodland of native tree species, planted with the assistance of pupils from four local primary schools. However the group is perhaps best known for its annual Valleyfield Snowdrop Festival. This lasts for five weeks during which time volunteer guides escort several hundred school children and many more members of the general public around Valleyfield Woodland Park, where they get to see magnificent displays of snowdrops and to hear about the former Valleyfield Estate and its designed landscape.”

This community group has made a real difference by enabling local people to visit, learn about and enjoy their woodlands. The group runs regular guided walks and members and volunteers also take part in practical work to improve woodlands for wildlife. The group has raised tens of thousands of pounds to improve the path network in and around woodlands in West Fife.”

“FIFE'S BIODIVERSITY IS PHENOMENAL, AND IT'S GREAT TO BE A SMALL PART OF PROMOTING AND CONSERVING IT”



LANDSCAPES & ECOSYSTEMS...

Wildlife is dependent upon a complex, interconnected environment, so a piecemeal approach to nature conservation cannot be effective.

AN ECOSYSTEM – OR A LIVING SYSTEM –

CAN BE ANYTHING FROM A POND OR A FOREST TO A RIVER CATCHMENT, AN ISLAND OR AN OCEAN. BECAUSE IT FUNCTIONS AS A SYSTEM, WHAT HAPPENS TO ONE PART OF AN ECOSYSTEM CAN AFFECT OTHER PARTS.

HEALTHY, RESILIENT ECOSYSTEMS ARE THE BASIS FOR SUSTAINING PEOPLE AND BIODIVERSITY.

WHAT IS ECOSYSTEM HEALTH?

A healthy ecosystem, like a healthy person, is one where all parts continue to work well individually and together. It has ecological integrity.

WHAT IS ECOSYSTEM RESILIENCE?

This is the ecosystem's ability to absorb disturbances while retaining its structure and way of functioning. It has to do with the ecosystem's ability to adapt to stress and change, such as invasive non-natives species and climate change.

A healthy, resilient ecosystem can continue to provide us with the ecosystem goods and services that we rely on.

An ecosystem approach can be applied at any scale, but it requires joint working. It should be applied to any policy, plan or action which affects the environment, whether it's building a new road, writing a forest design plan, setting up a fishery or putting together a development plan. It also needs policies and actions at different levels and in different sectors to be integrated.

Remember that restoring damaged ecosystem services or paying for their loss is far more costly than protecting and enhancing what we have in the first place⁶.

⁶ 2020 Challenge for Scotland's Biodiversity (2013)

“The Ecosystem Approach is “a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way, and which recognises that people with their cultural and varied social needs are an integral part of ecosystems”

Definition from the Convention on Biological Diversity



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“Ecosystems don't depend on economies but economies depend on ecosystems”

The Economics of Ecosystems and Biodiversity (2010)

”

THINKING BIG!

Three principles need to be followed in an Ecosystem Approach⁷:

- **Take account of how ecosystems work.** Nature connects across landscapes, so think of implications now and in the long-term, locally and at a broad scale. For instance consider the importance of a floodplain in flood regulation when making land-use decisions in a catchment.
- **Take account of services that ecosystems provide to people.** This includes regulating climate and flood, providing food, fuel and water, and breaking down our waste. Remember that they underpin our health, wealth and wellbeing. For instance, consider how your activity pollutes the environment. Pesticides can harm important crop pollinators and herbicides can pollute drinking water.
- **Involve people.** Those who benefit from the ecosystem services and those managing them need to be involved in decision-making. This means valuing people's knowledge, helping people participate, and giving people greater ownership and responsibility.

We need to reconnect fragmented habitats and populations, and ensure that as climate change takes effect, wildlife can move and adapt as far as possible. The Integrated Habitat Network (IHN) is a mapping tool which highlights existing habitat networks and can help identify opportunities to enhance these, which in turn could help improve ecosystem function. The IHN should be consulted when decisions affecting the environment are made. This will help target enhancement and reduce further fragmentation of habitats.

Putting conservation in financial and human terms is particularly important in the current economic climate, when conservation is often seen as a luxury or of least priority.

⁷ Applying an ecosystem approach to land use: information note (2011)

LOCAL PROJECTS WHICH ENHANCE ECOSYSTEM SERVICES

The dune restoration project at West Sands, St Andrews, contributes to coastal protection, flood defence, recreation and enhancing the natural beauty of a landscape

Pond and wetland creation projects such as the ones at Leslie and Dunning Golf Course support a wealth of wildlife and help flood mitigation, pollution filtration and carbon capture and storage

Encouraging native wildflowers along field margins creates a habitat for wildlife as well as attracting valuable crop pollinators.



THIS EDITION OF THE FIFE LOCAL BIODIVERSITY ACTION PLAN

The Fife Biodiversity Partnership felt that it was important for this edition to reflect changes in the national and international approach to conservation and move towards the Ecosystem Approach.

THE BIGGER PICTURE

We would like to better protect and enhance biodiversity in Fife by thinking in terms of landscapes and ecosystems wherever possible. This will include helping to reconnect habitat such as fragmented woodland, extending the distribution of habitats such as ponds and wetlands to create stepping stones for wildlife, and tackling threats such as invasive non-native species at a catchment scale.

However, landscape-scale conservation presents challenges as well as exciting opportunities, such as the need for widespread landowner consent and big funding packages. By the very nature of LBAPs and their means of implementation, it would be difficult for all projects to be landscape-scale.

We also wish to build on the successes, partnerships and momentum of the third edition. As such, this edition of the Fife LBAP moves towards the Ecosystem Approach whilst still including projects on specific species and sites. The seven priority species and 14 priority habitats in the third edition provide a degree of focus within each of the five ecosystems.



WHAT ARE WE TRYING TO ACHIEVE?

Our aim is to protect and enhance biodiversity for its intrinsic value as well as for the health, wellbeing and enjoyment of the people of Fife.

We hope to achieve this by maintaining and improving the condition of habitats, reducing the pressures on nature, creating new habitat and improving its connectivity, and involving people in the enjoyment and conservation of their environment.

OVERARCHING OBJECTIVES

Maintain and increase the extent, distribution and connectivity of ecosystems

Maintain and where possible improve ecosystem health

Involve local people in conservation actions and thereby raise awareness and enjoyment of ecosystems

WHO EXACTLY ARE 'WE'?

A huge variety of partners can contribute to implementation of the Fife LBAP, including local community groups, landowners and land managers, statutory and voluntary organisations, local expert groups, businesses, planners and developers, and individuals – from homeowners to volunteers. Public bodies have a duty under the Nature Conservation (Scotland) Act 2004 to further the conservation of biodiversity. Some partners have already committed to projects within this plan. New partners are welcome to come on board at any time. The more people get involved, the more of a difference we can make.

THE ECOSYSTEM CHAPTERS

Each ecosystem has its own chapter giving a description of that ecosystem, associated key habitats and species carried over from the third edition, a list of key sites, ecosystem services, indicators of ecosystem health, threats and objectives. Core LBAP projects are then listed. These provide a focus for LBAP action and for wider biodiversity projects across Fife. For further information, a summary table in Appendix 2 gives additional detail against each action of specific work which will be carried out. Many projects help protect more than one ecosystem.

FIVE DYNAMIC YEARS

The lifespan of this edition is 2013-2018, however it is important that the LBAP remains dynamic in order to take advantage of opportunities as they arise, including new projects, partners and sources of funding. As such, the action plan will be updated annually so that actions can be added or amended.

Local strategies, policies and initiatives with overlapping objectives

Fife's Community Plan 2011-2020

Fife Economic Strategy 2009-2020

Fife Greenspace Strategy 2012-2016

Fife Forestry & Woodland Strategy 2013-2018

Fife Shoreline Management Plan

Local Climate Change Impact Profile 2000-2010

Fife Council Climate Change Adaptation Framework

Fife Access Strategy 2006-2016

Fife Tourism Strategy 2007-2015

St Andrews And East Fife Local Plan

Dunfermline And West Fife Local Plan

Mid Fife Local Plan

Fifeplan Local Development Plan

Fifeplan MIR 'Green Networks In Fife' Background Paper

Green Infrastructure Supplementary Planning Guidance

Planning Supplementary Guidance Wind Energy

Take A Pride In Fife Initiative

Integrated Habitat Network

Fife Partnership Against Wildlife Crime

UPLAND ECOSYSTEM

Scotland's uplands are a unique landscape rich in wildlife and special to people. Globally, the purple swathes of heather moorland are virtually confined to Great Britain.

The upland ecosystem covers a relatively small proportion of Fife, mostly on the Lomond, Benarty, Glenduckie and Cleish Hills. Yet locally these hills are a striking, popular landscape offering spectacular vistas. They also support a wealth of wildlife such as red grouse, ravens, short-eared owls, water voles, poplar hawk-moth, green hairstreak butterfly, waxcaps, aspen, fragrant orchid and heather.

Our upland ecosystem is valuable for its assemblage of habitats and species, for the pleasure this landscape brings to people, and for the ecosystem services it provides us with. The enjoyment and benefits we derive from our uplands, such as hillwalking, angling and wildlife-watching, are dependent upon the health of the ecosystem.

Fife's priority upland habitats

Heath and moorland

Upland calcareous grassland

Blanket bog

Upland flush fen and swamp

“ The uplands, embracing the hills, moors and mountains, form the largest extent of undeveloped wildlife habitat remaining in Britain. They are typically above the limits of enclosed farmland and are composed predominantly of dwarf shrub heaths, grasslands and peat bogs.

Ratcliffe and Thompson (1988)

”

Key Sites

North Fife Heaths SSSI

Lacesston Muir And Glen Burn Gorge SSSI

Ballo And Harperleas Reservoirs SSSI

Craigmead Meadows SSSI

Holl Meadows SSSI

Park Hill & Tipperton Moss SSSI

Wether Hill SSSI

Benarty Hill Wildlife Site

Glenduckie Hill Wildlife Site

Largo Law Wildlife Site

Keystone species or indicators of ecosystem health

Moorland birds

Moths and butterflies

Vascular plant diversity

Invasive non-native species

UPLAND ECOSYSTEM SERVICES

These are some examples of the services which a healthy upland ecosystem provides:

Flood prevention, for instance bogs absorb rainfall and allow the slow release of water to rivers and the lowlands

Carbon sequestration, especially by bogs which act as carbon storage systems

Domestic water supply, for instance the Lomond Hills reservoirs supply drinking water to central Fife

Agriculture, including grazing for sheep and cattle and production of lamb

Recreation, including hillwalking, angling and field sports. Walking is by far the most popular activity in the Lomond Hills

Tourism, for instance the Lomond Hills Regional Park receives over 600,000 visits each year, and many of these visitors contribute to the local economy

KEY PRESSURES ON THE UPLAND ECOSYSTEM

Agriculture

Inappropriate grazing intensity from sheep, poorly managed muirburn, drainage of wet habitats, and habitat loss to agricultural buildings and infrastructure.

Woodland

Loss and fragmentation of habitat to afforestation and scrub encroachment on inappropriate, sensitive sites. Native upland woodland expansion is desirable in the right locations.

Development

Infrastructure development for renewable energy, roads and tourism, and to a lesser degree for housing and industry. The impact of wind farm development on species and habitats can be significant. Fife Council has produced Wind Energy Supplementary Planning Guidance to help ensure that environmental and cumulative impacts are satisfactorily addressed.

Recreation and tourism

The uplands are under increasing pressure from recreation. Footpaths and tracks are the most visible impacts. Wetter habitats such as blanket bog can be particularly vulnerable to the effects of trampling.

Climate change

Over the coming decades, it is likely that average temperatures and the proportion of annual rainfall will increase in the winter and decrease in the summer. This will affect many upland species and habitats, some of which will have nowhere to move to as their climate space disappears.

Pollution

This includes nitrogen deposition from atmospheric pollution as well as nitrogen input from grazing animals.

Field sports

The impacts of management for field sports is not of significant concern in Fife at present. Game species include red grouse and deer as well as trout, and adverse impacts can come from muirburn and trampling and overgrazing by deer.

OBJECTIVES

Maintain and increase the extent, distribution and connectivity of upland ecosystems

Maintain and where possible improve the health of upland ecosystems

Involve local people in conservation actions and thereby raise awareness and enjoyment of upland ecosystems



ACTIONS

For additional breakdown of actions, see Appendix 2.

UPLAND HEATHLAND

Improve the condition of 655 hectares of heather moorland in the North Fife Heaths, Lomond and Benarty Hills by bringing into or improving management. Use one of these areas as a good practice demonstration site. Assess condition of sites using a consistent monitoring methodology.

SNH, landowners, Falkland Centre for Stewardship, Falkland Estate Trust, Elmwood College, LLLP

UPLAND CALCAREOUS GRASSLAND

Improve the condition of Holl and Craigmead Meadows by working in partnership with landowners to annually cut or graze the sites. Assess condition of sites using a consistent monitoring methodology.

FCCT, Falkland estate, Scottish Water, SNH, Fife Council

UPLAND MANAGEMENT

Based on upland habitat and condition surveys, create management plans for up to 10 landholdings to record current land management practices and identify opportunities to enhance upland habitat including heath, native woodland and scrub, grassland and mire habitats. Prioritise proposed management recommendations and deliver measures to support sustainable livestock management and habitat restoration. Hold one upland management workshop to demonstrate good practice. This project is subject to securing funding.

FCCT, LLLP, landowners and managers, Elmwood College

MONITORING AND SURVEYING

Monitor moorland birds in the Lomond Hills Regional Park as indicators of upland ecosystem health through an annual survey with students and volunteers

Elmwood College, Fife Council, FCCT

Co-ordinate and publicise a public survey of the green hairstreak butterfly as an indicator species of upland ecosystem health.

FNRC, Fife Council, Butterfly Conservation

Undertake a Phase 1 survey as well as a habitat condition assessment of the Lomond and Benarty Hills to inform and prioritise the protection and enhancement of the quality, extent, connectivity and diversity of upland habitat. Subject to securing funding.

FCCT, LLLP

AWARENESS RAISING

Develop interpretation to increase enjoyment, awareness and understanding of the natural and cultural heritage of the Lomond Hills Regional Park. This will include outdoor interpretation and signage, a website, leaflets and two indoor information 'hubs' at Falkland and Lochore Meadows Country Park. Subject to securing funding.

LLLP, FCCT, Falkland Centre for Stewardship, Fife Council

FRESHWATER & WETLAND ECOSYSTEM



With its high rainfall and rugged, glaciated landscape, Scotland has a rich variety of freshwater and wetland habitats. From small ponds, burns and bogs, to rivers, reservoirs and lochs, our wet habitats form part of a unique landscape rich in wildlife and special to people. This ecosystem provides us with clean water, helps to moderate floods, store large amounts of carbon, provide water during droughts and maintain river flows. Activities such as angling, wildlife-watching and watersports are dependent upon the health of the ecosystem

Fife has three main river systems, the Eden, Leven and Ore. As well as its watercourses, there are an estimated 400 waterbodies covering some 831 hectares, ranging in size from small ponds to large lochs and reservoirs. The average number of ponds per square kilometre is still less than the national average of 2.8. In addition, there are about 348 hectares of mire habitats and 197 hectares of swamp and marginal habitats.

Water and wetland supports a wealth of wildlife. Our ponds are home to frogs and toads, the elusive great crested newt, marsh marigolds and flag irises. Some of our lochs are very important for wintering waders and wildfowl. Rivers and burns support otter, water voles, the spectacular kingfisher, sea trout and salmon. Our wetlands, such as raised bogs, marshes and swamp, are rich in sphagnum mosses and peppered with sundews and orchids, dragonflies and damselflies. Raised bogs in particular play a very important role in water retention and carbon storage.

Our freshwater and wetland ecosystem is valuable for its assemblage of species and habitats, for the pleasure it brings to people and for the ecosystem services it provides us with. This ecosystem overlaps with all other ecosystems.



Fife's priority freshwater and wetland habitats

Inland freshwater, including:

- Lowland fens
- Lowland raised bog
- Rivers
- Ponds
- Reedbed

Fife's priority freshwater and wetland species

- Water vole
- Great crested newt

Key sites

- Cameron Reservoir SPA, Ramsar, SSSI
- Morton Lochs SSSI, within Tentsmuir NNR
- Cullaloe LNR, SWT Reserve & SSSI
- Birnie & Gaddon Lochs LNR
- Coul Den LNR
- Dalbeath Marsh LNR & SSSI
- Bankhead Moss SWT Reserve & SSSI
- Barnyards Marsh SWT Reserve
- Ballo & Harplerleas Reservoirs SSSI
- Lindores Loch SSSI
- Lockshaw Mosses SSSI
- Park Hill & Tipperton Moss SSSI
- Star Moss SSSI
- 12 additional SSSIs
- 28 Wildlife Sites
- Lochore Meadows Country Park
- Townhill Country Park

Reedbed key sites include:

- Mugdrum Island within Firth of Tay and Eden Estuary SPA, SAC & Ramsar
- St Margaret's Marsh SSSI
- Firth of Forth SSSI, SPA, Ramsar

Keystone species or indicators of ecosystem health

- Wintering waders and wildfowl
- Otter
- Amphibians
- Freshwater macro-invertebrates
- Invasive non-native species

FRESHWATER & WETLAND ECOSYSTEM SERVICES

These are some examples of the services which a healthy freshwater and wetland ecosystem provides:

Products such as clean water, fish and water for irrigation. The Lomond Hills reservoirs supply water to central Fife

Flood management and control to reduce flood risk, for instance bogs absorb rainfall and allow the slow release of water to rivers

Regulation of water quality, including water purification through de-nitrification and dilution of pollution

Carbon sequestration and storage by wetlands and especially by bogs

Water-based recreation, including angling. Townhill Loch has a popular waterski centre and Loch Ore a sailing club

Water-edge recreation and tourism, such as bird watching, cycling and walking

KEY PRESSURES ON THE FRESHWATER AND WETLAND ECOSYSTEM

Agriculture

Pressures from drainage of wetter upland habitats, diffuse pollution from run-off of fertilisers, herbicides, pesticides, silage and other effluents. Damage from bank erosion and over-grazing by cattle and sheep, channel straightening, bank reprofiling, wetland drainage and eutrophication. Soil erosion and pollution of water courses from intensive potato, soft fruit and vegetable operations, worsened by de-stoning.

Woodland

Although there have in recent years been significant improvements in woodland establishment and management practices, poorly planned and managed woods can lead to the siltation, eutrophication and/or acidification of rivers and lochs. However, well planned and managed woodlands can help protect and enhance water quality and wetland habitats.

Development

This includes dredging and watercourse straightening, for instance for flood defence schemes, road development which can lead to changes to and loss of habitat, and bank erosion and river bed damage. Impermeable surfaces can lead to excessive run-off and pollution.

Water abstraction

For domestic and industrial water supply as well as irrigation. Dams and reservoirs can affect migratory fish as well as water levels downstream.

Waste water management

Sewage, industrial and agricultural discharges can all have polluting impacts, leading to damage and loss of habitats, species and eventually ecosystem health.

Fish farming and aquaculture

Pressures include localised nutrient input from fish faeces and waste feed. There can also be a threat to native fish species from genetically different fish populations.

Invasive non-native species

Introduced plants and animals cause changes in aquatic ecology at specific sites as well as within entire catchments. Species include mink, signal crayfish, giant hogweed, Japanese knotweed, Himalayan balsam and Canadian pondweed.

Recreation and tourism

Recreation pressures on rivers and lochs have significantly increased and can put pressure on the quality of the freshwater environment as well as introduce threats, such as invasive non-native species.

Climate change

Over the coming decades, it is likely that average temperatures and the proportion of annual rainfall will increase in the winter and decrease in the summer. Floods and droughts are forecast to become more extreme. This will affect many species and habitats, some of which will have nowhere to move to as their climate space disappears. It may also exacerbate some human impacts, such as eutrophication.

OBJECTIVES

Maintain and increase the extent, distribution and connectivity of freshwater and wetland ecosystems

Maintain and where possible improve the health of freshwater and wetland ecosystems

Involve local people in conservation actions and thereby raise awareness and enjoyment of freshwater and wetland ecosystems



THE FRESHWATER AND WETLAND ECOSYSTEM PROVIDES US WITH CLEAN WATER, HELPS TO MODERATE FLOODS, STORE LARGE AMOUNTS OF CARBON, PROVIDE WATER DURING DROUGHTS AND MAINTAIN RIVER FLOWS



ACTIONS

For additional breakdown of actions, see Appendix 2.

CREATE PONDS AND WETLANDS TO INCREASE EXTENT AND DISTRIBUTION OF THIS HABITAT

Facilitate the creation of four ponds or wetlands per annum with the help of local community groups or volunteers where possible. Consult the Integrated Habitat Network to identify priority enhancement areas with maximum opportunity to increase 'stepping stones'.

FARG, Fife Council, Take a Pride in Levenmouth, CLEAR Buckhaven, Leslie Community Council, FCCT

RESTORE OR ENHANCE HABITATS

Secure funding to undertake two restoration projects of watercourses with 'poor' or 'bad' ecological potential in accordance with SEPA's classification. Support other river restoration projects and work with local communities and volunteers where possible.

Fife Council

Facilitate three river clean-up events per annum with the support of local communities, volunteers and/or school groups.

Fife Council, Take A Pride in Fife, FCCT, Friends of Riverside Park, RAF Leuchars Conservation Group

Restore two ponds or wetlands per annum with the help of volunteers.

FARG, FCCT, Fife Council

Improve the condition of three raised bogs, Lockshaw Mosses, Wether Hill and Park Hill & Tippeton Moss SSSIs, by working with landowners to bring them into positive management.

SNH, FCS, landowners

Bring two key reedbed sites into management to maintain and enhance their condition.

Fife Council

PROTECT HABITAT

Revise the Fife Council urban greenspace herbicide application regime, with the aim of reducing spraying by half.

Fife Council

Protect and enhance Dalbeath Marsh SSSI in line with the management plan by installing a water control sluice to re-establish the marginal aquatic communities, controlling Japanese knotweed, removing encroaching scrub, managing grassland, monitoring ground flora, and carrying out four litter picks per annum with the support of school and community groups. Create new interpretation for the site.

FCCT, Friends of Dalbeath Marsh

Manage Drumdreel pond once per annum with the help of volunteers and trainees by keeping silt traps clear, managing willow scrub and cutting wildflower banks. Carry out a baseline species survey.

Falkland Centre for Stewardship, FARG

Protect and enhance Birnie and Gaddon Local Nature Reserve in line with the management plan by managing the two islands for ground nesting birds, controlling invasive non-native species and monitoring notable wildlife to inform management. Work with local communities, schools and volunteers.

FCCT

INVASIVE NON-NATIVE SPECIES MANAGEMENT

Deliver a project to survey and eradicate giant hogweed along a 10km stretch of the River Eden from Burnside to Ladybank. Involve and train volunteers. Subject to securing funding.

FCCT, LLLP

Secure funding for a Fife-wide Invasive Non-Native Species Officer to deliver a project to raise awareness about and facilitate control of INNS, including plants, crustaceans and mammals, which will help protect native wildlife including fish, ground-nesting birds, the water vole and red squirrel. Include the production of an INNS control strategy for Fife.

Fife Council, FCCT

Control invasive non-native species in the Eden Estuary Local Nature Reserve three times per annum targeting giant hogweed, Japanese knotweed and Himalayan balsam.

FCCT

Support and promote the Forth Invasive Non-Native Species Project in Fife by encouraging submission of records and facilitating the training of volunteers and staff in survey, monitoring, control and management of invasive non-native plants.

Fife Council, FCCT, River Forth Fisheries Trust, Take a Pride in Fife, SNH, SEPA

MONITORING

Monitor ponds and satellite ponds at Pitmedden for great crested newts and other amphibians annually.

FARG

Encourage the biological recording of fish and other riparian species. Create a leaflet and form to be inserted in 'catch returns booklets' and distribute to fisheries trusts and angling groups. Annually exchange records with fisheries trusts.

Fife Council, FNRC, River Forth Fisheries Trust, Tay Salmon Fisheries Board

SURVEYING

Co-ordinate and publicise a Fife-wide public survey of an indicator species of ecosystem health or an invasive species which threatens ecosystem health.

FNRC, FARG, FCCT

Resurvey the Fife wader population as an indicator species of ecosystem health, using the 1992 and 1996 surveys as a baseline.

Fife Council, RSPB, FNRC

Survey at least five new sites annually for reptiles and amphibians. Priority sites include the Goose Pools at Tentsmuir, Balmullo Hill, Townhill Muir, Leuchatsbeath, Petrie's Ponds and Earlsall Muir.

FARG, FCCT, Fife Council, Amazon

EDUCATION AND AWARENESS RAISING

Raise awareness of amphibian and reptile conservation by holding one Newt Night and attending a minimum of two public events per annum.

FARG

Hold three pond dipping sessions per annum with children to raise awareness about this important habitat and associated species.

St Andrews Botanic Garden Education Trust

Through written and online media, raise awareness about the importance of seasonal standing water and ponds on farmland.

Fife Council

By producing written information and holding an event, raise awareness within Fife Council about SUDS enhancement and best practice in management which affects watercourses.

Fife Council



LOWLAND & FARMLAND ECOSYSTEM



This is a broad and diverse ecosystem which covers both farmland and urban areas. These are both strongly influenced by human use and share the same types of habitats, such as grassland and hedgerows. Lowland and farmland habitats can support a rich diversity of species, from bats and butterflies to birds and veteran trees. Wildlife and semi-natural habitats are an integral component of our most intensively managed landscapes, where they help maintain ecosystem services such as pollination, water purification and pollution filtration⁸.

On intensively managed farmland, important areas for biodiversity are mostly found in less managed areas along field margins, hedgerows and long-established pastures. In Fife, arable land takes up 65% of the area, the highest proportion of land under cultivation of any region in Scotland. More extensive systems such as hill farming and crofting can support a high diversity of species and habitats.

Urban areas include green networks made up of public parks, private gardens, growing spaces, school grounds, golf courses, cemeteries and other greenspace. These are important spaces for public recreation, health and wellbeing as well as for biodiversity. In fact, greenspace is where people most frequently encounter wildlife. Well-connected greenspace is particularly important because it acts as a wildlife corridor in the built-up environment. So although urban areas take up about 10% of Fife's land area, 59% percent of this is green network land, of which 27% is made up of private gardens.

Species-rich grassland is one of the most diverse as well as threatened habitats in the UK. We have lost 98% of our flower-rich meadows and grasslands since the 1930s⁹, with devastating consequences on the wealth of wildflowers and species this habitat supports, such as orchids, butterflies, bumblebees, brown hare and barn owls. Pressures include agricultural improvements and changes in policy, over or under grazing, loss of grassland due to changes in land use, and fragmentation of remaining habitat.

As well as the often rare varieties of mature fruit trees, traditional orchards are important for the mosaic of habitats and the wildlife they support, including insects such as moths and bees, bats, birds, fungi and lichens. Traditional orchards were once common in both the urban and rural environment, but this biodiverse habitat is now under threat due to development pressures, changes in agricultural practices, and neglect. Of an approximate 160 sites considered as part of the North Fife orchard survey, only 36 were found still to have significant heritage and biodiversity value (Hayes, 2010).

Fife's priority lowland and farmland habitats

Species-rich grassland

Field margins & boundaries, including hedgerows

Parks & veteran trees

Golf courses

Traditional orchards

Lowland heathland

Fife's priority lowland and farmland species

Corn bunting

Bats

Key sites

Species-rich grassland sites include:

Craigmead Meadows SSSI

Ferry Hills SSSI

Fleecefaulds Meadow SSSI & SWT Reserve

Holl Meadows SSSI

Lielowan Meadow SSSI & SWT Reserve

Orrock Hill SSSI

Roscobie Hills SSSI

Walton Hill and Cradle Den SSSI

Whether Hill SSSI

27 additional SSSIs

Carlingnose Point SWT Reserve

Kilminning Coast SWT Reserve

Coul Den LNR

Auchtermuchty Common Wildlife Site

17 additional Wildlife Sites

Lochore Meadows Country Park

Lowland heathland sites include:

Lacesston Muir & Glen Burn Gorge SSSI

North Fife Heaths SSSI

Swinky Muir SSSI

Benarty Hill Wildlife Site

Glenduckie Hill Wildlife Site

Townhill Muir Wildlife Site

Parks and areas with veteran trees include:

Aberdour Castle

Balbirnie

Balcaskie estate

Beveridge

Culross Abbey House

Dalgairn

Donibristle

Earlshall

Falkland

Hill of Tarvit

Kellie Castle

Lochore Meadows

Naughton

Pittencrieff

The Murrel

Tulliallan

Valleyfield

Golf courses designated as Wildlife Sites:

Annsmuir Golf Course

Duke's Golf Course

St Andrews Links (Old Course)

Keystone species or indicators of ecosystem health

Bats

Moths and butterflies

Terrestrial breeding birds

Vascular plant diversity

Invasive non-native species

LOWLAND & FARMLAND ECOSYSTEM SERVICES

These are some examples of the services which a healthy lowland and farmland ecosystem provides:

Products such as food, including vegetables, fruit and meat, fibre such as sheep's wool, and fuel, for instance from biomass crops

Pollination by many different types of insects which help our crops to grow

Soil formation and soil conservation, for instance through erosion control

Soil fertility and nutrient cycling by microbes, decomposition and the recycling of organic matter and nutrients

Climate regulation, including carbon sequestration and storage in soils and biomass

Regulation of water quality, including water purification, for instance from soils and buffer strips along field margins and burns

Photosynthesis which allows plant growth and the production of oxygen

Recreation - including walking, cycling, field sports, gardening, visits to public parks – and associated public health and wellbeing

KEY PRESSURES ON THE LOWLAND AND FARMLAND ECOSYSTEM

Rural land management policy

European, UK and Scottish rural and agricultural policy influences how land managers use their land, which in turn directly impacts on the intensity of land management and pressures on species and habitats. Incentives for renewable energy production and a desire to be more efficient and reduce production costs can also have a significant impact on biodiversity.

Urban land management policy

Regeneration and planning policies can have an effect on greenspace and brownfield sites and associated species.

Agricultural development

Increased field sizes have led to the loss of hedgerows, fragmentation of habitat and erosion of soils. In Scotland, 52% of hedgerows were lost between the 1940s and 1980s. Greater reliance on fertilisers and pesticides and changes in cropping have led to a decline in the quality of terrestrial and aquatic habitats. Soil compaction and erosion as a result of heavier machinery is also having a significant impact on soil structure.

Urban development

This includes pressure from housing, industry, school land and associated infrastructure which leads to the loss and fragmentation of natural habitats as well as greenspace. Since the 1940s, built-up areas have expanded by about 50% in Scotland.

Demographics

As Scotland's population increases, so do the pressures for development and on resources, food production and recreation on the edges of our towns and cities and in our countryside.

Climate change

Over the next few decades, average temperatures are predicted to increase and there will be drier summers and wetter winters. This will cause changes in the lowland and farmland ecosystem and place pressure on some species as their climate space disappears and they have nowhere to move to.

Invasive non-native species

Some species of plant and animal have been introduced to Scotland and have a harmful effect on our native wildlife as well as a significant cost to our economy.

Pollution

Although there have been significant improvements in levels of pollutants due to new legislation and better management and regulation, there are still concerns over the impacts of atmospheric deposition of nitrogen and ground level ozone on sensitive habitats such as grassland and lowland heaths, as well as the possible accumulation of pollutants from spreading bio-solids on land.

⁸ 2020 Challenge for Scotland's Biodiversity (2013)

⁹ Plantlife http://www.plantlife.org.uk/wild_plants/habitats/grassland/saving_our_magnificent_meadows/



OBJECTIVES

Maintain and increase the extent, distribution and connectivity of lowland and farmland ecosystems

Maintain and where possible improve the health of lowland and farmland ecosystems

Involve local people in conservation actions and thereby raise awareness and enjoyment of lowland and farmland ecosystems



ACTIONS

For additional breakdown of actions, see Appendix 2.

RAISING AWARENESS ABOUT LAND MANAGEMENT FOR BIODIVERSITY

Hold one Farm Open Day per annum on a working farm to demonstrate good and poor practice, sustainability, woodland management including traditional techniques, river restoration, drainage, management for farmland birds and pollinating insects, and other methods of enhancing biodiversity in an agricultural landscape.

Pittarthis Farm, Fife Council, RSPB, BBCT, NTS, FCS, The Farm Environment Ltd.

Hold one training course per annum at Lochore Meadows Country Park and other key sites to demonstrate hedge, tree, veteran tree and grassland management.

FCCT, NTS

Hold an event on a Scottish Wildlife Trust site for a range of stakeholders to raise awareness about and share good practice on conservation grazing.

SWT, SNH, Fife Council

Create a leaflet and make information available on the biodiversity website to advise local authority staff, landmanagers and communities about the value of species-rich grassland, management methods and availability of further information and local resources.

Fife Council

Raise awareness about funding opportunities available for landowners to enhance biodiversity in the rural environment.

Fife Council, SNH, FCCT, The Farm Environment Ltd.

HEDGEROWS, FIELD MARGINS AND BOUNDARIES

Increase habitat connectivity in the urban and rural environment by planting 20 km of native hedgerows and tree-lines. Make use of the Integrated Habitat Network model to help identify priority areas in the rural environment.

Fife Council, Fife & Kinross Bat Group, FCCT

GREENSPACE AND PARKS

Enhance the grounds of eight NHS Fife sites for biodiversity as well as patient and visitor wellbeing.

NHS, SNH, Fife Council

Create and implement Biodiversity Action Plans for five major parks and 20 other areas of greenspace in order to enhance biodiversity in the urban environment.

Fife Council, FCCT, Fife & Kinross Bat Group

Develop material to help schools enhance their grounds for biodiversity through the establishment of wildlife areas, orchards and growing spaces. Create a demonstration site at Lundin Mill Primary School. Work with Parks & Countryside staff to deliver projects.

Fife Council, Lundin Mill Primary School

Trial a 'biodiversity village' project where Fife Council and the local community work in partnership to manage and enhance an urban area for the benefit of residents and biodiversity.

Fife Council

Produce and promote a leaflet on gardening for wildlife and make it available in garden centres across Fife. Encourage garden centres to have dedicated wildlife-friendly sections.

Fife Council

GOLF COURSES

Enter the seven Fife Golf Trust courses, amounting to 300 hectares, for GEO Certified, the Golf Environment Organisation's internationally-recognized ecolable for sustainable and environmental management. Undertake additional management to enhance courses for biodiversity.

Fife Golf Trust, SGEG, Fife Council

ORCHARDS, GROWING AND EDIBLE SPACES

Revise the Fife Allotments Strategy 2009-2014 to include a section on managing allotments for biodiversity. From this, produce a leaflet for plot holders.

Fife Council

Undertake a survey of traditional orchards in central and south Fife to complement the existing north Fife survey and help protect this valuable habitat.

Fife Council

Facilitate the creation of 10 new orchards of local provenance heritage fruit trees and 10 edible spaces across Fife by supporting community interest.

Fife Council, community groups

Set up a Horticultural Mentor Programme. Offer annual training for volunteers to support communities with food growing and orchard management. Oversee management of newly planted orchards where necessary.

Fife Council, FCCT

Support communities to hold at least one Harvest and Apple Day event per annum to raise awareness about local produce, biodiversity, food miles, healthy eating and fruit heritage. Continue to provide facilities for the public for pressing apples.

Fife Council, St Andrews Botanic Garden Education Trust

BATS

In 2013, survey Nathusius pipistrelles in Fife and East Lothian and radiotrack individuals to find out more about their roost locations and behaviour. Use data, to be shared with Fife Nature Records Centre, to inform a programme of public events and walks.

Fife & Kinross Bat Group

Raise awareness about bats in Fife by holding three night-time events per annum at locations across Fife. Ensure sightings are shared with Fife Nature Records Centre and Fife & Kinross Bat Group.

Fife Council, Fife & Kinross Bat Group, Daubenton's Roost Investigation Project, FNRC, FCCT, NTS

Develop a bat database to help ensure that bat roosts and habitat are protected.

Fife & Kinross Bat Group, FNRC, Fife Council

Carry out a bat survey at the limekiln at Craighall Den in order to confirm anecdotal evidence that all five species are present. Install an interpretation panel about the building and bats.

Fife & Kinross Bat Group, Fife Council, FCCT

BIRDS

Through appropriate management, maintain safe nesting habitats and year-round feeding opportunities for corn buntings at six farms in Fife.

RSPB

Monitor the Fife corn bunting population through annual survey with the support of volunteers.

RSPB, Chris Smout and volunteers, Fife Council

Create and install 10 artificial nesting sites for barn owls in locations identified through the barn owl survey.

FCCT, Fife Council

SURVEYING

Co-ordinate and publicise a Fife-wide public survey of barn owls as an indicator species of lowland and farmland ecosystem health.

FNRC

SPECIES-RICH GRASSLAND CREATION AND MANAGEMENT

Create 3 hectares of wildflower and pollinator-friendly meadow in suitable urban greenspace across Fife. Identify locations via groundtruthing and survey.

Buglife, Fife Council

Deliver a sustainable meadow management project in the Lomond Hills Regional Park. This will include management of 5.5 hectares of species-rich grassland, employment of a farmer to assist with management, purchase of specialist machinery and livestock management materials, training of volunteers, community and/or school groups through annual sessions, training of staff, and a Grassland Walks of Fife leaflet. Subject to securing funding.

FCCT, LLLP

Revise Fife Council's road verge management regime in order to better manage this habitat for biodiversity.

Fife Council



Manage key species-rich grassland sites annually to maintain and enhance condition: Coul Den LNR, Birnie Loch LNR, Craig Hartle SSSI, Hawcraig Point Wildlife Site, Townhill Meadow, Lochore Meadows Country Park, Craigtoun Country Park, Dalbeath Marsh SSSI/LNR, Dreeil Meadow Wildlife Site, Tip Point and Out Head (Eden Estuary LNR), Stenton and Riverside Park (Glenrothes), Carlingnose Point SWT Reserve, Cullaloe LNR/SWT Reserve, Fleecefaults Meadow SSSI, Lielowan Meadow SSSI/SWT Reserve, Kilminning Coast SWT Reserve and Bankhead Moss SWT Reserve.

FCCT, SWT, Fife Council, Links Trust, St Andrews University SERG, landowners, community groups, TAPIG

LOWLAND HEATHLAND

Remove encroaching silver birch scrub from Townhill Muir two times per annum with the help of volunteers.

FCCT

Seek funding to deliver the Townhill Muir Management Plan objectives on a larger scale.

FCCT

INVASIVE NON-NATIVE SPECIES

Create a centrally-coordinated database of invasive non-native species sightings and locations in Fife. Advertise the PlantTracker application as a means of submitting records and also produce INNS recording forms. Annually exchange data with Forth Invasive Non-native Species Project.

Fife Council, FNRC, FINNS

EDUCATION

Hold 5 education sessions per annum to enable children to learn about and enjoy lowland, farmland and urban habitats and associated species. Topics will include bees and pollination, orchards, bats and birds.

St Andrews Botanic Garden Education Trust

With pupils from local primary schools, deliver an annual project to collect wildflower seed, grow plugs and plant these to enhance the diversity and value of existing grassland.

St Andrews Botanic Garden Education Trust

PLANNING AND DEVELOPMENT

Provide nature conservation advice to Fife Council on relevant planning applications.

SNH, Fife Council EPPS

Use the Fife Integrated Habitat Network mapping study to inform Green Network and Green Infrastructure development through implementation of Green Network policy and Green Infrastructure Supplementary Planning Guidance.

Fife Council EPPS

WOODLAND ECOSYSTEM

Fife has a diversity of woodlands which mirrors Scotland's exciting range of woodland types. We have ancient woodland nestled in deep dens such as Craighall and Keil's, wet carr woodland at Dalbeath and St Michael's Wood Marshes, mixed broadleaved woodland such as Flisk Wood on the coast, and important plantations such as Devilla and Tentsmuir. In addition, there are remnant aspen woodlands in the Lomond Hills and important veteran trees in our historic parklands. The diversity of woodland in Fife is characterised by the richness and diversity of our geology, soils, climate and topography.

Woodlands are home to a wealth of well-loved species such as red squirrels, bats, bluebells, a colourful range of fungi, unusual and decorative lichens, and birds such as tawny owls and woodpeckers. In Scotland, the woodland ecosystem supports more priority species than any other ecosystem.

Woodlands of all types make up 11% of Fife's land area. This includes about 190 hectares of ancient woodland and 243 hectares of long-established semi-natural woodland. These are mostly found in dens because in the past, access to fell trees was difficult. Fife's wooded dens are small in size and fragmented, but play a vital role in maintaining biodiversity and wildlife networks. Urban woodlands within the boundaries of towns and villages are also valuable habitats, bringing nature closer to people and increasing urban biodiversity.

Our woodland ecosystem is valuable for its assemblage of species and habitats, for the pleasure this landscape brings to people, and for the ecosystem services it provides us with. We derive much enjoyment from our woodlands, whether it's through walking, cycling, wildlife-watching or picking mushrooms for dinner.

All woodlands and their associated open and edge habitats are within the scope of this ecosystem and there is overlap with all of the other ecosystems.



Fife's priority woodland habitats

Ancient, semi-natural & long-established woodland, including plantations on ancient woodland sites

Mixed lowland woodland

Urban woodland

Fife's priority woodland species

Aspen

Bluebell

Red squirrel

Key sites

Ancient, semi-natural and long-established woodlands include:

Bankhead Moss SWT Reserve

Craighall Den SSSI

Craigmad Wood SSSI

Dalbeath Marsh SSSI & LNR

Devilla Forest

Dunbog Bog SSSI

Flisk Wood SSSI

Glen Burn Gorge

Harran Hill Wood

Hatton Den

Holl Meadows SSSI

Keil's Den Wildlife Site

Kilconquhar Loch SSSI

Ladybank Forest

Lindores Loch SSSI

Lockshaw Mosses SSSI

Morton Lochs SSSI

Orrock Hill SSSI

Otterston Loch SSSI

Star Moss SSSI

Steelend Moss SSSI

Swallow Craig Den SSSI

Swinky Muir SSSI

Waltonhill and Cradle Den SSSI

Wether Hill SSSI

Key sites for aspen:

Glen Vale

Little Ballo

Key sites for red squirrels:

Blairadam Forest

Crawford Priory

Devilla Forest

Falkland Estate

Ladybank Forest

Lochmuir

Pitmedden Forest

Springfield Muir

Tentsmuir Forest

Woodland at Shell Bay, Elie

Woodlands between Balmerino,

Hazelton Walls and Balhevie

Keystone species or indicators of ecosystem health

Bats

Terrestrial breeding birds

Moths

Bluebells

Invasive non-native species

WOODLAND ECOSYSTEM SERVICES

These are some examples of the services which a healthy woodland ecosystem provides:

Timber, which can be converted into a variety of wood products including building materials, paper and biomass

Non-timber forest products such as mushrooms and wild berries

Shelter and feeding grounds for livestock

Regulation of water quality, including water purification through filtration

Flood management and control to reduce flood risk, through enhanced infiltration into soil and storage of water in floodplain woodland

Carbon sequestration and storage in soils and biomass

Reducing soil erosion on farmland by protecting fields and riverbanks

Climate and air quality regulation through air pollution filtration and photosynthesis which produces oxygen

Recreation - including walking, cycling and camping - and associated public health and wellbeing

KEY PRESSURES ON THE WOODLAND ECOSYSTEM

Fragmentation and loss of habitat

Loss and fragmentation to agriculture, urbanisation and development as well as gradual loss to browsing and grazing has left remaining habitat and species vulnerable and is a serious risk to woodland biodiversity.

Development, planning policy and practice

This is important in directing development away from further loss and fragmentation of woodland habitat and maintaining and enhancing habitat networks.

Land use policy and woodland expansion targets

It is important to ensure that woodland expansion takes place on appropriate land and leads to a net gain in biodiversity.

Deer and sheep

Overgrazing can prevent the natural regeneration of woodland as well as its diversity.

Invasive non-native species

These include shrub and field layer species such as *Rhododendron ponticum* and Japanese knotweed, as well as animals such as grey squirrels. Invasives pose a serious threat to native species and reduce woodland biodiversity.

Climate change

Over the coming decades, it is likely that average temperatures and the proportion of annual rainfall will increase in the winter and decrease in the summer. This may threaten and put adaptation pressures on many woodland species and habitats, particularly when the woodland is small and species have nowhere to move to as their climate space disappears.

Nitrogen enrichment

Eutrophication from atmospheric nitrogen deposition as well as diffuse pollution from livestock encourages nutrient-demanding species instead of more typical woodland ground flora.

Silvicultural systems

Most planted forests are managed by patch or clear-felling, and 20th century planted forests in particular often have low structural and species diversity. In Fife, FCS's preferred management method is small scale (<2ha) clearfell and a low impact silvicultural system. Non-native tree species also affect biodiversity in some native and ancient woods.

Lack of management

This can lead to loss of biodiverse woodland habitats such as open, young growth and edge habitats.

Recreation

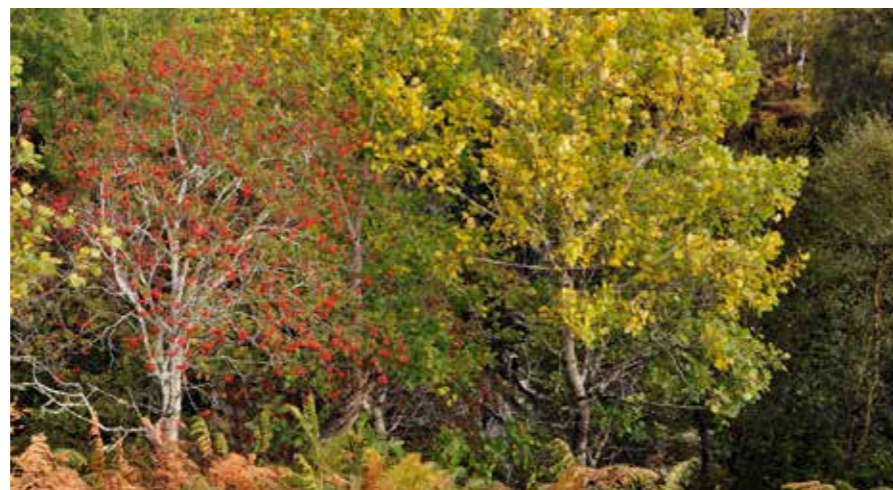
Woodlands are popular with people and this can affect biodiversity if wildlife is disturbed or if sensitive sites are damaged or fragmented by paths. Good planning and management are important in overcoming conflicts with biodiversity.

OBJECTIVES

Maintain and increase the extent, distribution and connectivity of woodland ecosystems

Maintain and where possible improve the health of woodland ecosystems

Involve local people in conservation actions and thereby raise awareness and enjoyment of woodland ecosystems



OUR WOODLAND ECOSYSTEM IS VALUABLE FOR ITS ASSEMBLAGE OF SPECIES AND HABITATS, FOR THE PLEASURE THIS LANDSCAPE BRINGS TO PEOPLE, AND FOR THE ECOSYSTEM SERVICES IT PROVIDES US WITH



ACTIONS

For additional breakdown of actions, see Appendix 2.

CREATE NEW WOODLAND AND INCREASE CONNECTIVITY

Increase the availability of local provenance tree stock by propagating specimens in local nurseries.

Fife Council, St Andrews Botanic Garden, Elmwood College, Lochore Meadows Country Park volunteers, FCCT

Create 20 hectares of native woodland per annum, making use of the Integrated Habitat Network and Fife Forestry & Woodland Strategy to help identify priority areas for enhancing woodland connectivity.

Fife Council, FCCT, FCS, Fife Red Squirrel Group, WTS, TAPIF, Falkland Centre for Stewardship

ASPEN

Survey all aspen stands presumed to be native in Fife and collate information on the number of trees and whether or not they have been planted. Ascertain which trees are of local provenance. Take cuttings from local provenance trees and propagate. Plant saplings in the Lomond Hills and other appropriate locations to establish viable populations. Hold an aspen seminar to raise awareness about conservation of the species.

Fife Council, St Andrews Botanic Garden, Falkland Centre for Stewardship, WTS, FCCT

JUNIPER

Source, propagate and plant local provenance juniper to reintroduce viable populations of this species to Fife and enhance existing and new woodland planting.

Fife Council, St Andrews Botanic Garden, FCS, CSFT, WTS, FCCT

SURVEYING AND MONITORING

Monitor transects at key red squirrel sites biannually in accordance with national guidelines. Co-ordinate volunteers and collate survey data.

Fife Red Squirrel Group, FCCT, Fife Council, FCS, Falkland Centre for Stewardship, landowners

Monitor the bird populations at Townhill Wood, Craighall Den, Calais Muir, School Wood and Lochore Meadows Country Park via the Common Bird Census in order to inform and monitor effectiveness of management. Submit all data to Fife Nature Records Centre.

FCCT

Co-ordinate and publicise a Fife-wide public survey of an indicator species of woodland ecosystem health or an invasive species which threatens ecosystem health.

FNRC, Fife Council

Deliver a butterflies and moths project to raise awareness about and encourage monitoring of these indicator species. Hold a series of talks and species identification days, attend bioblitzes, create and train a volunteer recorders group, establish three new butterfly transects and recruit 'champions' to monitor these, and produce a 'Butterflies and Day-flying moths of Fife' leaflet to encourage recording as well as improved habitat management

Butterfly Conservation, Fife Council

Through a questionnaire, groundtruthing and survey, create an up-to-date distribution map of native bluebell populations in Fife.

Fife Council, FNRC

Monitor the bat populations at Tentsmuir, Weddersbie and Ladybank Forests by checking boxes twice per annum.

Fife & Kinross Bat Group

Train volunteers to carry out bird surveys through an annual event to help with the monitoring of key natural heritage sites in Fife.

FCCT, Fife Council, FNRC

MANAGE WOODLAND TO ENHANCE BIODIVERSITY

Hold three practical woodland management workshops. Collate a woodland management toolbox of good practice and promote at workshops. Include an advisory leaflet on funding opportunities for landowners, communities and Fife Council staff. Provide advice on the creation of small native woodlands.

Fife Council, FCS, FCCT, WTS, NTS, Butterfly Conservation

Bring five woodlands into better management for biodiversity by creating management plans, securing funding, undertaking initial enhancement work and working with local communities.

Fife Council, FCCT

Manage 88 hectares of ancient semi-natural and long-established woodland, including restoration of any plantations on ancient woodland sites (PAWS), to maintain and enhance biodiversity as outlined in management plans.

FCCT, Woodland Trust Scotland

Manage 262 hectares of mixed lowland and urban woodland to maintain and enhance biodiversity.

FCCT, WTS, Fife Council, TAPIF, CLEAR Buckhaven

INVASIVE SPECIES

Co-ordinate grey squirrel control in a 3km buffer zone around nine of the key sites for red squirrels until April 2014 with the help of trained volunteers, community groups and contractors.

Fife Red Squirrel Group, FCCT

Control non-native species at Craighall Den annually: monitor and control few-flowered leek with a view to eradicate and remove regeneration of sycamore, beech and field maple.

FCCT

At Kennoway Den, remove non-native sycamore and beech regeneration annually, erect 10 bat boxes and plant scrub along the woodland edge.

Fife Council

Control *Rhododendron ponticum* in Inzievar Woods, Formonthills and Falkland Estate.

WTS, Falkland Centre for Stewardship

AWARENESS RAISING AND EDUCATION

Raise awareness about the woodland ecosystem through a series of events and educational activities including five woodland visits or guided walks, one woodland event, and 20 educational sessions per annum. Run a woodland learning programme at Formonthills with Collydean Primary School. Create an interpretive trail at Townhill Wood.

FCCT, Fife Council, WTS, St Andrews Botanic Garden Education Trust, Fife Red Squirrel Group

Enhance access to Calais Muir wood by improving the path network and creating an interpretive trail and recreational open spaces.

FCCT, Fife Council, Amazon



MARINE & COASTAL ECOSYSTEM

Scotland's coast and seas are beautiful, dramatic and extraordinarily rich. The country's position at the edge of the continental shelf, the mixing of warm and cold currents, a long coastline and large area of sea make it a special place for wildlife and habitats. There are some 40,000 marine species of which about 6,500 are plants and animals. Scotland's seas are internationally important for seabirds and home to 30% of the world's grey seals. Many of us live close to the coast and our culture and economy is closely linked with the sea.

Fife has 179 kilometers of coastline, ranging from the windswept strandline at Tentsmuir – Britain's most rapidly changing sand dune system – to the cliffs and reefs of the Isle of May. Fife's coastal habitats include sand dunes, islands, maritime cliffs, and intertidal communities such as saltmarsh and mudflats.

These habitats support a wealth of wildlife, from tiny plankton and delicate dune flowers to plunging gannets and mammoth whales. The Eden Estuary's rich intertidal mud and sand flats are home to millions of little plants and animals which provide food for thousands of birds such as black-tailed godwit, redshank and grey plover. The Isle of May has habitats and species that are rare or threatened in a European context. It is considered one of the best areas in the UK for grey seal and is home to seabirds such as Sandwich tern and puffin.

The Firth of Forth is internationally important for its invertebrate-rich intertidal habitats which support migratory and wintering birds such as red-throated diver and golden plover. The shallow seas at St Andrews and Largo Bays provide some of the richest feeding grounds for fish and seabirds in the country.

Our marine and coastal ecosystem is valuable for its assemblage of species and habitats, for the pleasure it brings to people and for the ecosystem services it provides us with. Many of our activities, such as fishing, tourism and recreation, depend on the good health of our seas and coasts.

Fife's priority marine and coastal habitats

Intertidal communities
 Marine
 Maritime cliffs & islands
 Saltmarsh
 Strandline, sand dune & shingle communities

Key sites

Intertidal communities:

Firth of Forth SPA, SSSI & Ramsar
 Firth of Tay and Eden Estuary SPA, SAC & Ramsar
 Inner Tay Estuary SSSI

Maritime cliffs & island key sites include:

Hawkcraig Point Wildlife Site
 Inchcolm Island Wildlife Site
 Isle of May SPA, SAC, NNR & SSSI
 Kincaig Point
 Long Craig island SPA & SSSI

Saltmarsh key sites include:

Barnsmuir Coast SSSI
 Charleshill Point Wildlife Site
 Cocklemill Marsh
 Eden Estuary SSSI & LNR
 Inner Tay Estuary SSSI
 Torry Bay LNR within Firth of Forth SPA, SSSI & Ramsar
 Tayport Bay within Firth of Tay and Eden Estuary SPA, SAC & Ramsar
 St Andrews - Craig Hartle SSSI

Strandline, sand dune & shingle community key sites include:

Barnsmuir Coast SSSI
 Earlshall Muir SSSI
 Eden Estuary SSSI & LNR
 Dumbarrie Links SSSI & SWT Reserve
 Drummochy (Massney Braes) Wildlife Site
 Fife Ness Coast SSSI
 Firth of Tay and Eden Estuary SPA
 Tayport – Tentsmuir Coast SSSI
 Tentsmuir NNR
 West Sands, St Andrews

Marine key sites include the waters in and around:

Fife Ness
 Isle of May SPA, SAC, NNR & SSSI
 Seafields
 Largo Bay
 St. Andrews Bay
 Firth of Forth SPA, SSSI & Ramsar
 Firth of Tay and Eden Estuary SPA, SAC & Ramsar

Keystone species or indicators of ecosystem health:

Seals
 Cetaceans
 Breeding seabirds
 Marine plankton
 Marine fish stocks within safe limits
 Wintering waterbirds
 Estuarine fish diversity
 Invasive non-native species

MARINE & COASTAL ECOSYSTEM SERVICES

These are some examples of the services which a healthy marine and coastal ecosystem provides:

Products such as food, including fish and crustaceans, medicines and renewable energy

Flood, storm and coastal protection by habitats such as saltmarsh and sand dunes

Regulation of water quality, including water purification through filtration, trapping of pollutants and absorption of run-off

Climate regulation, including carbon sequestration and storage in biomass

Photosynthesis by marine plants contribute to the production of oxygen

Recreation and leisure - including sailing, sea kayaking, fishing, wildlife-watching, walking and trips to the beach – and associated benefits to public health and wellbeing

Tourism, including whale-watching and coastal walking routes

KEY PRESSURES ON THE MARINE AND COASTAL ECOSYSTEM

Marine and coastal development

This includes loss of habitat as well as changes in the condition and dynamics of habitat, for instance from structures such as coastal defences and quays, development of golf courses and marinas, and installation of oil and gas platforms and communication cables.

Fisheries and shellfisheries

The scale and methods of fishing - include trawling, suction dredging, long-lining and fixed nets - can have a negative impact on marine species and habitats.

Commercial harvesting

This involves bait digging, collection of shellfish, plants and seaweed for human consumption, and harvesting of seaweed as a soil conditioner.

Aquaculture and mariculture

This can have adverse impacts on biodiversity through pollution, predator control and disease.

Energy generation and extraction

This includes the impacts on habitats and species of traditional as well as renewable energy generation, such as oil, gas, tidal, wave and wind. Extraction of non-renewable resources includes oil and gas, coastal quarrying and sand removal.

Recreation

Coastal pressures include trampling and erosion of sensitive habitat and disturbance of wildlife through activities such as walking, horse riding, dog walking and vehicular access. Inappropriate cosmetic cleaning of the strandline also greatly reduces biodiversity. On our seas, pressures can come from water sports such as boating and irresponsible whale-watching.

Dredging

This involves the destruction of habitat through the removal of material from the seabed for capital and maintenance dredging.

Waste disposal and pollution

This includes litter, industrial effluent and thermal discharges from cooling water, spoil dumping, fisheries and aquaculture waste, agricultural wastes, inorganic mine and particulate wastes, industrial and urban emissions, contaminated land and water run-off, sewage discharges and shipping wastes.

Shipping and navigation

This includes commercial shipping, island ferries and military vessels, as well as threats from navigation infrastructure.

Agriculture and forestry

These have an impact on low-lying coastal habitats, both through loss of habitat as well as changes to it, such as the effects of grazing on saltmarsh and forestry on water tables.

Climate change

Global warming affects both our seas and our coasts. Our coasts are much more susceptible to flooding, erosion and coastal squeeze due to sea level rise, choppier water and increased storm intensity. Higher carbon dioxide levels in the atmosphere are making oceans warmer and more acidic, affecting the distribution of plankton, which in turn affects fish and birds, and even the spread of invasive species such as cord-grass *Spartina anglica*.

OBJECTIVES

Maintain and increase the extent, distribution and connectivity of coastal ecosystems

Maintain and where possible improve the health of marine and coastal ecosystems

Involve local people in conservation actions and thereby raise awareness and enjoyment of marine and coastal ecosystems



OUR MARINE AND COASTAL ECOSYSTEM IS VALUABLE FOR ITS ASSEMBLAGE OF SPECIES AND HABITATS, FOR THE PLEASURE IT BRINGS TO PEOPLE AND FOR THE ECOSYSTEM SERVICES IT PROVIDES US WITH




ACTIONS

For additional breakdown of actions, see Appendix 2.

MAINTAIN AND ENHANCE THE EXTENT, DISTRIBUTION AND CONNECTIVITY OF COASTAL HABITAT

Deliver phases two and three of the West Sands dune restoration project using a soft engineering approach to protect and enhance the entire dune system, strandline and links.

FCCT, The Links Trust, Fife Council, RAF Leuchars Conservation Group

Create new saltmarsh through direct planting once per annum in order to reconnect fragmented habitat and buffer the shoreline from erosion and the impact of sea level rise.

St Andrews University SERG, SEPA, The Links Trust, RAF Leuchars, FCCT, Fife Council

Work in partnership with landowners, the local community and volunteers to protect and enhance the mosaic of habitats at Ruby Bay, Elie. Fence, plant and establish a grazing regime at the grassland site. Move the Fife Coastal Path inland and reinstate the dune.

FCCT, SNH, Fife Council, Elie estate

MAINTAIN AND WHERE POSSIBLE IMPROVE THE CONDITION OF HABITATS

Undertake a Plastic Bag Free initiative at five villages along Fife's coastline.

Fife Council, MCS, FCCT

Deliver a co-ordinated, partnership 'Beachwatch' project to clean and reduce litter along Fife's strandline. Create an online Fife Beach Atlas to facilitate the adoption and regular clean-up of beaches by local communities. Make Fife Council's Litter Plan available online to ensure clean-ups are co-ordinated. Hold at least 15 beach clean-up events per annum, one of which coincides with the Beachwatch Big Weekend.

FCCT, Fife Council, MCS, FEF, RAF Leuchars Conservation Group

Protect and manage the Eden Estuary LNR by addressing the pressures identified in the management plan. This includes: monitoring wildfowling from September to February; erecting seasonal instruction; annually updating and contributing to an archive of research, and; visiting seven breeding bird sites on a monthly basis.

FCCT, St Andrews University, SERG

Encourage the adoption of Integrated Coastal Zone Management (ICZM) in the Fife Local Development Plan in order to promote sustainable management of Fife's coastline in accordance with the National Marine Plan.

Fife Council

Ensure Fife Shoreline Management Plan policies and proposed sites for managed realignment are taken into account in the Local Development Plan and in determination of planning applications. Undertake a scoping study to progress a managed realignment project in Fife.

Fife Council

Report commercial scale bait digging, cockling, crabbing and razor shell fishing along Fife's coastline, especially at the Eden Estuary, Torry Bay, Largo Bay and Tayport Bay, to the Wildlife Crime Officer and collate annual reports for SNH.

FCCT, Police Scotland, SNH

INVASIVES

Control the cord-grass *Spartina anglica* in the Eden Estuary two times per annum.

FCCT

SURVEYING AND MONITORING

Monitor the seal population annually and undertake a campaign to encourage the public to report all marine mammal strandings along the Fife coast as indicators of estuarine ecosystem health and to gain a better understanding of the decline in the Harbour seal population.

SMRU, Fife Council, FCCT, Fife Seal Group

Encourage and support volunteers to take part in national schemes such as Wetland Bird Survey (WeBS) and Beached Bird Survey (BBS) along Fife's coastline. Organise an annual training event on bird monitoring for members of the public.

FNRC, Fife Council

Monitor the wetland bird population through the national Wetland Bird Survey (WeBS) scheme at the Eden Estuary, as indicators of ecosystem health and a means of monitoring effectiveness of site management. Collate all data and submit to Fife Nature Records Centre.

FCCT, volunteers, Fife Council

Protect, maintain and enhance the structure and function of the Eden Estuary LNR by carrying out quarterly site condition surveys including erosion and deposition monitoring.

FCCT

Survey the extent of saltmarsh and eelgrass beds in the Torry Bay LNR. Subsequently monitor these habitats every five years.

Fife Council

To establish a current baseline of non-estuarine wading bird populations in Fife, undertake a repeat of the 1971/72 & 1972/73 wintering wader survey along all sections of rocky shore in Fife.

ECOS Countryside Services, Fife Council

Co-ordinate and publicise a Fife-wide public survey of an indicator species of ecosystem health or an invasive species which threatens ecosystem health.

FNRC, Fife Council

Hold one coastal bioblitz per annum to encourage interest in coastal wildlife, citizen science and to generate biological records.

FNRC, Fife Council, MCS, FCCT

Through the biodiversity website, one press release per annum, and by putting up posters along the coast, encourage the public to report marine sightings and strandings, especially basking sharks, turtles and jellyfish, to Marine Conservation Society.

Fife Council, MCS, FCCT

RAISE AWARENESS

Raise awareness and encourage enjoyment and responsible use of our coastal and marine environment by holding a suite of events and excursions every year for a variety of audiences, and by producing a leaflet about Fife's coastal and marine environment.

FCCT, FEF, SNH, St Andrews Botanic Garden Education Trust, Fife Council, SWT

EDUCATION

Deliver an education programme on beach litter at five primary schools, where possible within the coastal towns and villages in the Plastic Bag Free campaign.

Fife Council

With pupils from Canongate Primary School, deliver the Blue Fleabane Project at West Sands to help meet Target 8 of the UK Plant Diversity Challenge. Collect seed, grow plugs and plant seedlings in order to expand the range of this plant on the dunes. Carry out four site visits to monitor the plant population.

St Andrews Botanic Garden Education Trust, Canongate Primary School, FCCT

With pupils from Lawhead Primary School, deliver the Purple Milk Vetch Project to help meet Target 8 of the UK Plant Diversity Challenge. Collect seed, grow plugs and plant seedlings at West Sands in order to expand the range of this plant on the dunes. Carry out four site visits to monitor the plant population.

St Andrews Botanic Garden Education Trust, Lawhead Primary School



AWARENESS RAISING & EDUCATION



The actions below relate to all ecosystems and aim to raise general awareness and enjoyment of biodiversity.

ACTIONS

Produce a book about Fife's wildlife and top natural heritage destinations for local residents and visitors to the Kingdom.

Fife Council

Raise awareness about biological recording and the Fife Nature Records Centre by producing an information leaflet, writing one press article per quarter and attending two local events per annum.

FNRC, Fife Council

Raise awareness about the Fife Local Biodiversity Action Plan, Fife Biodiversity Partnership and biodiversity in Fife by producing two newsletters and attending two public events per annum, and writing one press release per quarter.

Fife Council

Create a joint biodiversity and biological recording website for Fife. Include maps showing notable habitats, sites to visit, biodiversity features and recent wildlife sightings.

Fife Biodiversity Partnership, FNRC, Fife Council

Create an 'alert' GIS layer of protected species that can be incorporated into Fife Council's Uniform system for planners.

FNRC, Fife Council

Hold an annual themed biodiversity project through the Natural Connections programme.

Fife Council Natural Connections, St Andrews Botanic Garden Education Trust, FCCT

Hold a monthly wildlife club to enable children aged 8 - 14 years to learn about and enjoy wildlife and the outdoors.

St Andrews Botanic Garden Education Trust, Scottish Wildlife Trust

Create a leaflet on invasive non-native species found in Fife to raise awareness about the problem and encourage sightings to be submitted to Fife Nature Records Centre.

FNRC

Hold an annual biodiversity seminar for partners, stakeholders, community groups and volunteers to share best practice, exchange information on latest developments in conservation and provide project updates.

Fife Council

Hold one bioblitz per annum to encourage interest in wildlife and promote biological recording and citizen science.

FNRC, Fife Council, Butterfly Conservation, St Andrews Botanic Garden, NTS, MCS, FCCT



APPENDIX 1 MAPS OF ECOSYSTEMS

Maps produced by the Fife Nature Records Centre, supported by Fife Council and Scottish Natural Heritage.

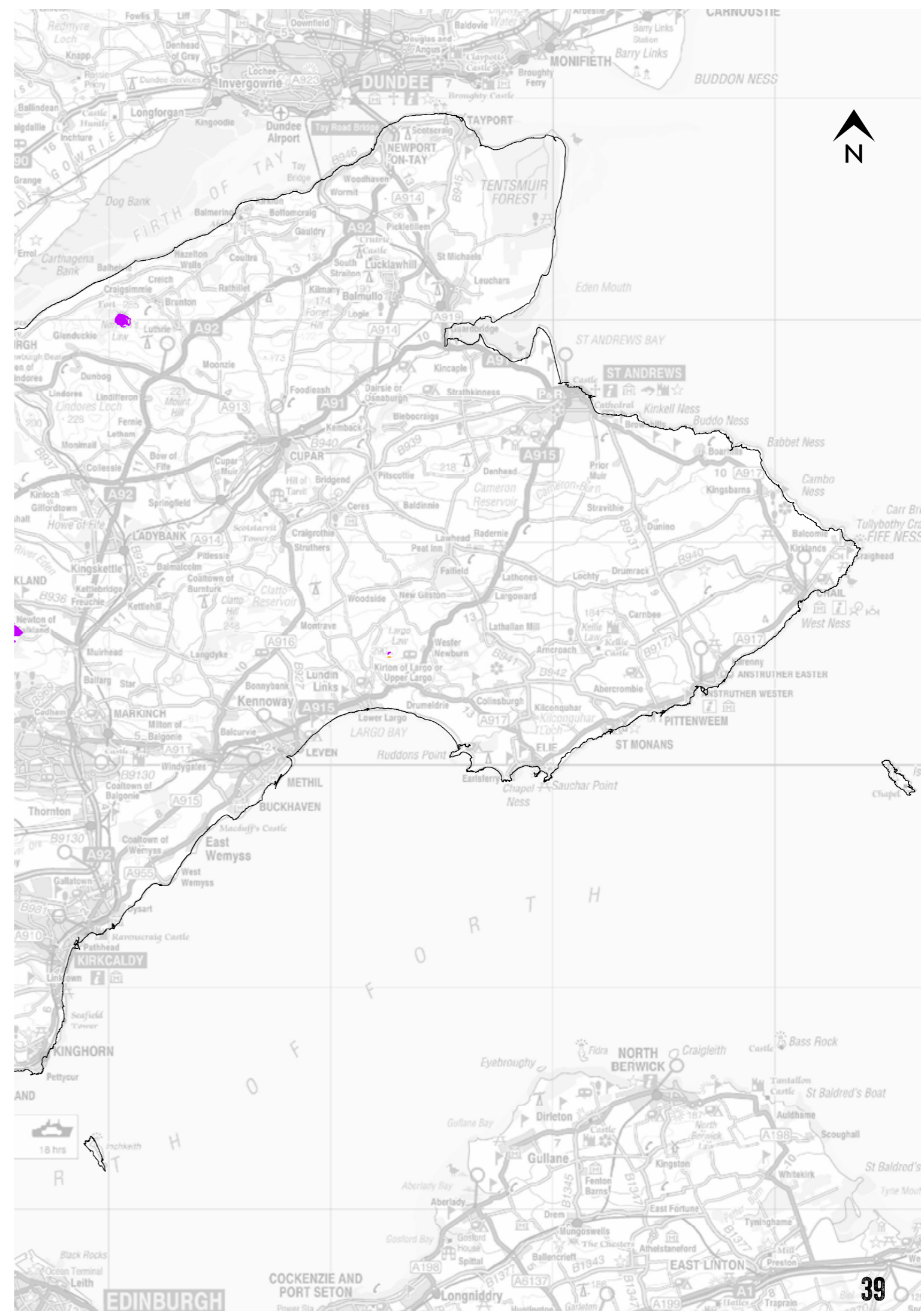
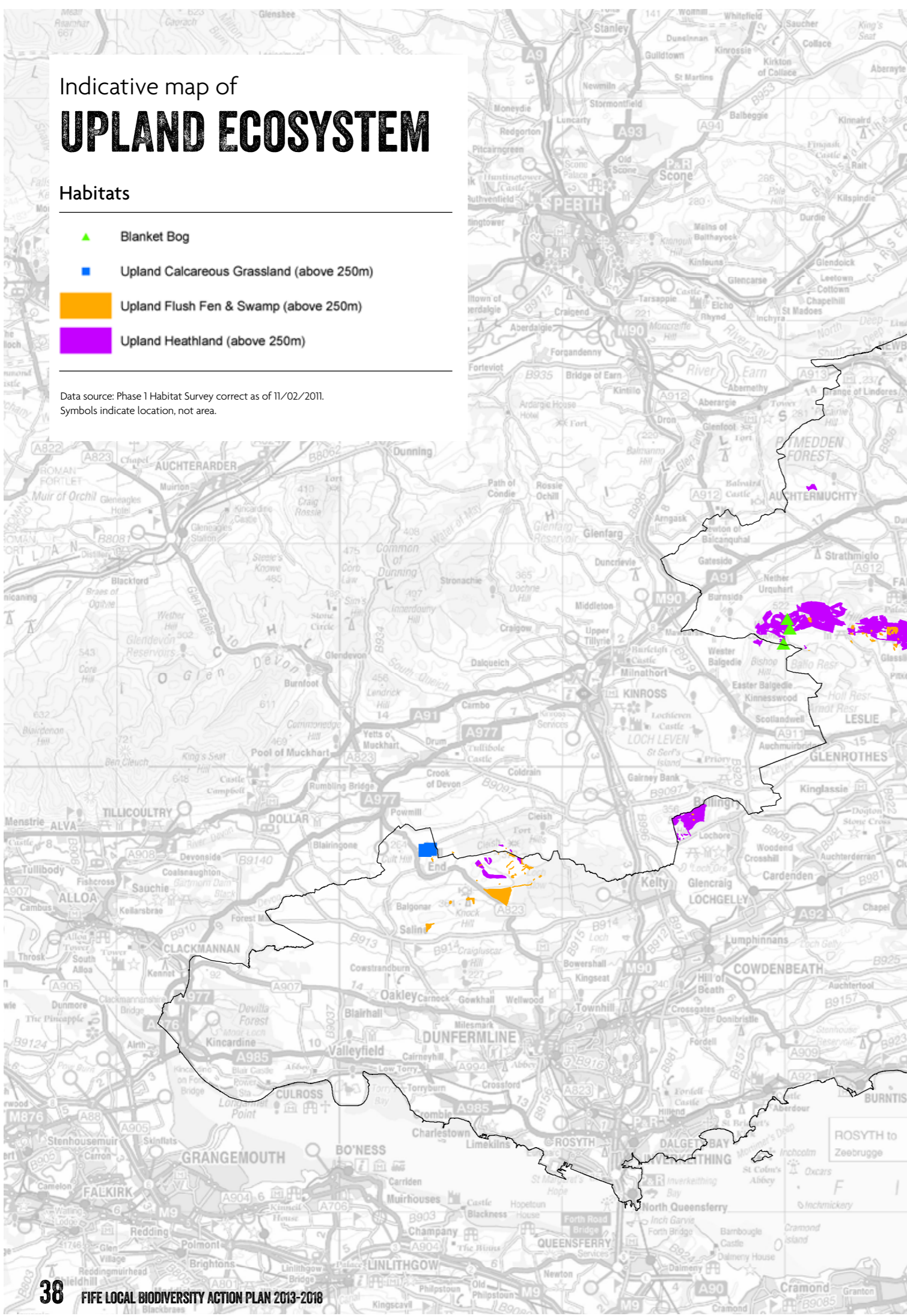


Indicative map of UPLAND ECOSYSTEM

Habitats

- ▲ Blanket Bog
- Upland Calcareous Grassland (above 250m)
- Upland Flush Fen & Swamp (above 250m)
- Upland Heathland (above 250m)

Data source: Phase 1 Habitat Survey correct as of 11/02/2011.
Symbols indicate location, not area.

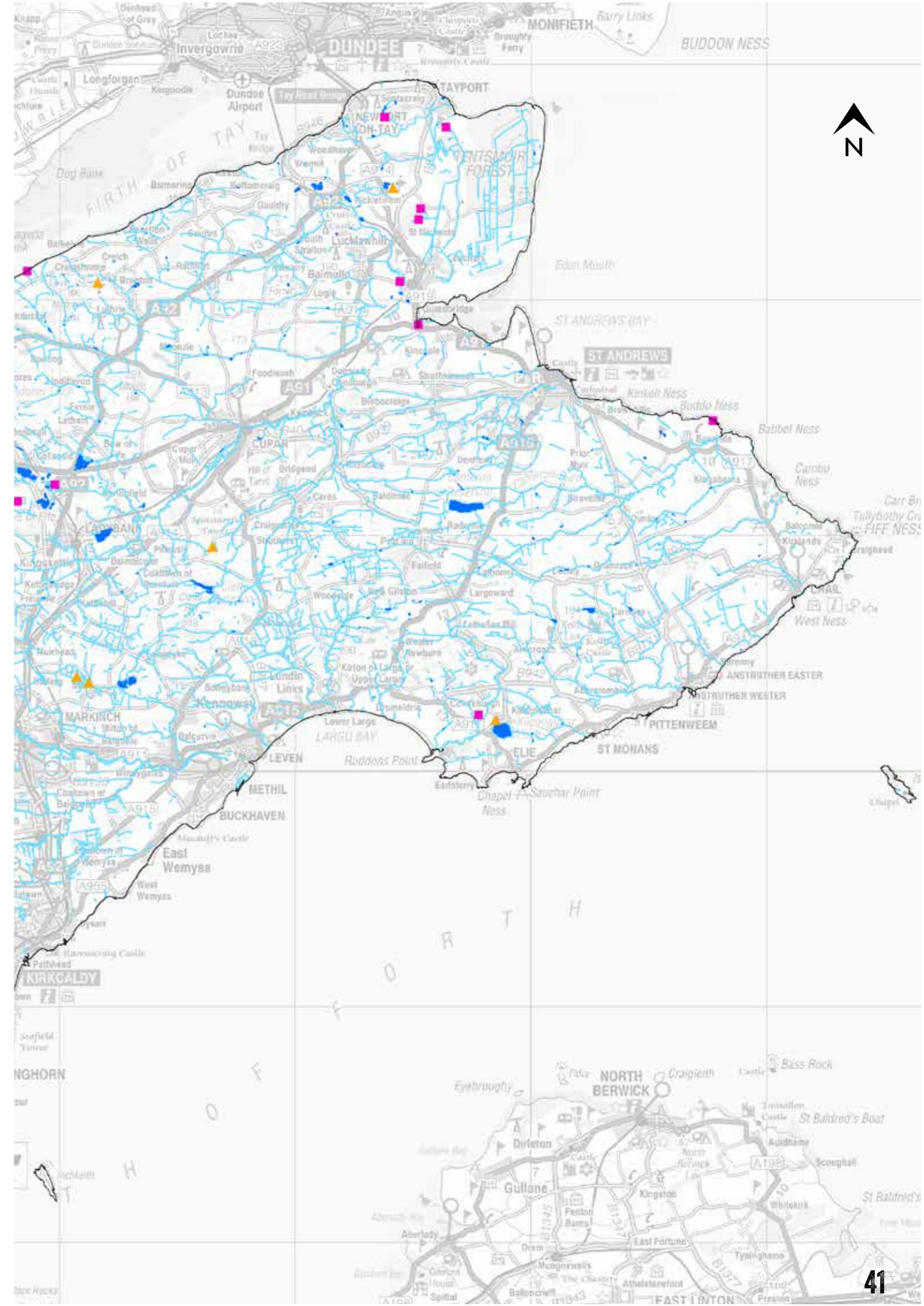
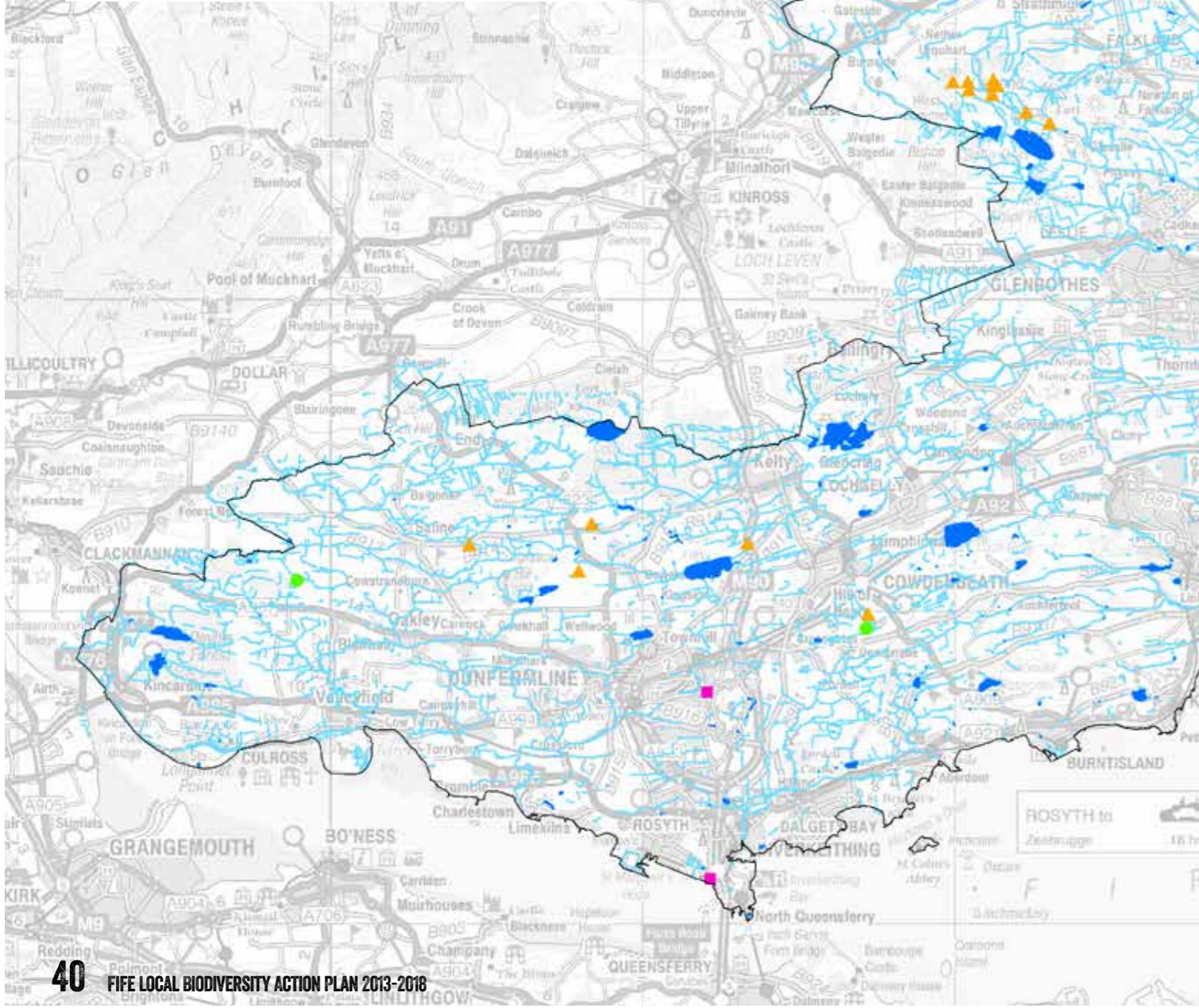
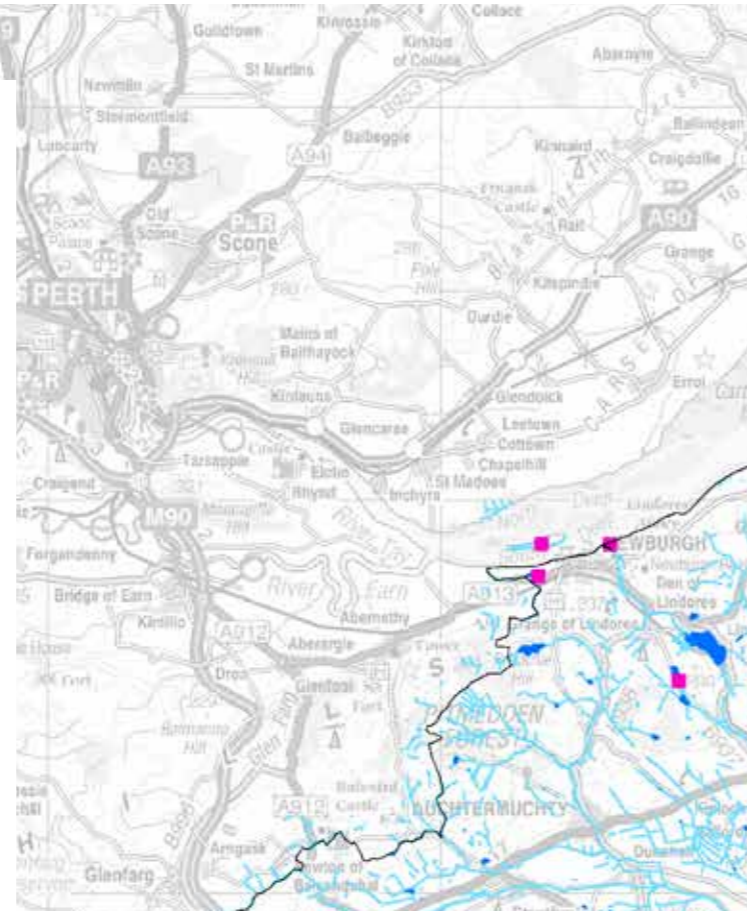


Indicative map of
FRESHWATER & WETLAND ECOSYSTEM

Habitats

- ▲ Lowland Fen (below 250m)
- Reedbed Habitats
- Lowland Raised Bog (below 250m)
- Standing Water
- Running Water

Data source: Phase 1 Habitat Survey correct as of 11/02/2011.
 Symbols indicate location, not area.

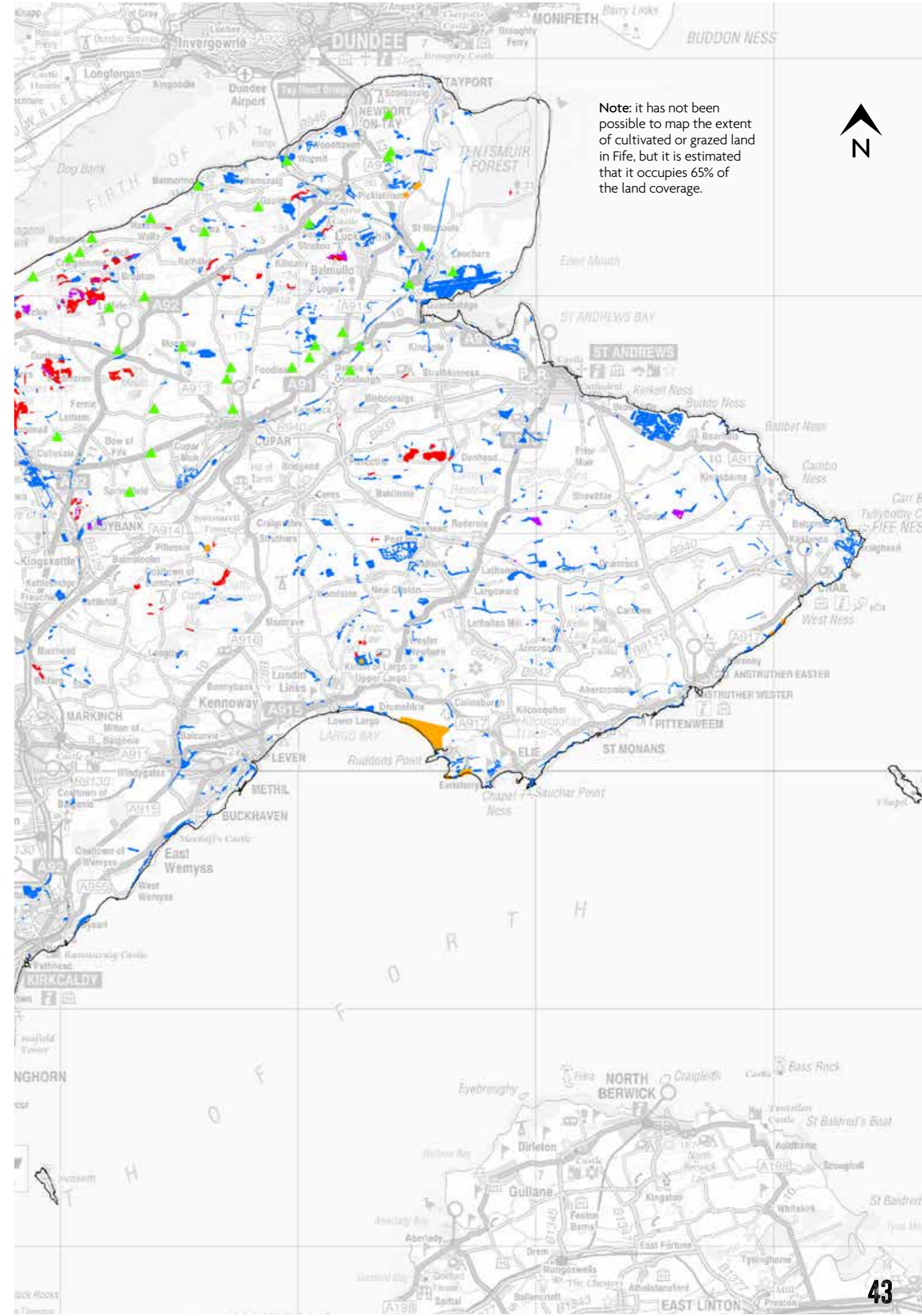
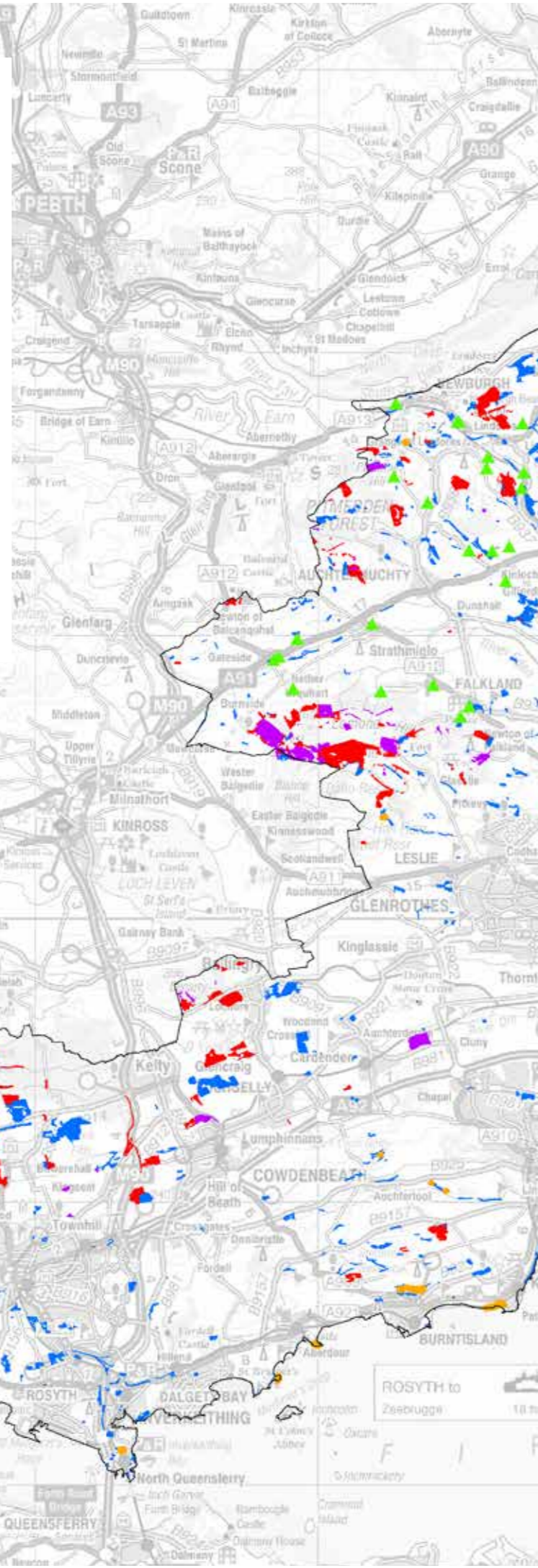


Indicative map of LOWLAND & FARMLAND ECOSYSTEM

Habitats

- ▲ Traditional Orchards of North Fife
- Lowland Calcareous Grassland (below 250m)
- Lowland Dry Acid Grassland (below 250m)
- Lowland Meadow & Upland Hay Meadow
- Lowland Heathland (below 250m)

Data source: Phase 1 Habitat Survey correct as of 11/02/2011.
Symbols indicate location, not area.



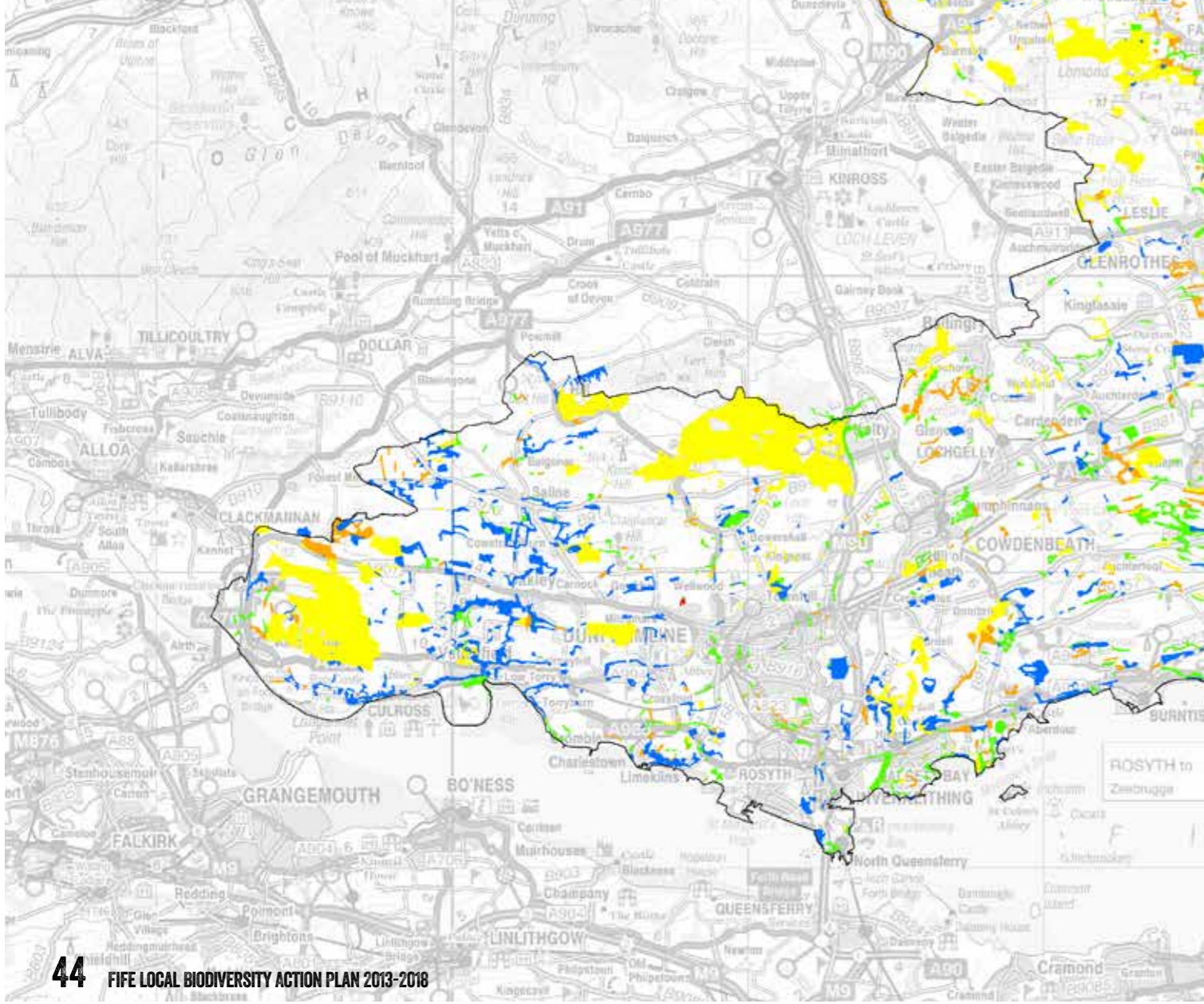
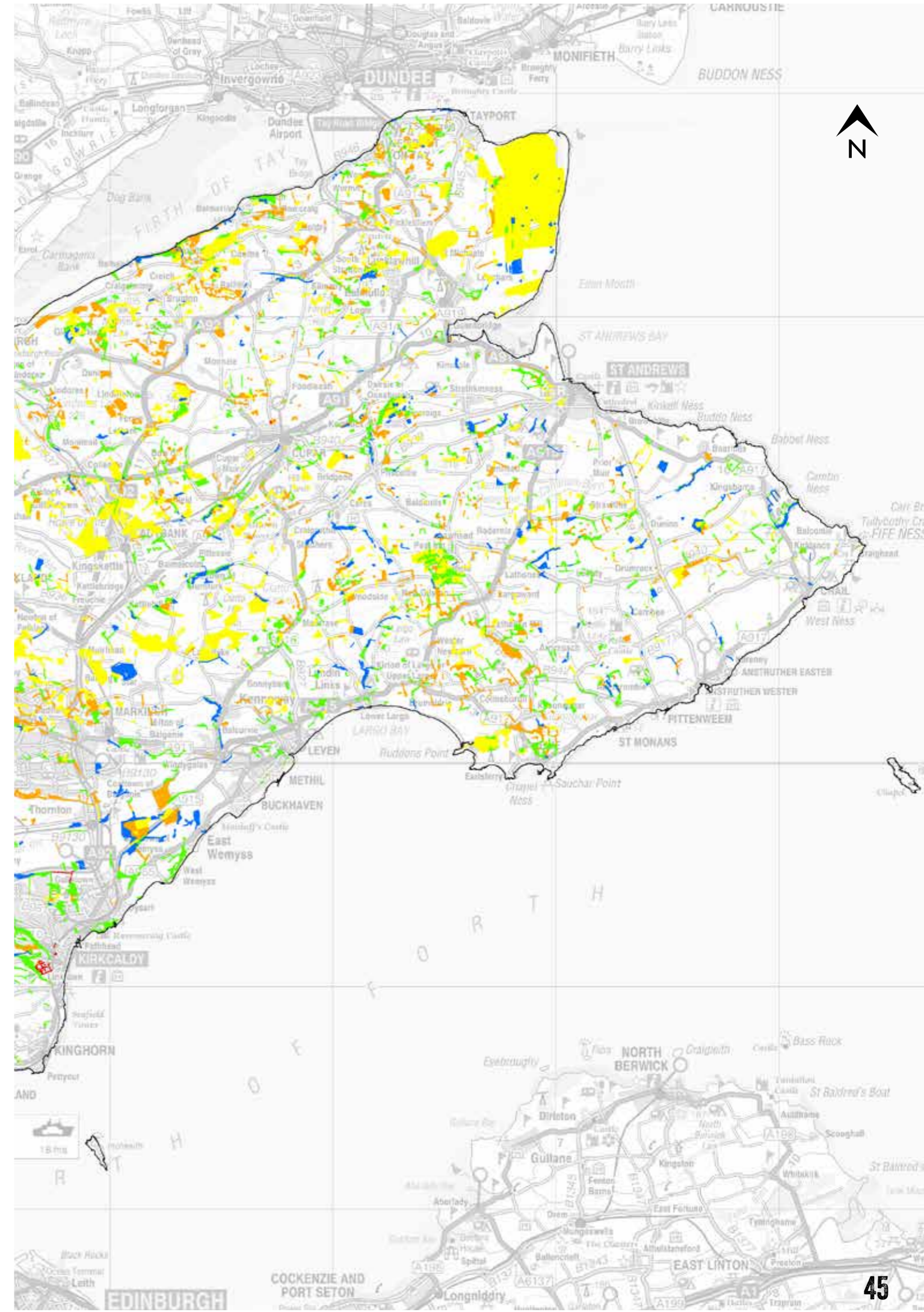
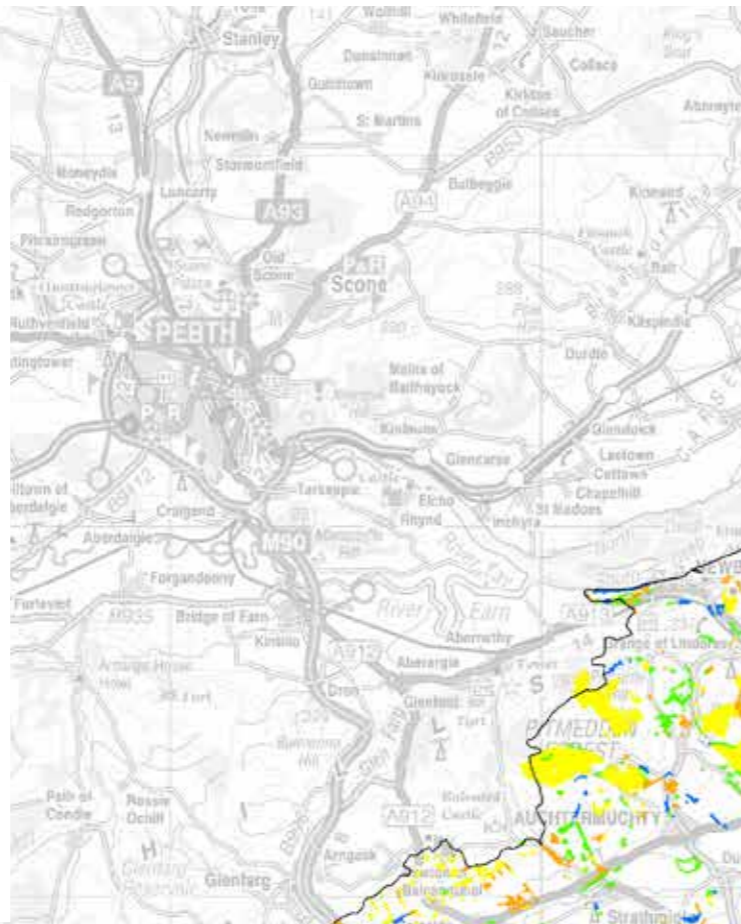
Note: it has not been possible to map the extent of cultivated or grazed land in Fife, but it is estimated that it occupies 65% of the land coverage.

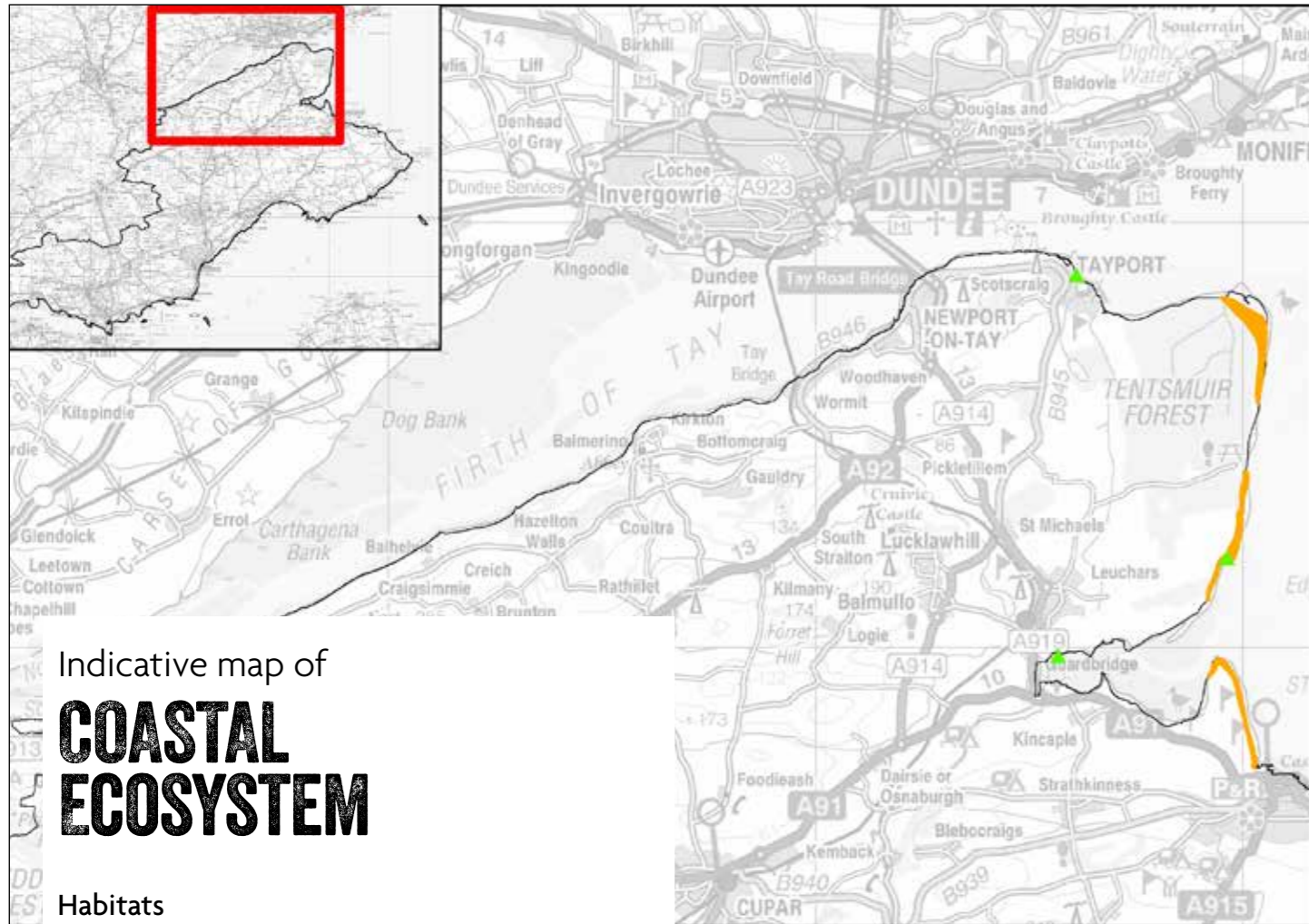
Indicative map of
WOODLAND ECOSYSTEM

Habitats

- Semi-Natural (mainly Broadleaf)
- Broadleaved Plantation
- Coniferous Plantation
- Mixed Plantation
- Parkland with Scattered Trees

Data source: Phase 1 Habitat Survey correct as of 11/02/2011.
Symbols indicate location, not area.



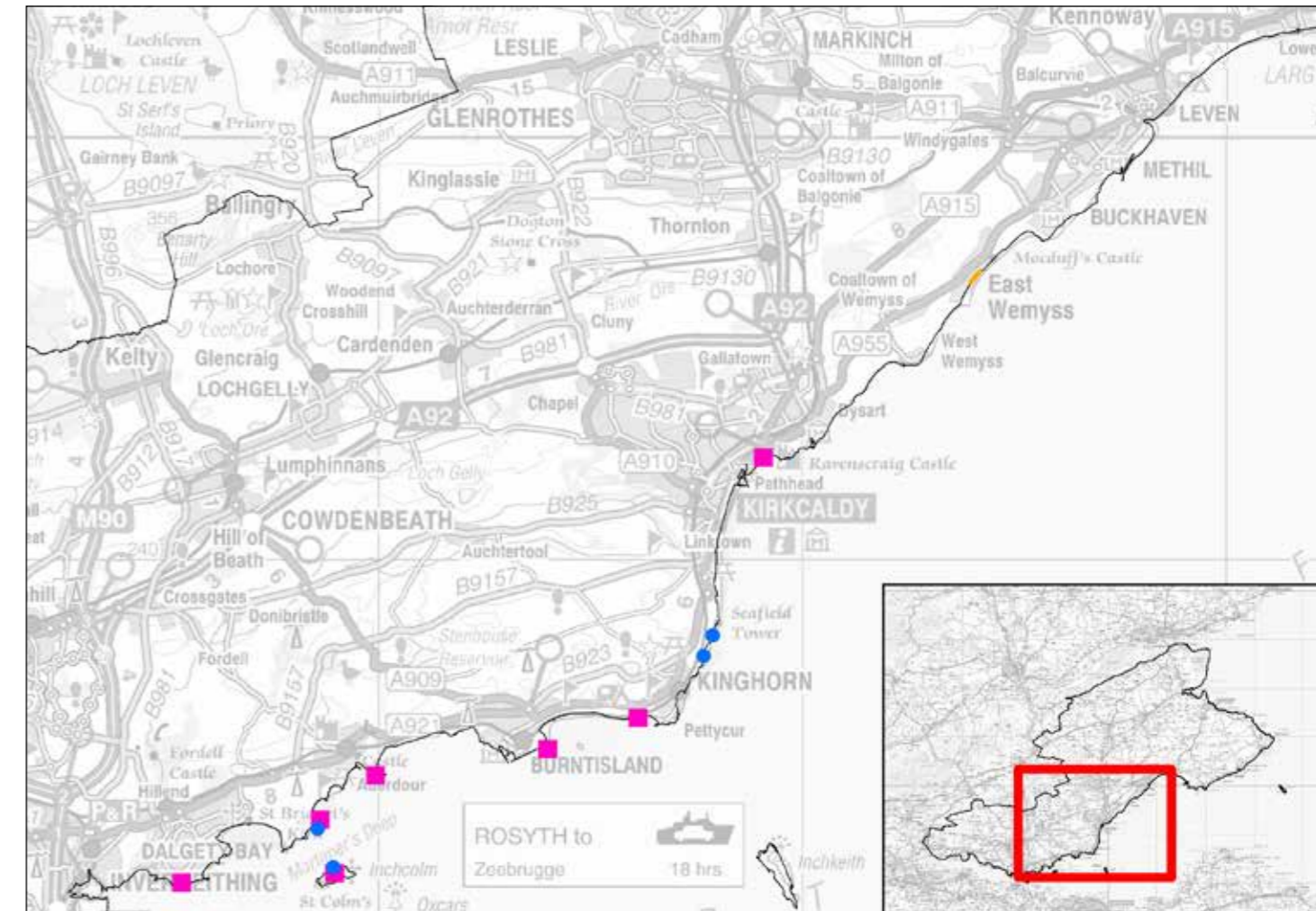
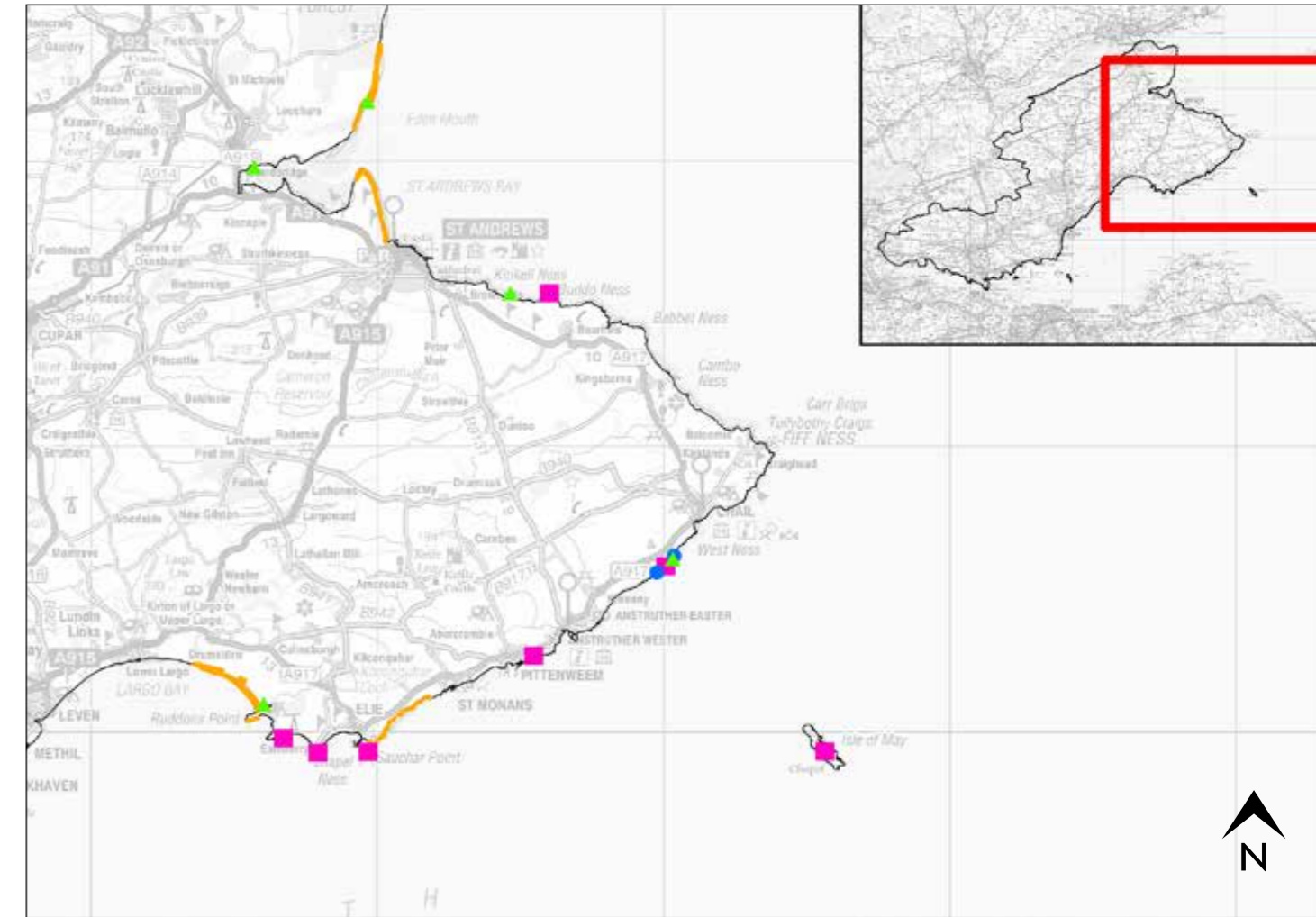
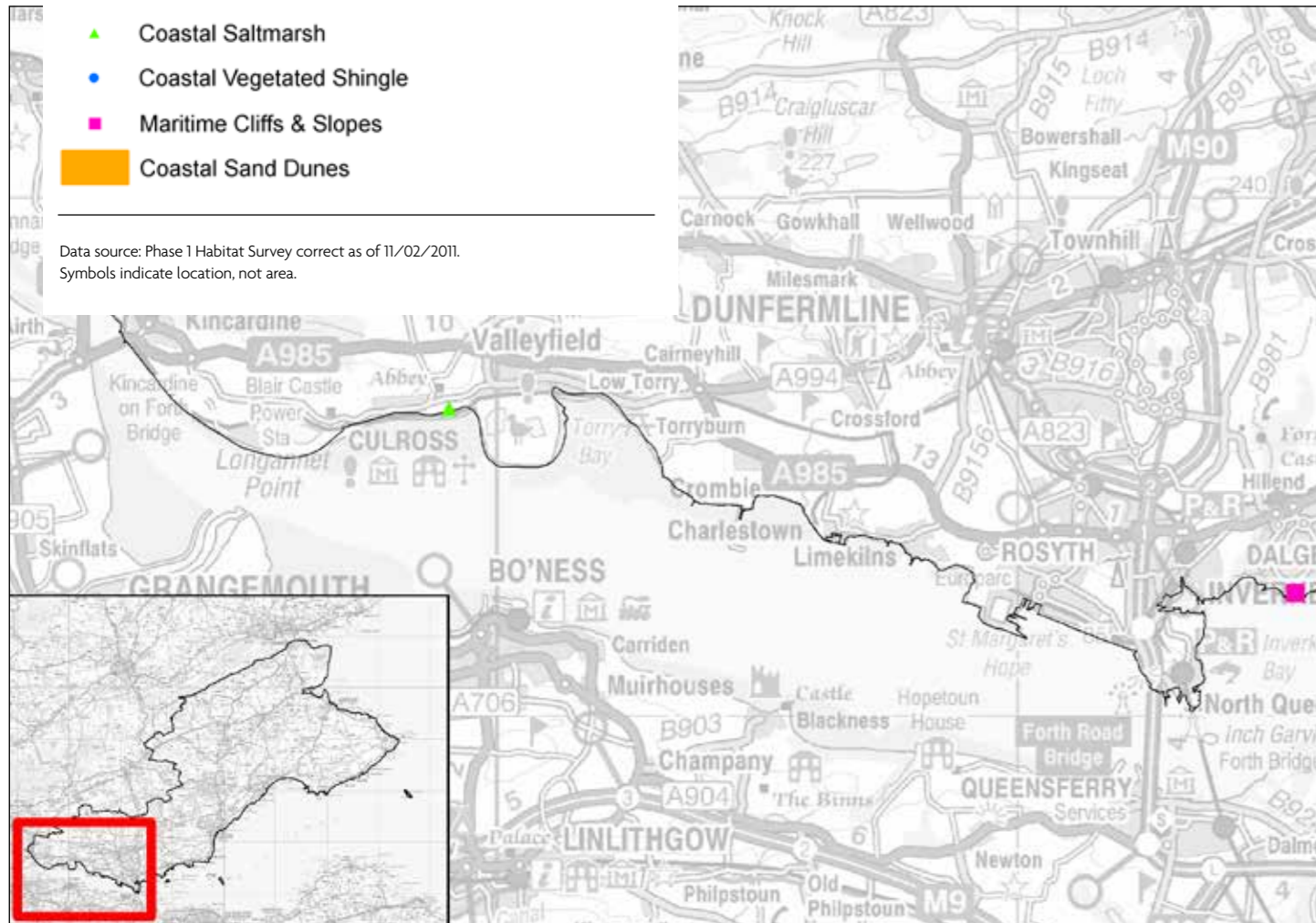


Indicative map of
COASTAL ECOSYSTEM

Habitats

- ▲ Coastal Saltmarsh
- Coastal Vegetated Shingle
- Maritime Cliffs & Slopes
- ▬ Coastal Sand Dunes

Data source: Phase 1 Habitat Survey correct as of 11/02/2011.
Symbols indicate location, not area.



APPENDIX 2: SUMMARY TABLE OF PROJECTS

This table compiles all of the core actions mentioned in the body of the document. In addition, it provides detail against each action of specific work which will be carried out to help deliver that action. The column of specific projects is not exhaustive and additional work will take place to fulfil the actions.

Number	Action	Breakdown of action if relevant	Lead	Partners	Lead individual
UPLAND					
UPLAND HEATHLAND					
1	Improve the condition of 655 hectares of heather moorland in the North Fife Heaths, Lomond and Benarty Hills by bringing into or improving management. Use one of these areas as a good practice demonstration site. Assess condition of sites using a consistent monitoring methodology.	Glenduckie Hill and Norman's Law (14.8 ha): continue to work with landowners of North Fife Heaths SSSI to develop appropriate management of heath features and improve their condition.	SNH	Landowner	Dave Shepherd
		Lacesston Muir and Glen Burn Gorge SSSI (95 ha) and the area of moorland to the east (81 ha): continue to work with landowners to develop appropriate management of heath features and improve condition.	SNH	Landowner	Dave Shepherd
		Falkland estate (384 ha): continue to improve condition of the hill ground by adopting sustainable grazing and appropriate heather management practices.	Falkland Estate Trust/ Falkland Centre for Stewardship	Elmwood College; LLLP Partnership	Land Manager / Ninian Stuart
		Bring an area of upland habitat flanking East Lomond (80 ha) into improved management by grazing with cattle. Secure funding for fencing.	Robert Balfour	Elmwood College; LLLP Partnership	Robert Balfour
UPLAND CALCAREOUS GRASSLAND					
2	Improve the condition of Holl and Craigmear Meadows by working in partnership with landowners to annually cut or graze the sites. Assess condition of sites using a consistent monitoring methodology.	Landowner to manage Holl Meadow by cutting or grazing in order to improve the condition of the grassland. Fife Council to arrange monitoring in 2014 and 2018.	FCCT / Scottish Water	SNH / Fife Council	Bob Weston
		Manage Craigmear Meadow by cutting or grazing in order to improve the condition of the grassland. Fife Council to arrange monitoring in 2014 and 2018.	Falkland Estate	SNH / Fife Council	Land Manager
UPLAND MANAGEMENT					
3	Based on upland habitat and condition surveys, create management plans for up to 10 landholdings to record current land management practices and identify opportunities to enhance upland habitat including heath, native woodland and scrub, grassland and mire habitats. Prioritise proposed management recommendations and deliver measures to support sustainable livestock management and habitat restoration. Hold one upland management workshop to demonstrate good practice. This project is subject to securing funding.	Create management plans for 10 landholdings and identify opportunities to enhance habitat. This will be informed by the Phase 1 and habitat condition surveys. Subject to securing funding.	FCCT	LLL; Land managers	Bob Weston & Countryside Ranger
		Prioritise proposed management recommendations and deliver measures to support sustainable livestock management and habitat restoration. Subject to securing funding.	FCCT	LLL; Land managers	Bob Weston & Countryside Ranger
		Hold one upland management workshop. Subject to securing funding.	FCCT	LLL; Elmwood College	Bob Weston & Countryside Ranger
MONITORING & SURVEYING					
4	Monitor moorland birds in the Lomond Hills Regional Park as indicators of upland ecosystem health through an annual survey with students and volunteers.		Elmwood College	Fife Council; FCCT	Stuart Macdonald
5	Co-ordinate and publicise a public survey of the green hairstreak butterfly as an indicator species of upland ecosystem health.		FNRC / Fife Council	Butterfly Conservation	Alexa Tweddle
6	Undertake a Phase 1 survey as well as a habitat condition assessment of the Lomond and Benarty Hills to inform and prioritise the protection and enhancement of the quality, extent, connectivity and diversity of upland habitat. Subject to securing funding.		FCCT	LLL	Countryside Ranger

Number	Action	Breakdown of action if relevant	Lead	Partners	Lead individual
AWARENESS RAISING					
7	Develop interpretation to increase enjoyment, awareness and understanding of the natural and cultural heritage of the Lomond Hills Regional Park. This will include outdoor interpretation and signage, a website, leaflets and two indoor information 'hubs' at Falkland and Lochore Meadows Country Park. Subject to securing funding.		LLL	FCCT; Falkland Centre for Stewardship; Fife Council; Markinch Heritage Group	Simon Scott

FRESHWATER & WETLAND					
CREATE PONDS AND WETLANDS TO INCREASE EXTENT AND DISTRIBUTION OF THIS HABITAT					
1	Facilitate the creation of four ponds or wetlands per annum with the help of local community groups or volunteers where possible. Consult the Integrated Habitat Network to identify priority enhancement areas with maximum opportunity to increase 'stepping stones'.	Extend the pond at Hill of Tarvit golf course.	FARG	SGEG	Bob Weston
		Enlarge pond or create mosaic of new ponds at Townhill Muir. Prior to creation, carry out a new survey on the Muir and in Townhill Wood to investigate anecdotal evidence of great crested newts.	FARG	Fife Council	Bob Weston
		Create a new, publicly accessible wetland area in Leslie adjacent to the Camby Burn.	Leslie Community Council	Fife Council	John Wincott
		Create a mosaic of standing open water surrounded by wet meadow at Starkies Wood in Buckhaven, as part of a community wildlife garden.	Take a Pride in Levenmouth	Fife Council; CLEAR Buckhaven	Laura Thomson
		Secure funding to create a new area of standing open water as well as public access and 800 m of fencing at the Coble Shore pools to enhance this area of valuable freshwater in the Eden Estuary Local Nature Reserve.	FARG	FCCT	Ranald Strachan

RESTORE OR ENHANCE HABITAT					
2	Secure funding to undertake two restoration projects of watercourses with 'poor' or 'bad' ecological potential in accordance with SEPA's classification. Support other river restoration projects and work with local communities and volunteers where possible.	Secure funding for a landscape-scale project to survey, restore and enhance the watercourses and riparian habitat in the Kennoway/Back Burn sub-catchment. Deliver with the help of volunteers and offer training in habitat assessment.	Fife Council		Johanna Willi
		Deculvert the burn at Silversands, Aberdour. Manage habitat on either side as wildflower meadow.	Fife Council		John McQueen / Johanna Willi
		Aspirational: subject to feasibility, undertake a project to 'daylight' and restore a section of culverted Lyne Burn in Dunfermline, as part of the Lyne Burn Corridor project.	Fife Council		Phil Clarke
3	Facilitate three river clean-up events per annum with the support of local communities, volunteers and/or school groups.	Hold one clean-up operation per annum along the Dree Burn with the support of volunteers and the local community.	FCCT		Deirdre Munro
		Lyneburn, Dunfermline	Fife Council		Johanna Willi
		River Leven, Levenmouth	TAPIL / Fife Council		Laura Thomson
		River Leven, Glenrothes	TAPIG / Fife Council	Friends of Riverside Park	Johanna Willi
	River Eden, Eden Estuary	Fife Council	RAF Leuchars Conservation Group; FCCT	Ranald Strachan	
4	Restore two ponds or wetlands per annum with the help of volunteers.	Remove a third of the area of reeds in the East Stenton Pond.	FARG	Fife Council; FCCT	Johanna Willi
		Manage ponds in Townhill Wood two times between 2012-2017, particularly for the benefit of the newt populations.	FCCT	FARG	Lyn Strachan
5	Improve the condition of three raised bogs, Lockshaw Mosses, Wether Hill and Park Hill & Tippeton Moss SSSIs, by working with landowners to bring them into positive management.	Lockshaw Mosses SSSI (ditch blocking and tree/scrub removal and control)	FCS	SNH	Jenny Ventham
		Wether Hill SSSI	SNH	landowner	Keith Dalgleish
		Park Hill & Tippeton Moss SSSI	SNH		Keith Dalgleish

Number	Action	Breakdown of action if relevant	Lead	Partners	Lead individual
6	Bring two key reedbed sites into management to maintain and enhance their condition.		Fife Council	SNH	Johanna Willi

PROTECT HABITAT

7	Revise the Fife Council urban greenspace herbicide application regime, with the aim of reducing spraying by half.		Fife Council		Johanna Willi
8	Protect and enhance Dalbeath Marsh SSSI in line with the management plan by installing a water control sluice to re-establish the marginal aquatic communities, controlling Japanese knotweed, removing encroaching scrub, managing grassland, monitoring ground flora, and carrying out four litter picks per annum with the support of school and community groups. Create new interpretation for the site.	Manage the willow carr by removing excess growth every two years.	FCCT	Friends of Dalbeath Marsh	Countryside Ranger
		Install a water control sluice to re-establish the marginal aquatic communities. Install WALRAGs to monitor the groundwater levels, to ensure the continued survival of Greater tussock sedge.			
		Control Japanese knotweed at Dalbeath Marsh annually.			
		Inform management by monitoring the ground flora in accordance with the management plan.			
	Create and install a series of interchangeable interpretive panels, including seasonal and habitat panels.				
9	Manage Drumdreel pond once per annum with the help of volunteers and trainees by keeping silt traps clear, managing willow scrub and cutting wildflower banks. Carry out a baseline species survey.		Falkland Centre for Stewardship	FARG	Sam Docherty
10	Protect and enhance Birnie and Gaddon Local Nature Reserve in line with the management plan by managing the two islands for ground nesting birds, controlling invasive non-native species and monitoring notable wildlife to inform management. Work with local communities, schools and volunteers.	Manage the two islands on Gaddon Loch for ground nesting birds (including skylark, lapwing, oystercatcher, red shank and common sandpiper) by cutting the grass once per annum after the breeding season (September to November)	FCCT		Countryside Ranger
		Protect notable wildlife at Birnie & Gaddon Lochs by: rebuilding the otter holt; surveying the water vole population; controlling mink during the bird breeding season from March to June; and monitoring the bird population annually through the Breeding Bird Survey. Survey, monitoring and control dependent on the support of volunteers. All records to be sent to Fife Nature Records Centre and bird records also to BTO.			

INVASIVE NON-NATIVE SPECIES MANAGEMENT

11	Deliver a project to survey and eradicate giant hogweed along a 10km stretch of the River Eden from Burnside to Ladybank. Involve and train volunteers. Subject to securing funding.		FCCT	LLP	Bob Weston
12	Secure funding for a Fife-wide Invasive Non-Native Species Officer to deliver a project to raise awareness about and facilitate control of INNS, including plants, crustaceans and mammals, which will help protect native wildlife including fish, ground-nesting birds, the water vole and red squirrel. Include the production of an INNS control strategy for Fife.		Fife Council	FCCT	Johanna Willi
13	Control invasive non-native species in the Eden Estuary Local Nature Reserve three times per annum targeting giant hogweed, Japanese knotweed and Himalayan balsam.		FCCT		Ronald Strachan
14	Support and promote the Forth Invasive Non-Native Species Project in Fife by encouraging submission of records and facilitating the training of volunteers and staff in survey, monitoring, control and management of invasive non-native plants.		Fife Council	River Forth Fisheries Trust / FCCT / TAPIL / SNH / SEPA	Johanna Willi

Number	Action	Breakdown of action if relevant	Lead	Partners	Lead individual
MONITORING					
15	Monitor ponds and satellite ponds at Pitmeddon for great crested newts and other amphibians annually.		FARG		Bob Weston
16	Encourage the biological recording of fish and other riparian species. Create a leaflet and form to be inserted in 'catch returns booklets' and distribute to fisheries trusts and angling groups. Annually exchange records with fisheries trusts.		Fife Council / FNRC	Tay Salmon Fisheries Board; River Forth Fisheries Trust	Johanna Willi

SURVEYING

17	Co-ordinate and publicise a Fife-wide public survey of an indicator species of ecosystem health or an invasive species which threatens ecosystem health.		FNRC	FARG / FCCT	Alexa Tweddle
18	Resurvey the Fife wader population as an indicator species of ecosystem health, using the 1992 and 1996 surveys as a baseline.		Fife Council	RSPB / FNRC	Johanna Willi
19	Survey at least five new sites annually for reptiles and amphibians. Priority sites include the Goose Pools at Tentsmuir, Balmullo Hill, Townhill Muir, Leuchatsbeath, Petrie's Ponds and Earlsall Muir.	Survey for great crested newts at Calais Muir Wood and Townhill Muir.	FCCT	Fife Council / Amazon	Lyn Strachan
			FARG		Bob Weston

EDUCATION / AWARENESS RAISING

20	By producing written information and holding an event, raise awareness within Fife Council about SUDS enhancement and best practice in management which affects watercourses.		Fife Council	SEPA	Johanna Willi
21	Raise awareness of amphibian and reptile conservation by holding one Newt Night and attending a minimum of two public events per annum.		FARG		Bob Weston
22	Hold three pond dipping sessions per annum with children to raise awareness about this important habitat and associated species.		St Andrews Botanic Garden Education Trust		Nikki Macdonald
23	Through written and online media, raise awareness about the importance of seasonal ponds on farmland.		Fife Council		Johanna Willi

LOWLAND & FARMLAND

RAISING AWARENESS ABOUT LAND MANAGEMENT FOR BIODIVERSITY

1	Hold one Farm Open Day per annum on a working farm to demonstrate good and poor practice, sustainability, woodland management including traditional techniques, river restoration, drainage, management for farmland birds and pollinating insects, and other methods of enhancing biodiversity in an agricultural landscape.		Pittarthe Farm	Fife Council; RSPB; Bumblebee Conservation Trust; National Trust for Scotland; FCS; The Farm Environment Ltd.	P & C Bowden-Smith
2	Hold one training course per annum at Lochore Meadows Country Park and other key sites to demonstrate hedge, tree, veteran tree and grassland management		FCCT	NTS	Dallas Seawright
3	Hold an event on a Scottish Wildlife Trust site for a range of stakeholders to raise awareness about and share good practice on conservation grazing.		SWT	SNH; Fife Council	Rory Sandison
4	Create a leaflet and make information available on the biodiversity website to advise local authority staff, landmanagers and communities about the value of species-rich grassland, management methods and availability of further information and local resources.		Fife Council		Johanna Willi

Number	Action	Breakdown of action if relevant	Lead	Partners	Lead individual
5	Raise awareness about funding opportunities available for landowners to enhance biodiversity in the rural environment.		Fife Council	The Farm Environment Ltd; SNH; FCCT	Johanna Willi

HEDGEROWS, FIELD MARGINS & BOUNDARIES

6	Increase habitat connectivity in the urban and rural environment by planting 20 km of native hedgerows and tree-lines. Make use of the Integrated Habitat Network model to help identify priority areas in the rural environment.	Plant 2 km of hedgerows, including 'edible hedges' and fruit trees, in urban parks and greenspaces to connect fragmented habitat.	Fife Council	FCCT; Fife & Kinross Bat Group	Johanna Willi / Kevin O'Kane
		Plant 3 km of native hedgerows and tree-lines in the rural landscape to connect fragmented habitat.	Fife Council		Johanna Willi
		Plant 0.5 km of hedgerow at Birnie Loch Wildlife Site to replace fencing.	FCCT		Countryside Ranger
		Plant 0.2 km of hedgerow at Calais Muir Woodland and Duloch Park.	FCCT		Lyn Strachan

GREENSPACE AND PARKS

7	Enhance the grounds of eight NHS Fife sites for biodiversity as well as patient and visitor wellbeing.		NHS	SNH; Fife Council	Jackie Hyland
8	Create and implement Biodiversity Action Plans for five major parks and 20 other areas of greenspace in order to enhance biodiversity in the urban environment.		Fife Council	FCCT; Fife & Kinross Bat Group	Johanna Willi
9	Develop material to help schools enhance their grounds for biodiversity through the establishment of wildlife areas, orchards and growing spaces. Create a demonstration site at Lundin Mill Primary School. Work with Parks & Countryside staff to deliver projects.		Fife Council	Lundin Mill Primary School	Johanna Willi / Peter Duncan / Clare Harley
10	Trial a 'biodiversity village' project where Fife Council and the local community work in partnership to manage and enhance an urban area for the benefit of residents and biodiversity.		Fife Council		Johanna Willi
11	Produce and promote a leaflet on gardening for wildlife and make it available in garden centres across Fife. Encourage garden centres to have dedicated wildlife-friendly sections.		Fife Council		Johanna Willi

GOLF COURSES

12	Enter the seven Fife Golf Trust courses, amounting to 300 hectares, for GEO Certified, the Golf Environment Organisation's internationally-recognized ecolable for sustainable and environmental management. Undertake additional management to enhance courses for biodiversity.		Fife Golf Trust	SGEG; Fife Council	Paul Murphy
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ORCHARDS, GROWING AND EDIBLE SPACES

13	Revise the Fife Allotments Strategy 2009-2014 to include a section on managing allotments for biodiversity. From this, produce a leaflet for plot holders.		Fife Council		Peter Duncan
14	Undertake a survey of traditional orchards in central and south Fife to complement the existing north Fife survey and help protect this valuable habitat.		Fife Council		Johanna Willi / Peter Duncan
15	Facilitate the creation of 10 new orchards of local provenance heritage fruit trees and 10 edible spaces across Fife by supporting community interest.	Facilitate the creation of 10 edible spaces.	Fife Council		Kevin O'Kane
		Facilitate the creation of three large new orchards.	Fife Council	Community groups	Peter Duncan
		Facilitate the creation of seven new orchards.	Fife Council	Community groups	Johanna Willi

Number	Action	Breakdown of action if relevant	Lead	Partners	Lead individual
16	Set up a Horticultural Mentor Programme. Offer annual training for volunteers to support communities with food growing and orchard management. Oversee management of newly planted orchards where necessary.	Manage the orchard in Riverside Park (300 trees)	Fife Council	TAPIG	Jim Leitch
		Manage the orchards at Birnie & Gaddon Lochs and Lochore Meadows Country Park	FCCT		Countryside Ranger & Dallas Seawright
		Run a Horticultural Mentor Programme and offer annual training days for volunteers	Fife Council		Johanna Willi
17	Support communities to hold at least one Harvest and Apple Day event per annum to raise awareness about local produce, biodiversity, food miles, healthy eating and fruit heritage. Continue to provide facilities for the public for pressing apples.		Fife Council	St Andrews Botanics Education Trust	Johanna Willi

BATS

18	In 2013, survey Nathusius pipistrelles in Fife and East Lothian and radiotrack individuals to find out more about their roost locations and behaviour. Use data, to be shared with Fife Nature Records Centre, to inform a programme of public events and walks.		Fife & Kinross Bat Group		Emilie Wadsworth
19	Raise awareness about bats in Fife by holding three night-time events per annum at locations across Fife. Ensure sightings are shared with Fife Nature Records Centre and Fife & Kinross Bat Group.		Fife & Kinross Bat Group; Daubenton's Roost Investigation Project; FNRC; FCCT; Fife Council; NTS		Johanna Willi
20	Develop a bat database to help ensure that bat roosts and habitat are protected.		Fife & Kinross Bat Group	Fife Nature Records Centre / Fife Council	Richard Smith
21	Carry out a bat survey at the limekiln at Craighall Den in order to confirm anecdotal evidence that all five species are present. Install an interpretation panel about the building and bats.		Fife & Kinross Bat Group	Fife Council / FCCT	Emilie Wadsworth

BIRDS

22	Through appropriate management, maintain safe nesting habitats and year-round feeding opportunities for corn buntings at six farms in Fife.		RSPB		Karen Cunningham
23	Monitor the Fife corn bunting population through annual survey with the support of volunteers.		RSPB	Chris Smout and volunteers; Fife Council	Karen Cunningham / Johanna Willi
24	Create and install 10 artificial nesting sites for barn owls in locations identified through the barn owl survey.		FCCT	Fife Council	Bob Weston

SURVEYING

25	Co-ordinate and publicise a Fife-wide public survey of barn owls as an indicator species of lowland and farmland ecosystem health.		FNRC		Alexa Tweddle
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SPECIES-RICH GRASSLAND CREATION AND MANAGEMENT

26	Create 3 hectares of wildflower and pollinator-friendly meadow in suitable urban greenspace across Fife. Identify locations via groundtruthing and survey.		Buglife / Fife Council		Suzanne Bairner / Johanna Willi
27	Deliver a sustainable meadow management project in the Lomond Hills Regional Park. This will include management of 5.5 hectares of species-rich grassland, employment of a farmer to assist with management, purchase of specialist machinery and livestock management materials, training of volunteers, community and/or school groups through annual sessions, training of staff, and a Grassland Walks of Fife leaflet. Subject to securing funding.		FCCT	LLLP	Dallas Seawright

Number	Action	Breakdown of action if relevant	Lead	Partners	Lead individual
28	Revise Fife Council's road verge management regime in order to better manage this habitat for biodiversity.		Fife Council		Johanna Willi
29	Manage key species-rich grassland sites annually to maintain and enhance condition: Coul Den LNR, Birnie Loch LNR, Craig Hartle SSSI, Hawkcraig Point Wildlife Site, Townhill Meadow, Lochore Meadows Country Park, Craigtoun Country Park, Dalbeath Marsh SSSI/LNR, Dreel Meadow Wildlife Site, Tip Point and Out Head (Eden Estuary LNR), Stenton and Riverside Park (Glenrothes), Carlingnose Point SWT Reserve, Cullaloe LNR/SWT Reserve, Fleecefaults Meadow SSSI, Lielowan Meadow SSSI/SWT Reserve, Kilminning Coast SWT Reserve and Bankhead Moss SWT Reserve.	Manage the species-rich grassland on Scottish Wildlife Trust reserves annually to maintain and enhance condition: Carlingnose Point, Cullaloe, Fleecefaults Meadow, Lielowan Meadow, Kilminning Coast and Bankhead Moss. Offer communities and landowners cost-free advice and support with funding applications. Supply resources such as the flying flock at a financial cost.	SWT	Local communities & professional bodies	Rory Sandison
		Manage Birnie Loch Local Nature Reserve meadow by grazing with livestock for 4-8 weeks every autumn from late September.	FCCT		Countryside Ranger
		Manage the meadow at Coul Den Local Nature Reserve by cutting, raking and removing arisings once per annum in August with the support of volunteers.	FCCT		Bob Weston
		Manage Townhill Meadow annually by cutting and baling in late summer and removing ragwort and encroaching alder with the help of community groups.	Fife Council		Johanna Willi / John O'Neil
		Manage Suspension Bridge Meadow at Riverside Park, Glenrothes, once per annum by cutting and removing arisings.	Fife Council	TAPIG / FCCT	Johanna Willi
		Co-ordinate the management of Dreel Meadow by cutting and raking annually on rotation with the support of Junior Rangers, East Neuk volunteers and/or the local primary school. Erect seasonal interpretation annually.	FCCT	Landowner	Deirdre Munro
		Manage the five MGS grassland sites at Lochore Meadows Country Park.	FCCT		Dallas Seawright
		Manage the grassland at Dalbeath Marsh Local Nature Reserve by cutting annually, raking and removing arisings. Remove encroaching scrub from grassland and lowland heath areas annually.	FCCT		Countryside Ranger
		Manage the meadow at Stenton Ponds, Glenrothes, once per annum by cutting and removing arisings.	Fife Council	TAPIG	Johanna Willi
		Manage the Tip Point coastal grassland in the Eden Estuary Local Nature Reserve as a species-rich grassland site either by grazing or cutting annually and removing arisings.	FCCT	St Andrew's University SERG	Ranald Strachan
		Secure funding to erect fencing and graze the grassland at Craig Hartle SSSI. Hold an annual bracken clearance event with volunteers.	Fife Council		Johanna Willi
Manage the coastal grassland at Out Head within the Eden Estuary Local Nature Reserve once per annum by cutting or grazing. Continue to monitor the diversity of ground flora along the established transect once per annum to inform management with volunteer support.	FCCT/ Links Trust		Ranald Strachan		
Manage the grassland and remove encroaching scrub annually at Hawkcraig Point Wildlife Site.	Fife Council	FCCT	Johanna Willi / John McQueen		

LOWLAND HEATHLAND

30	Remove encroaching silver birch scrub from Townhill Muir two times per annum with the help of volunteers.		FCCT		Lyn Strachan
31	Seek funding to deliver the Townhill Muir Management Plan objectives on a larger scale.		FCCT		Lyn Strachan

Number	Action	Breakdown of action if relevant	Lead	Partners	Lead individual
INVASIVE NON-NATIVE SPECIES					
32	Create a centrally-coordinated database of invasive non-native species sightings and locations in Fife. Advertise the PlantTracker application as a means of submitting records and also produce INNS recording forms. Annually exchange data with Forth Invasive Non-native Species Project.		Fife Council / FNRC	FINNS	Johanna Willi / Alexa Tweddle

EDUCATION

33	Hold 5 education sessions per annum to enable children to learn about and enjoy lowland, farmland and urban habitats and associated species. Topics will include bees and pollination, orchards, bats and birds.		St Andrews Botanic Garden Education Trust		Nikki Macdonald
34	With pupils from local primary schools, deliver an annual project to collect wildflower seed, grow plugs and plant these to enhance the diversity and value of existing grassland.		St Andrews Botanic Garden Education Trust		Nikki Macdonald

PLANNING/DEVELOPMENT

35	Provide nature conservation advice to Fife Council on relevant planning applications.		SNH	Fife Council EPPS	Dave Shepherd; Stephanie Little
36	Use the Fife Integrated Habitat Network mapping study to inform Green Network and Green Infrastructure development through implementation of Green Network policy and Green Infrastructure Supplementary Planning Guidance.			Fife Council EPPS	Alison Wood

WOODLAND

CREATE NEW WOODLAND AND INCREASE CONNECTIVITY

1	Increase the availability of local provenance tree stock by propagating specimens in local nurseries.		Fife Council	St Andrews Botanic Garden / Elmwood College / Lochore Meadows Country Park and volunteers / FCCT	Johanna Willi
2	Create 20 hectares of native woodland per annum, making use of the Integrated Habitat Network and Fife Forestry & Woodland Strategy to help identify priority areas for enhancing woodland connectivity.	Secure funding for and plant 200 aspen trees per annum at appropriate sites in the Lomond Hills Regional Park. Secure local provenance stock.	Fife Council	FCS / WTS / Falkland Centre for Stewardship/ FCCT	Johanna Willi
		Create woodland corridors for red squirrels around key sites for the species by planting 2000 Scots pine trees with the help of volunteers and community groups by 2014.	FCCT / FRSG		Sophie Eastwood
		FCS woodland planting on farms	FCS		Jenny Ventham / Gareth Waters
		Enhance connectivity of Benarty Wood to other woodland in the area by planting native woodland corridors.	Fife Council	FCS / FCCT	Johanna Willi

ASPEN

3	Survey all aspen stands presumed to be native in Fife and collate information on the number of trees and whether or not they have been planted. Ascertain which trees are of local provenance. Take cuttings from local provenance trees and propagate. Plant saplings in the Lomond Hills and other appropriate locations to establish viable populations. Hold an aspen seminar to raise awareness about conservation of the species.		Fife Council	St Andrews Botanic Garden / Falkland Centre for Stewardship / Woodland Trust Scotland / FCCT	Johanna Willi
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Number	Action	Breakdown of action if relevant	Lead	Partners	Lead individual
JUNIPER					
4	Source, propagate and plant local provenance juniper to reintroduce viable populations of this species to Fife and enhance existing and new woodland planting.		Fife Council	St Andrews Botanic Garden / FCS or Forest Research / CSFT / Woodland Trust Scotland / FCCT	Johanna Willi

SURVEYING AND MONITORING

5	Monitor transects at key red squirrel sites biannually in accordance with national guidelines. Co-ordinate volunteers and collate survey data.		FCCT / FRSG	Forestry Commission Scotland / Falkland Centre for Stewardship / landowners / Fife Council	Sophie Eastwood & Johanna Willi
6	Monitor the bird populations at Townhill Wood, Craighall Den, Calais Muir, School Wood and Lochore Meadows Country Park via the Common Bird Census in order to inform and monitor effectiveness of management. Submit all data to Fife Nature Records Centre.		FCCT		Lyn Strachan
7	Co-ordinate and publicise a Fife-wide public survey of an indicator species of woodland ecosystem health or an invasive species which threatens ecosystem health.		Fife Council / FNRC		Alexa Tweddle
8	Deliver a butterflies and moths project to raise awareness about and encourage monitoring of these indicator species. Hold a series of talks and species identification days, attend bioblitzes, create and train a volunteer recorders group, establish three new butterfly transects and recruit Champions to monitor these, and produce a 'Butterflies and Day-flying moths of Fife' leaflet to encourage recording as well as improved habitat management		Butterfly Conservation	Fife Council	Duncan Davidson
9	Through a questionnaire, groundtruthing and survey, create an up-to-date distribution map of native bluebell populations in Fife.		Fife Council / FNRC		Johanna Willi & Alexa Tweddle
10	Monitor the bat populations at Tentsmuir, Weddersbie and Ladybank Forests by checking boxes twice per annum.		Fife & Kinross Bat Group		Gavin Johnson
11	Train volunteers to carry out bird surveys through an annual event to help with the monitoring of key natural heritage sites in Fife.		FCCT	Fife Council / FNRC	Dallas Seawright & Lyn Strachan

MANAGE WOODLAND TO ENHANCE BIODIVERSITY

12	Hold three practical woodland management workshops. Collate a woodland management toolbox of good practice and promote at workshops. Include an advisory leaflet on funding opportunities for landowners, communities and Fife Council staff. Provide advice on the creation of small native woodlands.		Fife Council	FCS / Butterfly Conservation / Woodland Trust Scotland / NTS	Johanna Willi
13	Bring five woodlands into better management for biodiversity by creating management plans, securing funding, undertaking initial enhancement work and working with local communities.		Fife Council	FCCT	Johanna Willi
14	Manage 88 hectares of ancient semi-natural and long-established woodland, including restoration of any plantations on ancient woodland sites (PAWS), to maintain and enhance biodiversity as outlined in management plans.	Harran Hill Wood (27.64 ha)	FCCT		Dallas Seawright
		Lochore Meadows Nature Reserve (27 ha)	FCCT		Dallas Seawright
		Craighall Den (14.9 ha)	FCCT		Lyn Strachan
		Keil's Den (18.2 ha)	Woodland Trust Scotland		Jill Aitken
	Thin and replant the woodland at Dalbeath Marsh.	FCCT		Countryside Ranger	

Number	Action	Breakdown of action if relevant	Lead	Partners	Lead individual
15	Manage 262 hectares of mixed lowland and urban woodland to maintain and enhance biodiversity.	Manage c. 46 ha of mixed lowland woodland within Lochore Meadows Country Park to maintain and enhance biodiversity.	FCCT		Dallas Seawright
		Maintain the young woodland on the escarpment at Leslie Backbraes by monitoring tree mortality once per annum and 'beating up' to maintain 80% of trees.	Fife Council	Leslie Golf Club	Johanna Willi
		Advise on and assist with the management of community-owned Denburn Wood (1.5 ha) in Crail, including the delivery of biodiversity projects in conjunction with local schools and community groups.	FCCT		Lyn Strachan
		Manage Formonthills (118.47 ha) to enhance biodiversity, including mowing glades to encourage wildflowers, thinning shelterbelt to enhance ground flora, grazing semi-improved acid grassland, and replacing the non-native plantation with native woodland.	Woodland Trust Scotland		Jill Aitken
		Secure funding to enhance Starkies Wood (1.8 ha) for biodiversity, including diversifying the species and age structure through tree planting, by planting native fruiting and flowering hedgerows, sowing ground flora, creating a wet meadow, areas of shallow open water, amphibian hibernacula, and erecting bird and bat boxes.	Take a Pride in Levenmouth	Fife Council, CLEAR Buckhaven	Iain Wilson
		School Wood (1.5 ha)	FCCT		Lyn Strachan
		Calais Muir (39 ha)	FCCT		Lyn Strachan
		Manage Inzievar Wood (12.4 ha) to maintain and enhance biodiversity.	Woodland Trust Scotland		Jill Aitken
		Deliver the biodiversity objectives of the Townhill Wood Management Plan: instigate continuous cover management (42 ha); encourage natural regeneration of native species; plant the understorey with native trees.	FCCT		Lyn Strachan

INVASIVES

17	Co-ordinate grey squirrel control in a 3km buffer zone around nine of the key sites for red squirrels until April 2014 with the help of trained volunteers, community groups and contractors.		FCCT / FRSG		Sophie Eastwood
18	Control non-native species at Craighall Den annually: monitor and control few-flowered leek with a view to eradicate and remove regeneration of sycamore, beech and field maple.		FCCT		Lyn Strachan
19	At Kennoway Den, remove non-native sycamore and beech regeneration annually, erect 10 bat boxes and plant scrub along the woodland edge.		Fife Council		Johanna Willi / Iain Wilson
20	Control <i>Rhododendron ponticum</i> at Inzievar Woods, Formonthills and Falkland Estate.	Inzievar Woods and Formonthills	Woodland Trust Scotland		Jill Aitken
		Falkland Estate	Falkland Centre for Stewardship		Ninian Stuart

Number	Action	Breakdown of action if relevant	Lead	Partners	Lead individual
AWARENESS RAISING AND EDUCATION					
21	Raise awareness about the woodland ecosystem through a series of events and educational activities including five woodland visits or guided walks, one woodland event, and 20 educational sessions per annum. Run a woodland learning programme at Formonthills with Collydean Primary School. Create an interpretive trail at Townhill Wood.	Lead five groups per annum on woodland visits and guided walks covering a variety of topics such as fungal forays, wild food foraging, and red squirrel spotting.	Fife Council	St Andrews Botanic Garden Education Trust	Johanna Willi
		Run a woodland learning programme at Formonthills, Glenrothes, with Collydean Primary School.	Woodland Trust Scotland		Jill Aitken
		From 2013-2014, deliver the Red Squirrel Champion School Programme around key sites for red squirrels.	FCCT / FRSG		Sophie Eastwood
		Hold at least 20 woodland education sessions per annum to enable children to learn about and enjoy this habitat and associated species. Topics will include Tree Trails, Tree-mendous Maths, hedgehogs, fungi, mini-beasts and monitoring.	St Andrews Botanics Education Trust		Nikki Macdonald
		Create an interpretive trail at Townhill Wood and hold one woodland event for the public per annum.	FCCT		Lyn Strachan
22	Enhance access to Calais Muir wood by improving the path network and creating an interpretive trail and recreational open spaces.		FCCT	Fife Council / Amazon	Lyn Strachan

MARINE & COASTAL

MAINTAIN AND ENHANCE THE EXTENT, DISTRIBUTION AND CONNECTIVITY OF COASTAL HABITAT					
1	Deliver phases two and three of the West Sands dune restoration project using a soft engineering approach to protect and enhance the entire dune system, strandline and links.		FCCT; The Links Trust; Fife Council	RAF Leuchars Conservation Group	Ranald Strachan
2	Create new saltmarsh through direct planting once per annum in order to reconnect fragmented habitat and buffer the shoreline from erosion and the impact of sea level rise.		St Andrews University Sediment Ecology Research Group; SEPA	The Links Trust; RAF Leuchars; FCCT; Fife Council	Clare Maynard
3	Work in partnership with landowners, the local community and volunteers to protect and enhance the mosaic of habitats at Ruby Bay. Fence, plant and establish a grazing regime at the grassland site. Move the Fife Coastal Path inland and reinstate the dune.		FCCT	SNH; Fife Council; Elie Estate	Deirdre Munro
					Robbie Blyth

MAINTAIN AND WHERE POSSIBLE IMPROVE THE CONDITION OF HABITATS

4	Undertake a Plastic Bag Free initiative at five villages along Fife's coastline.		Fife Council	MCS; FCCT	Johanna Willi
5	Deliver a co-ordinated, partnership 'Beachwatch' project to clean and reduce litter along Fife's strandline. Create an online Fife Beach Atlas to facilitate the adoption and regular clean-up of beaches by local communities. Make Fife Council's Litter Plan available online to ensure clean-ups are co-ordinated. Hold at least 15 beach clean-up events per annum, one of which coincides with the Beachwatch Big Weekend.	Create an online Fife Beach Atlas to facilitate the adoption and regular clean-up of beaches by local communities.	Fife Council	FCCT Beaches & Coast Officer	Johanna Willi
		Make the Fife Council Litter Plan - a beach cleaning schedule for over 44 sites - available to the public online in order to encourage co-ordinated beach cleaning.	FCCT	Fife Council	Robbie Blyth
		Co-ordinate 15 beach clean-up sessions per annum along Fife's coastline involving community and school groups, where possible through the Marine Conservation Society 'Beachwatch' scheme. Hold one of these clean-ups every September during the flagship Beachwatch Big Weekend.	FCCT	Forth Estuary Forum; MCS; Fife Council; RAF Leuchars Conservation Group	Deirdre Munro / Ranald Strachan
		Through quarterly condition surveys of the Fife Coastal Path, identify main land-based sources of litter and fly-tipping and report suspected offenders to Fife Council Environmental Services.	FCCT	Fife Council Environmental Services	Robbie Blyth or Ed Heather-Hayes
	Collate information annually on the number of Marine Conservation Society Beachwatch litter surveys carried out in Fife.		Fife Council	MCS	Johanna Willi

Number	Action	Breakdown of action if relevant	Lead	Partners	Lead individual
6	Protect and manage the Eden Estuary LNR by addressing the pressures identified in the management plan. This includes: monitoring wildfowling from September to February; erecting seasonal instruction; annually updating and contributing to an archive of research, and; visiting seven breeding bird sites on a monthly basis.	Provide, promote and facilitate responsible public access for recreation, including controlled wildfowling.	FCCT	Volunteers	Ranald Strachan
		During the bird breeding season, carry out monthly site visits to the Goose Pools and six further breeding sites for birds (2km section of the River Eden, Motray, Tip Point, Coble Pools, Outhead and the Links course). Take appropriate action if Schedule 1 species present. Erect seasonal instruction between March-July. Submit records to Fife Nature Records Centre.	FCCT		Ranald Strachan
		Provide permits to enable landowners to manage their coastal boundaries with the Eden. Actively participate in the West Sands and SERG project partnerships. Support and implement the Shoreline Management Plan. Monitor all activities in the Eden Estuary LNR to ensure that they comply with international designations (SPA) of the site.	FCCT & partners	St Andrew's University SERG	Ranald Strachan
		Annually update and contribute to an archive of research, projects and training taking place in the Eden Estuary in order to support current and future biodiversity and site management. Administer a permit system to control and manage research impacts and effects.	FCCT	St Andrew's University	Ranald Strachan
			Fife Council		Johanna Willi
7	Encourage the adoption of Integrated Coastal Zone Management (ICZM) in the Fife Local Development Plan in order to promote sustainable management of Fife's coastline in accordance with the National Marine Plan.		Fife Council		Johanna Willi
8	Ensure Fife Shoreline Management Plan policies and proposed sites for managed realignment are taken into account in the Local Development Plan and in determination of planning applications. Undertake a scoping study to progress a managed realignment project in Fife.		Fife Council		Johanna Willi
9	Report commercial scale bait digging, cockling, crabbing and razor shell fishing along Fife's coastline, especially at the Eden Estuary, Torry Bay, Largo Bay and Tayport Bay, to the Wildlife Crime Officer and collate annual reports for SNH.	FCCT Coastal Team to report cases at the Eden Estuary, Largo Bay and Tayport Bay.	FCCT	Police Scotland; SNH	Ranald Strachan
		Beaches & Coast Officer to brief seasonally appointed lifeguards on the issue and undertake additional monitoring along Fife's coastline.	FCCT		Robbie Blyth

INVASIVES

10	Control <i>Spartina anglica</i> in the Eden Estuary two times per annum.		FCCT		Ranald Strachan
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SURVEYING & MONITORING

11	Monitor the seal population annually and undertake a campaign to encourage the public to report all marine mammal strandings along the Fife coast as indicators of estuarine ecosystem health and to gain a better understanding of the decline in the Harbour seal population.	Monitor the seal populations annually in the Forth and Tay estuaries.	SMRU	Fife Seal Group	Chris Morris
		Monitor the seal population at the Eden Estuary LNR on a monthly basis.	FCCT		Ranald Strachan
		Create a new poster specific to seals to encourage members of the public to report strandings and to raise awareness about the dramatic local decline in the Harbour seal population and recent 'corkscrew' deaths.	SMRU	Fife Council	Joe Onoufriou
		Through posters, press releases and information on the biodiversity website, encourage the public to photograph and report all marine mammal strandings to the Sea Mammal Research Unit.	Fife Seal Group and Fife Council	Fife Council, SMRU	Deirdre Munro
12	Encourage and support volunteers to take part in national schemes such as WeBS and BBS along Fife's coastline. Organise an annual training event on bird monitoring for members of the public		FNRC & Fife Council		Alexa Tweddle / Johanna Willi

Number	Action	Breakdown of action if relevant	Lead	Partners	Lead individual
13	Monitor the wetland bird population through the national WeBS scheme at the Eden Estuary, as indicators of ecosystem health and a means of monitoring effectiveness of site management. Collate all data and submit to Fife Nature Records Centre.		FCCT	Volunteers; Fife Council	Ranald Strachan
14	Protect, maintain and enhance the structure and function of the Eden Estuary LNR by carrying out quarterly site condition surveys including erosion and deposition monitoring.		FCCT		Ranald Strachan
15	Survey the extent of saltmarsh and eelgrass beds in the Torry Bay LNR. Subsequently monitor these habitats every five years.		Fife Council		Johanna Willi
16	To establish a current baseline of non-estuarine wading bird populations in Fife, undertake a repeat of the 1971/72 & 1972/73 wintering wader survey along all sections of rocky shore in Fife.		ECOS Countryside Services	Fife Council	David Bell
17	Co-ordinate and publicise a Fife-wide public survey of an indicator species of ecosystem health or an invasive species which threatens ecosystem health.		Fife Nature Records Centre	Fife Council	Alexa Tweddle
18	Hold one coastal bioblitz per annum to encourage interest in coastal wildlife, citizen science and to generate biological records.		FNRC & Fife Council	FCCT; MCS	Alexa Tweddle and Johanna Willi
19	Through the biodiversity website, one press release per annum, and by putting up posters along the coast, encourage the public to report marine sightings and strandings, especially basking sharks, turtles and jellyfish, to Marine Conservation Society.		Fife Council	MCS; FCCT	Johanna Willi

RAISE AWARENESS

20	Raise awareness and encourage enjoyment and responsible use of our coastal and marine environment by holding a suite of events and excursions every year for a variety of audiences, and by producing a leaflet about Fife's coastal and marine environment.	Produce a leaflet about Fife's coastal and marine environment, its biodiversity and pressures on this ecosystem.	Forth Estuary Forum	FCCT; Fife Council	Chris Cutts
		Run one awareness-raising campaign per year targeting fishing forums.	Forth Estuary Forum		Chris Cutts
		Hold an annual wildlife awareness event for dog owners.	FCCT		Deirdre Munro
		Hold one event and four illustrated talks per annum at the Eden Estuary.	FCCT		Various
		Hold 10 coastal excursions per annum.	FCCT		Various
		Hold 10 coastal excursions with school groups per annum.	SNH	SNH, Forth Estuary Forum, St Andrews Botanic Garden Education Trust, SWT	Various

EDUCATION

21	Deliver an education programme on beach litter at five primary schools, where possible within the coastal towns and villages in the Plastic Bag Free campaign.		Fife Council		Johanna Willi
22	With pupils from Canongate Primary School, deliver the Blue Fleabane Project at West Sands to help meet Target 8 of the UK Plant Diversity Challenge. Collect seed, grow plugs and plant seedlings in order to expand the range of this plant on the dunes. Carry out four site visits to monitor the plant population.		St Andrews Botanic Garden Education Trust	Canongate Primary School; FCCT	Nikki Macdonald

Number	Action	Breakdown of action if relevant	Lead	Partners	Lead individual
23	With pupils from Lawhead Primary School, deliver the Purple Milk Vetch Project to help meet Target 8 of the UK Plant Diversity Challenge. Collect seed, grow plugs and plant seedlings at West Sands in order to expand the range of this plant on the dunes. Carry out four site visits to monitor the plant population.		St Andrews Botanic Garden Education Trust	Lawhead Primary School	Nikki Macdonald

AWARENESS RAISING & EDUCATION

1	Produce a book about Fife's wildlife and top natural heritage destinations for local residents and visitors to the kingdom.		Fife Council		Johanna Willi
2	Raise awareness about biological recording and the Fife Nature Records Centre by producing an information leaflet, writing one press article per quarter and attending two local events per annum.		FNRC / Fife Council		Alexa Tweddle
3	Raise awareness about the Fife Local Biodiversity Action Plan, Fife Biodiversity Partnership and biodiversity in Fife by producing two newsletters and attending two public events per annum, and writing one press release per quarter.		Fife Council		Johanna Willi
4	Create a joint biodiversity and biological recording website for Fife. Include maps showing notable habitats, sites to visit, biodiversity features and recent wildlife sightings.		Fife Biodiversity Partnership / Fife Council / FNRC		Johanna Willi / Alexa Tweddle
5	Create an 'alert' GIS layer of protected species that can be incorporated into Fife Council's Uniform system for planners.		FNRC / Fife Council		Alexa Tweddle
6	Hold an annual themed biodiversity project through the Natural Connections programme.		Fife Council Natural Connections	St Andrews Botanic Garden Education Trust / FCCT	Tony Credland
7	Hold a monthly wildlife club to enable children aged 8 - 14 years to learn about and enjoy wildlife and the outdoors.		St Andrews Botanic Garden Education Trust; Scottish Wildlife Trust		Nikki Macdonald
8	Create a leaflet on invasive non-native species found in Fife to raise awareness about the problem and encourage sightings to be submitted to Fife Nature Records Centre.		FNRC		Alexa Tweddle
9	Hold an annual biodiversity seminar for partners, stakeholders, community groups and volunteers to share best practice, exchange information on latest developments in conservation and provide project updates.		Fife Council		Johanna Willi
10	Hold one bioblitz per annum to encourage interest in wildlife and promote biological recording and citizen science.		FNRC	Butterfly Conservation / St Andrews Botanic Garden / NTS / Fife Council / MCS / FCCT	Alexa Tweddle

APPENDIX 3

SUMMARY OF FIFE LBAP PRIORITY HABITATS AND SPECIES

For a comprehensive list of priority species in Scotland, please see the Scottish Biodiversity List and UKBAP priorities list. For a full list of protected species, see Scottish Natural Heritage's website.

ECOSYSTEM	PRIORITY HABITATS FROM 3RD EDITION LBAP FROM UK BAP LIST	ASSOCIATED UK BAP HABITAT IF DIFFERENT	PRIORITY SPECIES * IF UK BAP PRIORITY, ^ IF ON SCOTTISH BIODIVERSITY LIST
Upland	Heath and moorland	Upland heathland	
	<i>Blanket bog</i>		
	<i>Upland calcareous grassland</i> <i>Upland flush fen and swamp</i>		
Freshwater & Wetland	Inland freshwater	Eutrophic standing waters Oligotrophic & dystrophic lakes Mesotrophic lakes	Great crested newt** Water vole**
	<i>Lowland fen</i>		
	<i>Lowland raised bog</i>		
	<i>Rivers</i>		
	<i>Ponds</i> <i>Reedbed</i>		
Lowland & Farmland	Species-rich grassland	Lowland calcareous grassland Lowland dry acid grassland Lowland meadows Upland hay meadow	Corn bunting** Bats: Brown long-eared** Common pipistrelle^ Daubenton's^ Nathusius pipistrelle^ Natterer's^ Soprano pipistrelle**
	Field margins & boundaries	Arable field margins Hedgerows	
	Parks & veteran trees		
	Golf courses		
	<i>Traditional orchards</i> <i>Lowland heathland</i>		
	Woodland	Ancient, semi-natural & long-established woodland	Lowland mixed deciduous woodland Native pinewoods
Mixed lowland woodland		Lowland mixed deciduous woodland	
Urban woodland			
Marine & Coastal	Intertidal communities	Intertidal mudflats	
	Marine	TBC	
	Maritime cliffs & islands	Maritime cliffs & slopes	
	Saltmarsh	Coastal saltmarsh	
	Strandline, sand dune & shingle communities	Coastal sand dunes Coastal vegetated shingle	

APPENDIX 4

PARTNER ORGANISATIONS

The Fife Local Biodiversity Action Plan was created and is delivered by a partnership of organisations, groups and individuals. The following partners are involved in this edition:

- Buglife – The Invertebrate Conservation Trust
- Bumblebee Conservation Trust
- Butterfly Conservation
- Central Scotland Forest Trust
- Central Scotland Green Network
- ECOS Countryside Services
- Elmwood, Scotland's Rural College
- Daubenton's Roost Investigation Project
- Falkland Centre for Stewardship
- Fife Amphibian & Reptile Group
- Fife Coast & Countryside Trust
- Fife Council
- Fife Golf Trust
- Fife & Kinross Bat Group
- Fife Nature Records Centre
- Fife Red Squirrel Group
- Fife Seal Group
- Forestry Commission Scotland
- Forth Estuary Forum
- Forth Invasive Non-Native Species Project
- Linking Environment And Farming
- Marine Conservation Society
- National Health Service
- National Trust for Scotland
- Pittarhie Farm
- Police Scotland
- RAF Leuchars Conservation Group
- River Forth Fisheries Trust
- Royal Society for the Protection of Birds
- Scottish Environment Protection Agency
- Scottish Golf Environment Group
- Scottish Water

- Scottish Wildlife Trust
- Scottish Natural Heritage
- Sea Mammal Research Unit, St Andrew's University
- Sediment Ecology Research Group, Scottish Oceans Institute, St Andrew's University
- St Andrews Botanic Garden Education Trust
- Take a Pride in Fife groups
- Tay Estuary Forum
- Tay Salmon Fisheries Board
- The Farm Environment Ltd.
- Woodland Trust Scotland



IN ADDITION TO THESE, THERE ARE MANY COMMUNITY GROUPS, LANDOWNERS, LAND MANAGERS, BUSINESSES AND INDIVIDUALS INVOLVED IN PROTECTING AND ENHANCING FIFE'S BIODIVERSITY THROUGH LOCAL PROJECTS.

APPENDIX 5 ACRONYMS

BBCT	Bumblebee Conservation Trust
CSFT	Central Scotland Forest Trust
EPPS	Enterprise, Planning and Protective Services
FARG	Fife Amphibian & Reptile Group
FCCT	Fife Coast & Countryside Trust
FCS	Forestry Commission Scotland
FEF	Forth Estuary Forum
FINNS	Forth Invasive Non-Native Species Project
FNRC	Fife Nature Records Centre
IHN	Integrated Habitat Network
INNS	Invasive non-native species
LBAP	Local Biodiversity Action Plan
LLLP	Living Lomonds Landscape Partnership
LNR	Local Nature Reserve
MCS	Marine Conservation Society
NHS	National Health Service
NNR	National Nature Reserve
NTS	National Trust for Scotland
RIGS	Regionally Important Geological and Geomorphological Site
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SEPA	Scottish Environment Protection Agency
SGEG	Scottish Golf Environment Group
SMRU	Sea Mammal Research Unit
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
SWT	Scottish Wildlife Trust
TAPIF	Take a Pride in Fife
UKBAP	United Kingdom Biodiversity Action Plan
WTS	Woodland Trust Scotland

APPENDIX 6 PHOTOGRAPHY CREDITS

Pg Subject & Photographer

Cover

Peacock butterfly © iStock

Inside front cover

Puffin group © SNH

Identifying flowers © Lindsay Mackinlay

1 Field pansy © Lindsay Mackinlay

2 Tentsmuir Sands © SNH

5 Lomond Hills © Simon Scott

Apples © Lindsay Mackinlay

Bumblebee © WildStock

6 Firth of Tay estuary © SNH

Barn owl © WildStock

Fleecefaulds Meadow © SWT

Red squirrel © Rick Thornton

8 Comma butterfly © Kate Morison

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9 Fife Ness coast © PA Macdonald SNH

10 Oak sapling © SNH

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34 Tentsmuir Sands © SNH

Dolphin © SNH

Grey seal and pup © SNH

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Pond survey © Johanna Willi

Elmwood College survey © Stuart Macdonald

37 Red squirrel © Jim Wilson

63 Gannet © SNH

65 Bumblebee © SNH

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