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Isle of Man Government

Reiltys Ellan Vannin

Managing our Natural Wealth,
The Isle of Man's First Biodiversity Strategy

2015-2025

Department of Environment, Food and Agriculture

Rheynn Chymmyltaght, Bee as Eirinys

Cover photos: Richard Selman, Caroline Perry, Pete Hadfield, Linda Moore, Ben Jones, Gareth Pinkard

By 2050 Manx biodiversity will be valued, conserved, restored and managed sustainably, able to adapt to unavoidable change, provide essential services and contribute to a high quality of life for all.

Manx Biodiversity
Bea-neuchaslid Vannin

Manx Nature Conservation Forum's website

www.Manxbiodiversity.org

Written for the

Department of Environment, Food and Agriculture

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Manx Nature Conservation Forum

and Dr Bob Brown from Northern Ireland.

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Minister's Foreword

"Managing our natural wealth, the Isle of Man's first Biodiversity Strategy" is a compass by which to steer our course towards greater awareness of and support for our natural environment. I feel privileged to be Minister at this time of focussed action for our natural heritage.

I've always been inspired by the scenery and wildlife of the Isle of Man, growing up as I did in Castletown.

Biodiversity is a new word to many people and one which we all need to understand if we are to effectively care for our beautiful island. Biodiversity includes life of all kinds, from basking sharks to blue butterflies. Manx biodiversity has always been valuable to our livelihoods, be it herrings or heather-covered hills. Biodiversity provides us with food, clean water, building materials and other essentials that we cannot live without. It underpins vital economic sectors such as agriculture, fisheries and tourism. Biodiversity is an essential part of our Manx heritage.

This Strategy sets out a vision for the future health of our biodiversity, and maps out the framework for action to conserve and enhance our natural richness for the health, enjoyment and economic well-being of all the people of Isle of Man. It is primarily for Isle of Man Government and its partners but should be of interest to everyone.

We have had a profound impact upon biodiversity and in recent years we have become far more conscious of that impact. From the Rio Conference in 1992, through various stages of adoption by the Isle of Man Government of biodiversity policies, to the Nagoya Summit in 2010, important steps have been taken towards recognition of the need for co-ordinated action to safeguard our planet's natural heritage. This plan has been prepared against a background of growing urgency at an international and European level. The period 2011-2020 has been identified as "The Decade on Biodiversity" by the United Nations in recognition of this urgency. We have a responsibility as a national government to embrace this international movement. However our effectiveness in turning the tide in the Isle of Man may not be seen for many years so if we are to make a difference we must start now. This Strategy and its revisions will guide that action in the Isle of Man over the coming decades.

A key theme of the Strategy is to raise public awareness and strengthen the relationship between people and nature so people appreciate, understand, protect, conserve and above all enjoy Manx biodiversity. In parallel with the Biodiversity Strategy and supporting it, the Department is seeking UNESCO Biosphere Reserve status through the Biosphere Isle of Man project. This is also about that relationship. It is a means of promoting the Island which would recognise the economic benefits biodiversity brings, market the Island's biologically diverse environment and assist us in improving biodiversity management with community support.

The Department is particularly grateful to the members of the Manx Nature Conservation Forum's Strategy Steering Sub-committee. The Strategy's development has been a model of cooperation and shared vision between government and non-governmental bodies. I am grateful to everyone who has contributed to this work, many in a voluntary capacity, to produce a Biodiversity Strategy that we can all be proud of.

As Minister for Environment, Food and Agriculture I meet many individuals who manage the land and harvest the sea. I am confident that there is a growing appreciation of the important part these people play in the conservation of our biodiversity. We need to influence key stakeholders, be it fishermen, farmers or land owners, the business sector or the wider public, if we are to make a significant difference during the 10 period of this first plan.

We are learning that it costs much less to put in place the appropriate actions to protect biodiversity now than to try and replace or restore it in the future. We have no illusions, however and know that achieving our aims will be a big challenge.

Government will play an important role but alone it can't deliver this Strategy. Our conservation charities, supported by members of the public and volunteers, already make a vital contribution in protecting biodiversity. To be successful this project will require a partnership with many others playing a role. This is an open invitation to get involved so that future generations can enjoy the rich and diverse natural environment that we do today.

Richard Ronan MHK,
Minister for Environment, Food and Agriculture

Preface

To Hon Clare Christian, President of Tynwald, and the Hon Council and Keys in Tynwald assembled.

I recommend that this Strategy be adopted as a framework for the development of biodiversity conservation services and collaboration over the next 10 years.

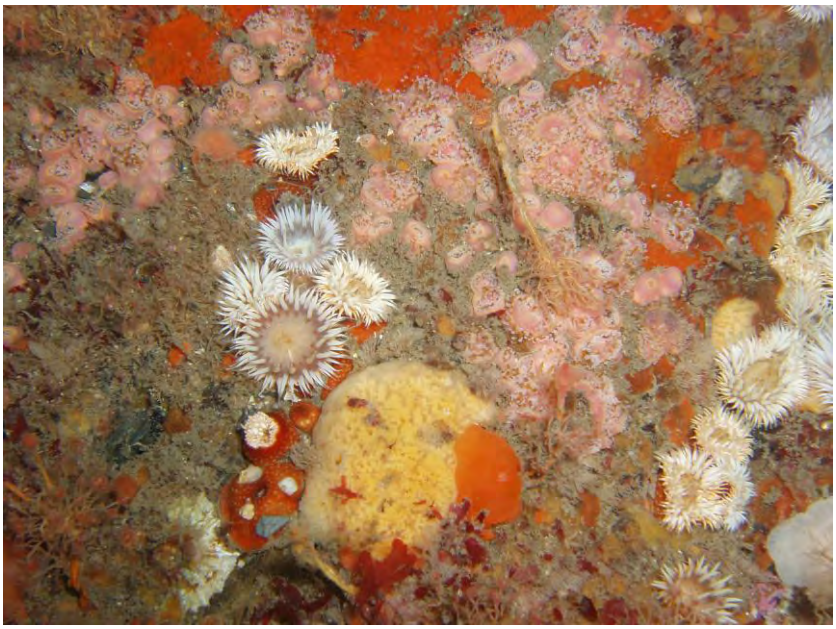
Richard Ronan MHK,
Minister for Environment, Food and Agriculture.

What is biodiversity?

Biodiversity means all forms of life on land, in sea, freshwater and the atmosphere, including the habitats and natural processes that together make up ecosystems (see Box 5).

Biodiversity includes us, wildlife, crops and domestic animals. It supports the benefits we receive from our environment called "ecosystem services", including food production, pollination and recycling of nutrients (see Box 5).

Biodiversity has great economic and social value, besides its biological role. Knowledge and conservation of our biodiversity are central to sustainable development, showing us whether we are living within our means or depleting essential 'natural capital' (see glossary).



Our diverse marine environment (Photo: C. Perry)

Executive summary

This Island is a wonderful place to live. The healthy, productive land and rich sea have sustained generations of Manx people; indeed traditional activities and Manx wildlife have benefitted one another. With continued care and good management they will continue to do so. However, there are signs of damaging change and biodiversity loss. It is time to plan the future of our environment and its biodiversity (the variety of plants, animals and natural surroundings) if we are to attain a sustainable future. This is why the Island needs a biodiversity strategy.

The Isle of Man has biodiversity which is important regionally, nationally and internationally so it is vital we continue to play our part in an international effort to conserve biodiversity, through our commitment to the Convention on Biological Diversity (CBD). This requires a strategic approach.

The successful delivery of this Biodiversity Strategy will be vitally important for the Island, to our species and habitats, to our economy and the well-being of current and future generations. Our biodiversity has significant cultural and amenity value integral to Island life, much is impossible to quantify. But there are also many other benefits of a rich and thriving biodiversity. It plays a role in attracting people to the Island as investors, new residents and visitors. There is plenty of evidence from other places about the positive contribution that healthy biodiversity makes to the economy. A recent assessment of the Island's land and freshwater habitats conservatively values them and the benefits they provide at over £40m a year while the value of stored carbon has been estimated at over £95m, (see section 3).

This Strategy is a vital component of our obligation under the Convention on Biological Diversity. The substantial amount of work which the Convention commits us to is entirely compatible with what we need to do anyway to conserve this valuable asset and our way of life. Much is already under way but the Island will need to commit further effort in the future. There are good economic, ecological, social and ethical reasons for ensuring that we actively manage Manx biodiversity and our potential impact upon it. The cost of underestimating this impact could be hugely significant.

Strategic Aims

By 2025 we aim to:

- manage biodiversity change to minimise loss,
- maintain and where necessary restore or enhance native biodiversity, and
- actively involve society in understanding, appreciating and safeguarding biodiversity.

Box 1. The Strategy has seven Strategic Objectives

1. By 2015 the Government and partners will have developed and adopted an effective biodiversity strategy and will have commenced implementation in 2016.

2. By 2025 Government will lead by ensuring biodiversity conservation is being considered in all relevant areas of policy and decision-making, actively encouraging good practice and adopting all appropriate incentives to support biodiversity.

3. By 2025 everyone will have access to reliable, up-to-date and comprehensive biodiversity data which is essential to support Government policies and decisions of businesses and private land and sea users.

4. By 2025 everyone will understand what biodiversity is, why it is important to our quality of life and will have been empowered to use it more sustainably.

5. By 2025 all sites of critical importance for conservation of our biodiversity will be effectively protected and managed so that resident or migratory wildlife has adequate refuge to safeguard its future survival, recognising the challenge of climate change. To achieve this we

will prevent loss of priority habitats, significantly reduce habitat degradation and fragmentation and, where appropriate, restore key species populations and priority habitats.

6. By 2025 Government will monitor, understand and substantially reduce the other main pressures on biodiversity, particularly environmental pollution and the prevalence of invasive non-native species and will take measures to meet the biodiversity challenges posed by climate change.

7. By 2025 the Government will have ensured that policies are in place to promote the sustainable management of our land, freshwater and marine resources, including by means of traditional practices where these are compatible with biodiversity objectives and taking due account of the need to conserve ecosystem services.

Forty six Strategic Actions are described to assist with achieving these 7 Strategic Objectives.

Scope of the Biodiversity Strategy

We are concerned with three groups of species; those which are native to the Island, those which migrate to and from here and those in other countries affected by our actions. In addition the strategy aims to conserve habitats and the ecosystems services underpinned by biodiversity. This Strategy focuses on what Government and its partners need to do before 2025 to minimise biodiversity loss. The next stage will be the Delivery Plan, expected in 2015 which will provide the detail of how these strategic objectives are to be realised.

Opportunities

Developing a Green Economy[1] will create opportunities to enhance our Island's reputation and achieve more sustainable use of our natural wealth. Healthy biodiversity will make the Island more resilient to climate challenges. Marine management policies are already leading to improved produce, better economic returns with lower environmental impacts and the enhancement of the Island's image with consumers. It is also clear that some measures which benefit biodiversity also reduce waste, thus saving money and promoting greater efficiency.

Eco-tourism already exists on the island and is capable of making a substantial contribution to our economy including creating employment. Many residents and visitors enjoy the countryside and there are opportunities to further promote activities without damage or disturbance to biodiversity.

The UNESCO Biosphere Reserve initiative will support the delivery of the Biodiversity Strategy through raising the profile of biodiversity, encouraging environmentally sustainable management, drawing attention to the commercial opportunities and adding momentum to the conservation of our natural heritage. This project is intended to show how low-impact, sustainable industries and a Green Economy can be compatible with a high quality, well managed and biodiverse environment.

Challenges

Globally and locally the human population has grown in recent decades. This growth continues to create significant issues for the environment, habitats and species. The island has finite space, with finite natural resources, and planning to manage expected human population growth must be integral to strategic environmental and resource management.

We will need to continue to fill the significant gaps in our knowledge of Manx biodiversity in order to better understand the complex relationships between biodiversity and our use of land and sea, and thereby enable us to use it sustainability.

In the challenging economic climate it can be tempting to neglect activities which, whilst of utmost importance for the future, may not be seen as a current priority. However some conservation

[1] The Green Economy is one that results in improved/maintained human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. Green economy is an economy or economic development model based on sustainable development and knowledge of ecological economics.

measures save money, others require a change of attitude and many can be done in partnership with others. Not to take action now may lead to significantly greater costs to achieve equivalent objectives in the future.

Whilst some factors affecting biodiversity remain largely outside the Island's control - climate change, ocean acidification and some movements of invasive species by man, we must not neglect our proportionate role in managing impacts on global biodiversity. We have yet to begin to address our global ecological footprint and whilst our first priority must be to our own native biodiversity, we need to consider and act on the impacts we, our businesses and our lifestyles may have on biodiversity worldwide.

Innovative and effective delivery of the strategy will secure economic and other benefits for our Island, many of which will be critical in the challenging times ahead. Along with the challenges, there will be opportunities to deliver benefits for our Island community. It will help position the Island squarely as a responsible player in an increasingly connected world.

"We live in a unique place and have unique opportunities today to go forward to achieve these ambitions. These goals are not beyond our reach. We owe it to our future generations to do this". Quote from John Hellowell, Chairman of the Strand Group.

Fungi associated with birch (Photo: E. Charter)

Mission

By 2025 Manx biodiversity will be conserved and managed in a positive way, including restoration where possible and desirable. The Isle of Man Government will work with the Manx community to ensure that wise biodiversity management underpins sustainable development.

Grey Seals in Peel harbour (Photo: A. Smith)

1.0 Introduction and need for the Strategy

This is the first Isle of Man Biodiversity Strategy, written after the Isle of Man Government requested the Convention on Biological Diversity (hereafter referred to as the CBD) be extended by the UK to the Island in August 2012. The UK signed the CBD in 1992 and has been a Contracting Party since 1994.

We need a strategy to ensure that Manx biodiversity is conserved to the benefit of our environment, our economy and for current and future generations. Implementing this Strategy and associated action plans will also fulfil our commitments under the CBD (article 6).

Develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity… and integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies.

The Strategy lays out aims, objectives and strategic actions required to ensure the Island's biodiversity continues to sustain us. Once the Strategy is approved a Delivery Plan will be developed during 2015 to implement the Strategy, and this will identify the specific tasks needed before 2025. The Strategy will continue to be reviewed, consulted on and extended to deliver biodiversity conservation until at least 2050.

By 2025 we aim to:

- **manage biodiversity change to minimise loss,**
- **maintain and where necessary restore or enhance native biodiversity and**
- **actively involve society in understanding, appreciating and safeguarding biodiversity.**

The Biodiversity Strategy is consistent with the 2012 Agenda for Change (Chief Secretary's Office 2012) in that there is an element of "protecting the vulnerable". Biodiversity needs a voice. Understanding our biodiversity and conserving it is necessary to "promote the value and utilisation of our amenity, cultural and landscape resources". The Strategy recognises that the Island needs to "encourage sustainable economic activity" but it must be "in harmony with our natural resources". It is important such terms are appropriately defined in the context of our natural heritage. Healthy biodiversity can provide a lasting contribution to the economy. This document does not attempt to address all the issues of climate change or sustainability but focusses on biodiversity, and specifically local biodiversity. Sustainability and climate change require their own strategies. Enacting the intentions of the Convention on Biological Diversity demonstrates that the Island is a "responsible and reputable jurisdiction".

Box 2. Sustainable development

A thriving biodiversity underpins sustainable development. Sustainable development is defined as that which "*meets the needs of the present without compromising the ability of future generations to meet their own needs*" (Brundtland 1987). It has three basic elements: economic, social and environmental. All of these are relevant to the sustainability of a project, business, policy or decision. Our actions can have an effect on all three and this must be taken into account in our decisions. Where developments unavoidably cause biodiversity loss due to overriding social and economic benefits developers will be expected to identify appropriate mitigation and or compensation (see Appendix E, Environmental Impact Assessment, for definitions).

This is how strategic development is linked to the Ecosystem Approach (Box 5).

We have responsibility for three categories of biodiversity:

1. **Local**: Biodiversity on or around the Isle of Man which does not migrate; our resident species, for example red-billed chough and lesser-mottled grasshopper, and habitats such as the Ayres sand dunes, associated biological processes such as crop pollination as well as genetic resources and ecosystems.
2. **Migratory**: Biodiversity for which the Island has a shared responsibility, such as migratory birds (swallows, terns and puffins) and fish (basking sharks and herring), as these animals spend some of their time here, breeding and feeding.
3. **Global**: Biodiversity elsewhere in the world which is affected by our businesses and lifestyles, particularly the products we buy, including food, holidays, other commodities and foreign investments.

All government, public and private sector decision-makers need to be familiar with and adopt this Strategy to help realise its vision. The Strategy is also for the people of the Island; everyone has a role to play in biodiversity conservation. Our actions have great power to change our environment, both positively and negatively, and we are currently losing the diversity of wild animals, plants, habitats and the ecosystems they create. More than one hundred years ago the visionary poet, artist and social reformer William Morris reminded his contemporaries that "*We are only custodians for those that come after us*".

Waterfall in the Dhoon Glen Area of Special Scientific Interest (photo: DEFA)

2.0 The Convention on Biological Diversity

2.1 Introducing the Convention on Biological Diversity

The Convention on Biological Diversity (CBD) was adopted at the Rio Summit in 1992. It now has almost universal applicability, with 196 Contracting Parties around the globe.

The 3 objectives of the CBD are:

- *the conservation of biological diversity,*
- *the sustainable use of the components of biological diversity, and*
- *the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.*

There is increasing global recognition that the abundance and variety of biodiversity have deteriorated under pressure from human activities, especially in the past 50 years and that this threatens our economies and well-being in the long term.

2.2 CBD's strategic goals

The Island's Biodiversity Strategy is based upon the Aichi Strategic Goals and Biodiversity Targets, which are the basis of *Strategic Plan for Biodiversity 2011–2020* adopted by the CBD's Conference of Parties in Japan in 2010.

Box 3. Aichi Strategic Goals for conserving biodiversity 2011–2020[2]

A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.

B: Reduce the direct pressures on biodiversity and promote sustainable use.

C: Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity.

D: Enhance the benefits to all from biodiversity and ecosystem services.

E: Enhance implementation through participatory planning, knowledge management and capacity building.

This is the first Isle of Man Biodiversity Strategy, written following the extension of the Convention on Biological Diversity to the Island in 2012. Under the top level Vision and Mission, it lays out the strategic actions required to ensure we act responsibly in relation to the Island's biodiversity and to ensure it continues to sustain us and future generations of Manx people. The Strategy writing followed international guidance (Fauna and Flora International, 1999). Shortly following Tynwald approval of the Strategy the Department will produce the first 2 year Delivery Plan. This will identify the specific tasks that Department of Environment, Food and Agriculture (DEFA) and others need to undertake in a systematic way to ensure Government complete its strategic actions by 2025. DEFA will in due course need to review, revise and consult on further Strategies and the corresponding Delivery Plans which will take us towards 2050.

It is acknowledged that the period of this Strategy is not synchronised with the UK's various biodiversity strategies or CBD's Strategic plan. The target date of 2025 will give the strategy a longer life, allowing ambitious targets to be adopted within a realistic timescale. However it is recognised that we will need to consider amending our strategy post 2020 to reflect the CBD's next Strategic Plan, which is expected to be adopted at the 15th Conference of the Parties in 2020.

[2] See http://www.cbd.int/sp/targets/ for full list of Aichi goals and targets

2.3 The Isle of Man's achievements so far

We are already doing much to address biodiversity conservation on the Island. Having the CBD extended to the Isle of Man signals our renewed commitment to this task. This is both a Manx responsibility and a matter of national pride.

Examples of measures which have already been introduced include:

- passing of the Wildlife Act 1990[3] introducing statutory nature conservation functions.
- mapping land habitats and land use (1991–2000).
- passing the Water Pollution Act 1993.
- designing and implementing a pilot Agri-environment Scheme for farmers (2002-2014).
- mapping of seabed habitats (2008).
- initiating a network of protected areas (21 sites since 2000, covering 4.5% of our land) including the Ayres National Nature Reserve, and where appropriate negotiating management agreements.
- establishing Marine Protected Areas covering more than 3% of our territorial sea, including the first Marine Nature Reserve at Ramsey Bay, now an internationally recognised marine reserve under OSPAR (2011)
- establishing significant fisheries conservation areas, bringing in further sustainable management rules, thus enabling the Marine Stewardship Council accreditation of the Manx Queen scallop fishery
- creating a single biological records database for the Isle of Man (2012).

However, much more will need to be done if we are to achieve our 2025 goals.

Early purple orchid on the Ayres National Nature Reserve (Photo: B. Jones)

[3] See http://www.legislation.gov.im/cms/ Government legislation website

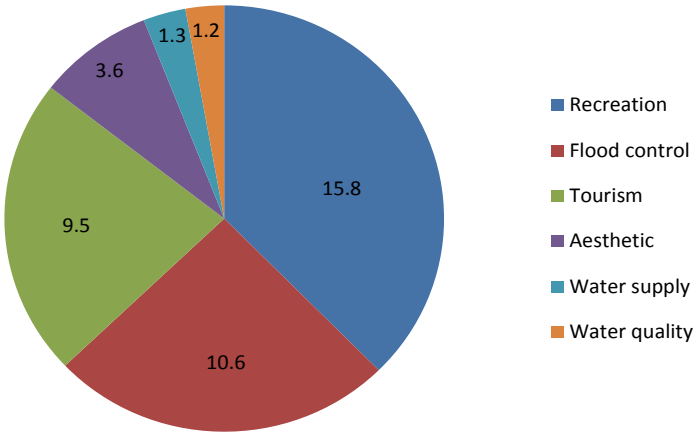
3.0 Valuing Manx biodiversity

We rely on plants and animals to provide the goods and services that sustain our lives. Their economic value is significant but very difficult to quantify, and we need to acknowledge the often overlooked direct and indirect contributions of biodiversity to our well-being. It has been estimated that these 'ecosystem services', the benefits we derive from the environment (see Box 5), provide the world with goods and services valued at US$33 trillion a year (Constanza et al. 1997). For example pollination of crops by insects, including wild and hive bees is worth an estimated £430 million per year to British agriculture (UK National Ecosystem Assessment 2011).

The economic value of the main habitats in the Isle of Man was recently estimated at a minimum of £42 million annually (Brander and McEvoy 2012) (Figure 1). This is calculated in terms of water quality and supply, flood control and our use and enjoyment of the habitats and landscape. This figure is undoubtedly an underestimate as many ecosystem services were not valued, there being no dataset on which to base values. This valuation mainly uses an estimated cost if this task or service had to be performed by another, artificial means, or if it was not done at all.

The role of habitats for carbon sequestration is also now recognised. A provisional estimate of the quantity of carbon in the Island's soils is 4.76 million tonnes. Based on the value of carbon (on global markets) in 2010/11 (£20/tonne) this has been valued at £95.2 million (McEvoy and Longworth, 2011). There are also marine carbon stores in underwater habitats.

Figure 1. Partial economic value (in £m/year) of terrestrial and freshwater habitats in the Isle of Man.



Source: Brander and McEvoy (2012)

3.1 Biodiversity supports life

Tangible and sustainable goods and services provided by effectively functioning ecosystems include:

- food, fuel, construction materials, medicines from wild plants, and fibre for clothing.
- purification of air and water in rivers, seas and soils.
- pest control and pollination.
- detoxification and decomposition of wastes, generating natural fertility in soil.
- stabilisation and moderation of the Earth's climate.
- moderation of floods and droughts.
- protection from upland and coastal erosion.

Box 4. The economic value of biodiversity

"Biodiversity is complex, difficult to define, difficult to measure, and often involves international and intergenerational considerations. Biodiversity loss presents significant economic challenges. A great deal of economics is required to understand the issues, but a simple and important observation is that most species and ecosystems are not traded in markets, so prices are often absent and biodiversity is under-provided."

Helm and Hepburn (2012)

Less tangible benefits, such as an attractive landscape or the thrill of seeing wild creatures contribute hugely to our quality of life, sustain human health (CBD 2013) and attract inward investment from people and businesses wishing to move to an aesthetically pleasing and healthy area (2020 Vision, 2012).

Biodiversity is an important part of the Manx sense of place. People have lived with, relied upon and celebrated the Island's natural resources for centuries. The wildness of Mann is an integral part of our folklore and history, a rich heritage from which we have benefited.

Today, modern living and increasing human population place additional pressure on biodiversity and increase the risk of species extinction. Lost ecosystems (see Box 5) are expensive to replace, if this is even possible and restoration is rarely completely successful. By sustainably managing the biodiversity of the Isle of Man, we enable the long-term viability of our economy and society, and keep our options open for the future by maintaining our ability to deal with unforeseen changes such as climate effects or emerging pests and diseases.

Box 5. What is an ecosystem?

"An ecosystem is a functioning community of plants, animals and smaller organisms that live, feed, reproduce and interact in the same area or environment, together with their non-living environment."

What is an ecosystem service?

"An ecosystem service is a benefit people obtain from the environment. Ecosystem services are the transformation of natural assets (soil, plants and animals, air and water) into things that we value.

Ecosystem goods include food, medicinal plants, construction materials, shelter for us and our livestock, tourism and recreation, and wild genes for improving domestic plants and animals (for example disease resistance)." IUCN (2010).

Ecosystems and the services they provide are sometimes referred to as "Natural Capital" (EU 2011 and Appendix E -Glossary).

What is the ecosystem approach?

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. It recognises that we humans, with our cultural diversity, are an integral component of ecosystems, (CBD website). The ecosystem approach is fundamental to many Multilateral Environmental Agreements to which the Island is aligned (listed in full in Appendices B and F) but especially to the CBD.

Common lizard (Photo: R. Selman)

4.0 Important biodiversity on the Isle of Man

Our Island's biodiversity and varied landscape are the result of various influences including geology, glaciation, traditional agriculture and natural colonisation.

Islands have a specific natural character and their own genetic types have evolved after long periods of isolation. These can be threatened by invasive non-native species or genetically different species from other areas. The Isle of Man has no endemic species as far as we know (those found nowhere else on earth in their natural habitat), but does have unique genetic types.

A full assessment of significant species has not yet been undertaken but the following are examples, some of which are significant locally or globally and/or where there is concern about their continued survival. A complete list of habitats and species and their significance will be included in the Delivery Plan.

We have obligations for internationally important wildlife under other international conventions. See Appendix B for other international agreements that we have extended to us, such as Ramsar and OSPAR. This Strategy is intended to deliver actions necessary for all the conventions to which the Island is party.

4.1 Internationally important species and habitats

There are many species occurring in the Isle of Man listed by the International Union for Conservation of Nature (IUCN) as Globally Threatened (Critically Endangered, Endangered or Vulnerable) or Near Threatened or listed by OSPAR as Threatened and/or Declining Species in our waters. These are the most significant:

European eel. Critically Endangered; good populations have been identified in some Manx rivers. (OSPAR listed), CITES[4] Appendix II.
Atlantic cod. Vulnerable; still found in Manx waters but protected by EU Common Fisheries Policy and the Irish Sea Cod Recovery Programme.
Curlew. Near Threatened; breeding trend steady except on hills so needs close monitoring.
Balearic shearwater. Near Threatened; rare visitor here (OSPAR listed)
Basking shark. Vulnerable (globally) and Endangered (North Pacific and North East Atlantic); now well studied in Manx waters, a regular visitor during the summer months. Listed on OSPAR and other conventions.

Examples of species that are less threatened globally (IUCN, Least Concern) but for which the Island has important populations, associated research and monitoring data and therefore a regional and international responsibility/role in their protection:

Grey seal. Limited mostly to NW Europe; the British Isles are globally important for this species with about 40% of the world population and 95% of the EU population occurring in British waters.
Manx shearwater. A small population of these burrow-dwelling birds breed on the Calf of Man. The species was originally named after the once much larger Calf colony, though it is not confined to the Isle of Man. The species is important because most of the world's breeding population is centred on the islands around Britain and Ireland.

Other species and habitats of international significance which are present on the Island or in its territorial seas include the following;

Ramsar sites (see Box 6). Ballaugh Curragh is designated. Five other candidate areas fit Ramsar criteria as internationally important wetlands (Pienkowski 2005), including the south coast sea cliffs.

[4] CITES – Convention on International Trade in Endangered Species.

Marine habitats. Eel grass, maerl beds, intertidal mudflats and other shoreline habitats, horse mussel reefs, (all OSPAR listed).
Marine species. Skates, rays and other sharks, including porbeagle and spurdog, (all OSPAR listed). Risso's dolphin, listed under ASCOBANS, Bern and Bonn Conventions.

Terrestrial habitats. Upland heather moorland is an EU priority habitat under the Habitats Directive[5]. Flower-rich meadows with orchids, the area of which has reduced by more than 95% in the British Isles since 1960. A similar percentage is likely to have been lost here.
Terrestrial species. Hen harriers; population has declined here recently. Elm species; fairly recently affected by Dutch elm disease but 99% remain healthy. Lesser mottled grasshopper; its only site in the British Isles is on the Isle of Man. Isle of Man Cabbage; though not restricted to the Island, this species is limited to Irish Sea coasts.
Important Bird Areas. Two sites are listed by Birdlife International: the Isle of Man Sea Cliffs, for species such as red-billed chough and European shag and Isle of Man Hills, for hen harriers.

Box 6. Ramsar Wetlands

The Ramsar Convention on Wetlands of International Importance was extended to the Island in 1992. Ballaugh Curragh was the first Manx site recognised as being of international conservation importance and given Ramsar status in 2006. Through the Ramsar Convention we also agree to "wise use" of all wetlands (ponds, marshes, watercourses and shallow seas), not only those designated as Ramsar sites.

Ballaugh Curragh Ramsar site, internationally important for its wetland. (Photo: H. Leoidsson)

[5] While EU directives to not apply to the Isle of Man they are a regional reference point for habitat significance.

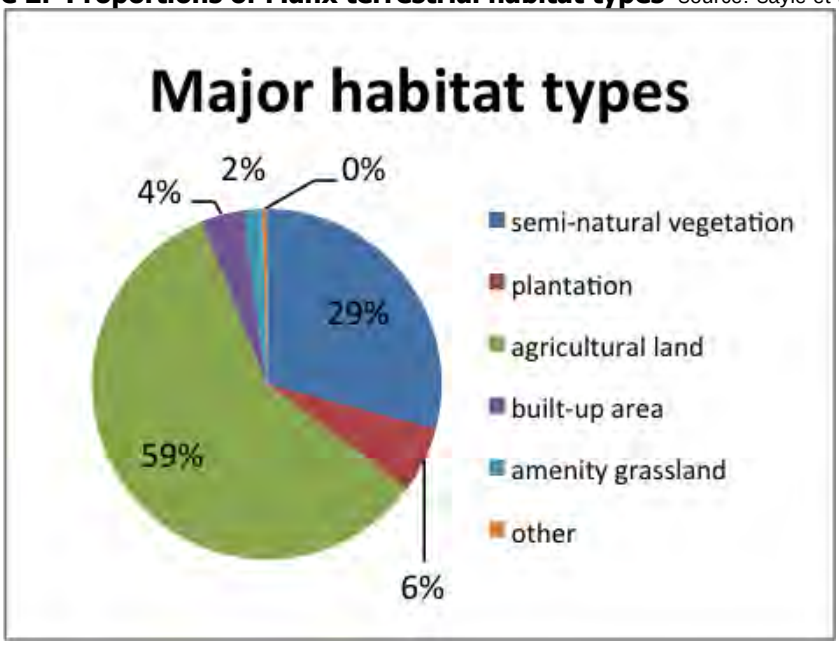
4.2 Additional nationally important species and habitats (Manx significance)

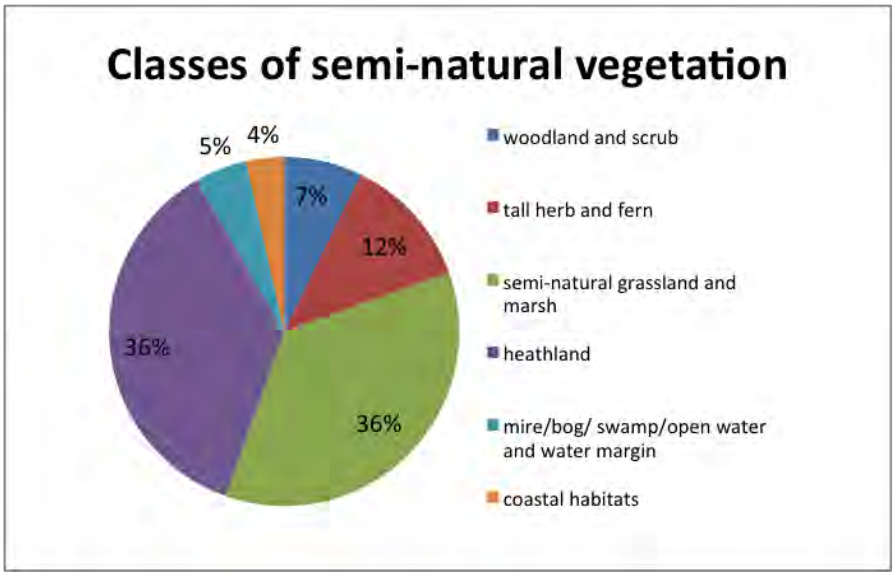
The most important terrestrial species are listed in the schedules of the Wildlife Act 1990 (mostly revised in 2004), however Manx marine species still need reassessing.

Marine habitats, eg underwater rocky reef habitats – which are varied and species-rich.
Marine species. Harbour porpoises are resident and thought to breed in Manx waters, Risso's dolphins appear to use Manx waters for birthing and as a nursery, and bottle-nosed dolphins and minke whales are regular visitors while common dolphins are occasional visitors. There are also rare sightings of humpback and other whales. Important invertebrates include the long-lived mollusc, the ocean quahog which is scientifically and ecologically significant as well as being OSPAR listed.
Terrestrial habitats. Extensive semi-natural habitat network; road verges, hedges and banks and coastal habitats.
Terrestrial species. Lapwing; small numbers breed and pass through the Island in winter. Corncrake; recorded very rarely but possibly still breeding in the Isle of Man. Red-billed chough, for which the Island has special responsibility; doing well and numbers are increasing here but not throughout its range in Britain. Stoats arrived from Ireland, we believe and may well be our oldest established native mammal.
Leisler's bat; while widespread in south and west of the British Isles the Manx population is significant and frequent. Isle of Man cabbage; scarce regional endemic here but also scarce elsewhere around the Irish Sea. Other rare plants (occurring at single sites) include various orchids, two filmy ferns, least willow (an alpine shrub) and spring sandwort. Wild bees are important pollinators and a source of stock for bee keepers.
Freshwater species. Salmon, brown trout, sea trout, river and brook lampreys occur in our cleanest rivers and streams.
Distinctive Manx genes. These are expected to be found, probably in sub-species, as our local plants and animals have evolved in isolation since the separation of the Island from Britain and Ireland by the Irish Sea.

The first and only comprehensive habitat survey was in 1991–94 (Sayle et al. 1995). At the time this showed that 29% of the Island was under semi-natural vegetation, which could be further subdivided into six broad vegetation types (see Figure 2). Mapping the marine habitats (begun in 2008 by Bangor University) is more challenging, although broad habitat types have been identified. However, finer resolution scale survey and analysis is required to better understand sub-tidal ecology and species interactions.

Figure 2. Proportions of Manx terrestrial habitat types Source: Sayle et al 1995





4.3 Site designation and monitoring

The most important habitats in the Isle of Man may be given statutory designation under the Wildlife Act 1990 as Marine Nature Reserves, National Nature Reserves, Areas of Special Protection or Areas of Special Scientific Interest (ASSIs). ASSIs are chosen using site selection criteria (Department of Agriculture Fisheries and Forestry 2008). The number and areas of land or sea covered by statutory designation, together with those protected through ownership or agricultural schemes, are given in Appendix D. This designation process, begun in 2000, is continuing.

Designation of Wildlife Sites is being led by the Manx Wildlife Trust. Although non-statutory, Wildlife Sites enable planners to recognise other sensitive areas and to take them into account in planning decisions. Post-war land use changes and development are known to have resulted in changes in distribution and abundance of flora, fauna and their habitats. Some species and habitats have thrived as a consequence while others have seen a significant decline. Similarly, human population growth (see Section 5.1) has impacted significantly on biodiversity, through the increased demand for space and resources. In the light of this site designation with appropriate land and water management is the most effective way to conserve the most important habitats.

It is Government policy to nominate the Island and its Territorial Sea for consideration as a UNESCO Biosphere Reserve (UNESCO 2012). Achieving this status would complement site designation by encouraging an integrated approach to sustainable land management and economic growth. This approach is based on 3 mutually-reinforcing functions:

- conservation: to conserve landscapes, ecosystems, species and genetic variation.
- development: to foster sustainable economic and human development.
- logistics: to provide support for research, monitoring, education and information exchange related to local, national and global issues of conservation and development.

5.0 The opportunities and challenges

5.1 Economics of sustainability

Many national economies are moving towards increased resource efficiency and reduced environmental damage, under the banner of the Green Economy. A greener economic approach creates opportunities for enhancing our reputation and encourages more sustainable use of our natural wealth. This would be encouraged through Biosphere Reserve project by demonstrating that conservation and human activities can be compatible if well managed. Healthy biodiversity makes the Island more resilient to the challenges posed by the climate, protecting agricultural productivity and providing innovative solutions to sustainable living. Marine management policies are leading to high quality seafood, better economic returns and are enhancing the Island's image with consumers. Some measures which benefit biodiversity also reduce waste thus saving money, an incentive for greater efficiency.

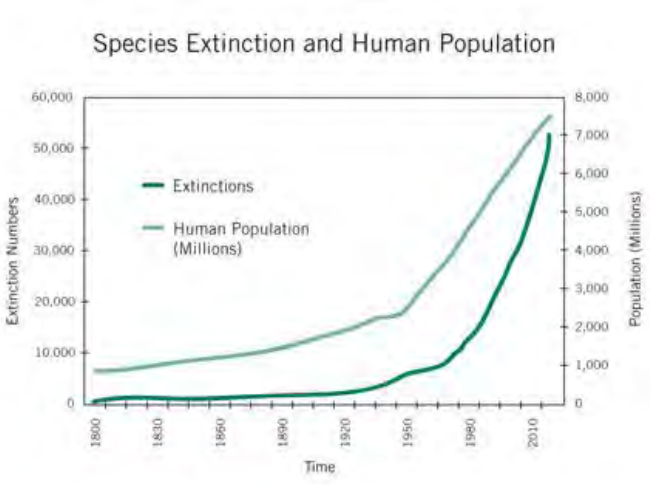
For those economic sectors that depend directly on biological resources and ecosystem services – including agriculture, fisheries, forestry, food and drink, tourism, and water – improved biodiversity management can clearly support improved financial performance. In addition biodiversity, healthy and robust habitats which make up the Manx landscape are of significant value through being central to our high quality of life. The value of the Island's natural landscape was also recognised in the Isle of Man Tourism Visitor Economy Strategy and DEFA's 2014 Upland Report.

Most residents and visitors enjoy the countryside and its biodiversity without impacting on it negatively. Further opportunities exist to promote enjoyment of this asset in a sustainable way by specifically developing a diverse eco-tourism sector.

5.2 Biodiversity loss and human population

Biodiversity is being lost worldwide at an unprecedented rate, as the human population increases (Millennium Ecosystem Assessment 2005), (Figure 3). People need space for houses, roads and productive land and this leads to habitat loss. On the Island some of these effects are mitigated through the planning system. While some species are able to adapt to environmental change many British Isles species are in decline (Burns F, *et al*. 2013) and global impacts such as climate change, ocean acidification and movements of invasive species by humans are already impacting or are likely to impact on the Isle of Man and its ecology. We already know that some bird and plant species are declining here but more survey and analysis is expected to identify other losses.

Figure 3. Relationship between species extinction and population (Source: www.biologicaldiversity.org).



Ecosystems have always been subject to change. A burgeoning world population today means human-induced changes are happening faster, especially when boosted by substantial net immigration as in the Isle of Man (see Figure 4). Globally population-induced impacts are already becoming profound and widespread and are occurring faster than natural systems or species can adapt or evolve, hence the recognition of the Earth's current, human-mediated mass extinction event (known as the Holocene extinction).

Figure 4. Rates of population increase (Source: Isle of Man and UK census figures)

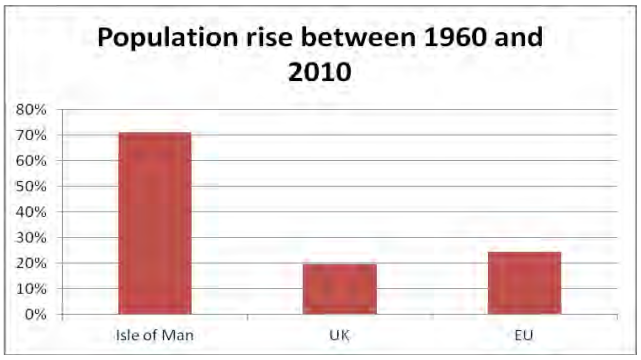


Figure 4 shows that the rate of population increase on the Island during the last 50 years has been significantly higher than in both the UK and the EU. However the overall population density here is still much lower than in the UK (148 per square km in Isle of Man 2011 compared with 257 in UK in 2010).

If population growth here continues at the present rate, the implications for our biodiversity will need to be consciously managed. Our planning policies, which already recognise biodiversity, are part of the solution, but direct biodiversity protection is also required.

In order to deliver environmentally sustainable development we need to take account of the different pressures including the projected increase in the Island's population.

5.3 Invasive non-native species

The spread of invasive species to the Island can have serious economic implications. Examples include *Phytophthora ramorum*, Dutch elm disease and Japanese knotweed. Others have caused concern without yet understanding and identifying any actual effects eg the invasive seaweed, wireweed, and the New Zealand flatworm. Each year more non-native pests are identified, (see Appendix E for definition of native) with the potential to damage our crops, landscape, fisheries, gardens, human and animal health. The estimated cost of controlling invasive non-native species in the UK is now £1.7 billion a year. Between 2011 and 2013 DEFA's control costs for *Phytophthora ramorum* alone were estimated to be around £570,000 and it is expected to require more than £1m in addition. The discovery of widespread *Phytophthora ramorum* in larch raises concerns about the possible impact on upland vegetation. Imminent threats include a killer shrimp with the often co-occurring invasive zebra mussel, ash dieback and carpet sea-squirt, all of which are now established in the UK, incurring significant control and management costs.

Polecat ferret (photo: R. Selman)

Once invasive non-native species become established a cost benefit assessment will help determine whether available control methods are appropriate or justifiable, since in many cases eradication is

simply too expensive. Instead investment in preventing arrival is the most cost-effective way to address invasive non-native species. Invasive species management and introductions are a complex issue and the Government refers to international guidance to help address it.

5.4 Pollution

In 2013 89% of Manx rivers were of 'good' or 'excellent' condition based on chemical water quality and 96% are 'fair' or better. Although there is now a general awareness of the risk of water pollution from concentrated wastes, sewage and animal manures the last two years (2013-2014) have seen slightly increased numbers of pollution incidents. Pollution from identifiable sources is dealt with by enforcing the Water Pollution Act 1993. However, the problems of gradual leaching of fertility from soils and heavy metals from old mine workings are more difficult to address.

Government routinely monitors sea temperature, bathing water quality and water enrichment, and monitors other marine pollution such as that caused by heavy metals and persistent organic pollutants on an ad hoc basis. Some pollution sources could seriously affect marine life (including commercial fisheries and marine mammals) which tend to accumulate persistent pollutants.

Pollution incident contingency plans exist for the Manx Territorial Sea and inland waters. Fortunately, the Island has not yet had a major marine pollution incident, although 80 guillemots died in the worst event, cause unknown. In general sea and river water quality have improved with the reduction in raw sewage discharge but diffuse and occasional point source pollution of watercourses continues.

Run-off from construction sites and quarries can increase suspended solids in streams thereby affecting freshwater life. Numbers of incidents have reduced recently due to the economic downturn but could rise again with economic improvement. Government planning control and enforcement plays a role here.

The spread of development into the countryside has increased light pollution and affects our nocturnal wildlife such as pollinating moths, bats and some birds. Light pollution also reduces the opportunities for 'dark sky' stargazing (now being promoted as an attraction in the Isle of Man). Underwater sound caused by various commercial activities is another potentially damaging form of pollution for marine life. Planning conditions and mitigation can be applied to minimise some of these issues.

5.5 Unsustainable exploitation of natural resources

Changes in wildlife diversity and abundance can be indicators of sustainability. Irreversible change and species extinction reduce the options available to future generations and damage provision of ecosystem services.

Manx fisheries now largely depend on invertebrates such as scallops, crabs, lobsters and whelks rather than the herring, cod, plaice, skate and mackerel caught a century ago. Unsustainable fishing led to falling fish populations, exacerbated by political and fisheries management changes, such as loss of quotas. The impacts of excessive seabed dredging, trawling and by-catch are of public concern and over the last 10 years policies have changed to address this. By-catch from scallop and queenie fisheries has been reduced greatly through technical measures and gear changes. There are currently five Fisheries Closed Areas in Manx waters where scallop dredging is not permitted and a large Marine Nature Reserve off Ramsey protects some of our more important and vulnerable habitats. These initiatives are being implemented with the full co-operation of the fishing community.

Unsustainably farmed soils typically show a decline in organic matter, soil depth and micro-organisms, although this is not specifically monitored on the Island. Ploughing of peatland soils in such places as wetlands on the northern plain and on the upland fringes leads to increased carbon dioxide emissions from captured carbon, which in turn contributes to global warming.

Healthy ecosystems provide beneficial recreational opportunities. However, these may need to be managed through education and awareness to reduce adverse impact on biodiversity. For example, a simple code of conduct around basking sharks can significantly reduce disturbance and damage, particularly important when they are demonstrating breeding behaviour.

5.6 Climate challenge

Climate change will bring changes to our flora and fauna. The Island is seeing increasingly unpredictable weather with more frequent extreme events, such as drought and wind, all of which impact on biodiversity. Meteorological Office figures from the Isle of Man and elsewhere in the region show more frequent abnormally high temperatures. Regular monitoring of Manx sea temperatures initiated by the former Port Erin Marine Laboratory and since continued by the Government, shows a significant increase of approximately 0.7°C since the beginning of the 20th century (Kennington et al. 2012).

The potential impacts of climate change on Manx biodiversity have not yet been fully assessed although some projections are available from a recent publication (see Box 7). However we do know that a biologically diverse environment with a well-connected network of habitats is more resilient to climate-induced change. For example, a diverse range of native species is more likely to include predators of emerging pest species which can enable natural control mechanisms to occur.

Conversely climate change can provide increased opportunities for habitat creation and restoration. For example new mudflats are being created in East Anglia as a response to unavoidable coastal erosion and inundation. In the Manx hills DEFA is restoring upland bogs through blocking drainage to increase carbon capture by re-activating peat accumulation. This also improves drinking water quality in reservoir catchments and helps prevent flooding downstream.

Biodiversity plays an important role in reducing atmospheric carbon dioxide. Habitats such as peatlands, forests, seagrass beds and kelp forests store significant amounts of organic carbon. If these carbon reservoirs are mismanaged carbon can be released into the atmosphere increasing atmospheric carbon dioxide levels. Recent research shows that carbon locked up in marine habitats has generally been underestimated (Pendleton et al. 2012), indicating the sea's important role in carbon capture.

Drying pool at Holman's Dub in Ballaugh Curragh (Photo: J Wornham)

Box 7. Climate change impacts on breeding birds based on recent predictions

- Hen Harrier: Isle of Man may either lose its breeding population or retain an isolated one, although wintering birds still seem likely.
- Garden Warbler: distribution in British Isles expands west to include Ireland, putting Isle of Man roughly in the centre.
- Dartford Warbler: a distinct possibility of arrival in the Isle of Man by end of century, along with Cirl Bunting.
- Manx Shearwater: "The simulated potential future distribution [late 21st C] extends northwards to include more localities in Iceland, whereas most of the present range is simulated as no longer suitable."
- Arctic tern: predicted as likely to be absent as a breeding species by end of century.
- Long Eared owl: predicted as likely to be absent as a breeding species by end of century.

Source: 'Climate Atlas of European Breeding Birds' by RSPB and Durham University (with Cambridge University, Birdlife International and the European Bird Census Council) 2012.

5.7 Resources for delivering biodiversity management

The biggest challenge for delivering biodiversity conservation is scarcity of resources. The Isle of Man has limited access to external grants and funds for biodiversity and the cost of managing biodiversity must largely be met from within the Island. We will need innovative ideas and incentives combined with creative use of public and private partnerships.

However, some conservation measures involve spending less. For example, reducing the frequency and extent of roadside cutting to the minimum requirements for road safety can benefit hedgerow plants, animals and birds, while reducing expenditure.

Resources will be necessary for biodiversity conservation and habitat management training, ensuring a succession of professionally qualified people with local knowledge. The input of skilled amateurs is also a much-appreciated resource which needs to be nurtured and trained, and volunteers working alongside Government officers will be important in delivering the Biodiversity Strategy.

There is a crucial role for broader society, businesses and community groups in assisting in the delivery of this strategy. They have an interest in and can be a valuable resource in some projects.

St John's Wildflower garden (Photo: A. Dubbeldam)

Watching basking sharks in Peel bay
(Photo: F Gell)

6.0 Aims, objectives and strategic actions

By 2025 we aim to:

- manage biodiversity change to minimise loss,
- maintain and where necessary restore or enhance biodiversity and
- actively involve society in understanding, appreciating and safeguarding biodiversity.

The Island will achieve these aims by meeting the Convention on Biological Diversity Aichi Goals (see section 3.2) but in an extended timescale. Appendix C shows how Manx Objectives correspond to the CBD's Goals and Targets. These Aichi goals and targets are quoted below in the margin adjacent to the Manx Strategy.

This Biodiversity Strategy consists of 7 strategic objectives and associated actions. A Delivery Plan will set out the specific tasks required to deliver these objectives. The Strategy and the Delivery Plan will be regularly reviewed and updated. Some actions have higher priority and these are indicated in **bold**.

Objective 1. Delivering an effective strategy

By 2015 the Government and partners will have developed and adopted an effective biodiversity strategy and will have commenced implementation in 2016.

Aichi Goal E

Enhance implementation through participatory planning, knowledge management and capacity building.

The Island is a stronghold for many species but we know other Manx biodiversity is in decline. Action to prevent biodiversity loss can entail costs. But biodiversity loss itself is costly to society, especially in the long term. To date, funding for biodiversity conservation, survey and research has come from within Government notably Department of Environment, Food and Agriculture (DEFA) and also through Manx Museum and National Trust (MMNT), Manx Wildlife Trust, Manx Birdlife and other wildlife charities which are non-governmental organisations (NGOs). Funding will need to be assessed in the light of current difficult economic circumstances. Potential funding channels are the Lottery Fund and the national Biodiversity Fund set up in 2012 and administered by MMNT.

Aichi Target 17

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

It will be essential to engage with and harness resources from all parts of society, including from businesses and from the wider community.

Government/NGO partnerships can be a cost-effective way of conserving biodiversity. Specialist training can build a significant local resource. For example, the fungus identification course in 2012 trained nearly 60 people and established a fungus research group at very little cost to Government. Volunteer Seasearch divers have carried out hundreds of surveys, increasing our knowledge of habitats and helping monitor the Ramsey Marine Nature Reserve and Fisheries Closed Areas. Strong civil society ("Third Sector") involvement is important in delivering biodiversity objectives.

Actions for Objective 1

1. **Complete and approve the Draft Strategy in 2015, followed by a Delivery Plan (with tasks and resourcing options) agreed within 6 months of the adoption of the Strategy by Tynwald.**
2. **In 2015 establish a Biodiversity Oversight Group tasked with driving forward and monitoring implementation of the Biodiversity Strategy and Delivery Plan.**
3. Regularly review and revise both Strategy and Delivery Plan to take forward the work up to and beyond 2025.

Aichi Target 20

By 2020, at the latest, the mobilisation of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011–2020 from all sources. (CBD's Plan)

Objective 2. Government leading by example

By 2025 Government will lead by ensuring biodiversity conservation is being considered in all relevant areas of policy and decision-making, actively encouraging good practice and adopting all appropriate incentives to support biodiversity.

Aichi Goal A

Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.

The Isle of Man Government will lead by example and further integrate environmental considerations into its policies. Biodiversity should be specifically mentioned in all relevant Government policy documents, as it is already in the Isle of Man Strategic Plan Towards a Sustainable Island (which takes account of protected sites, species and habitats of local, national and international importance). Government needs to further encourage active, informed participation of local groups and communities in the conservation and sustainable use of biodiversity to realise the full benefits of biodiversity and ecosystem services to the community and the economy.

The key Government bodies will be the Departments of Infrastructure (DoI), Economic Development (DED) (including the tourism section), Environment, Food and Agriculture (DEFA), and the "arm's length" agency Manx Museum and National Trust (MMNT). Improved integration of biodiversity conservation within DEFA will enhance the positive contribution of the agriculture, forestry and fisheries sectors to wildlife protection and its sustainable use.

The Wildlife Act 1990 contains a duty on all parts of Government to 'have regard for' biodiversity. This needs modernising in line with best practice so that Departments and officers need to demonstrate that biodiversity has been taken into account and its conservation furthered wherever possible and compatible with statutory functions.

Aichi Target 2

By 2020, at the latest, biodiversity values will have been integrated into national and local development and poverty reduction strategies.

Government's incentives to businesses must not inadvertently lead them to damage the land and seascape and their natural richness, recognising that these play a part in attracting investors to the Island. There is scope for adjusting existing policies and support to enhance management for biodiversity. This is not just about money. An appropriate balance between advice, voluntary, fiscal and statutory measures is required to achieve biodiversity objectives.

Actions for Objective 2

4. **From 2015 Government will lead the Manx community in implementing the Manx Biodiversity Strategy and Delivery Plan.**
5. **By 2017 seek a more robust "duty" for Government to conserve biodiversity in the Wildlife Act. This would mean public bodies need to further biodiversity conservation wherever possible, ensuring this is measured and accounted for.**
6. **By 2020 review all of government's relevant legislation, regulations, schemes, incentives and codes of practice for consistency with biodiversity conservation, especially international obligations.**
7. **By 2022 embed proper consideration of biodiversity and ecosystem services in all relevant policy and decision-making to facilitate Government's commitment to biodiversity.**
8. **From 2018, where government offers incentives it will need to show that the activities it supports are not detrimental to biodiversity and wherever possible it will provide positive incentives to conserve it.**

Aichi Target 3

By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio-economic conditions.

Objective 3. Biodiversity knowledge

By 2025 everyone will have access to reliable, up-to-date and comprehensive biodiversity data which is essential to support Government policies and decisions of businesses and private land and sea users.

Aichi Goal E

Enhance implementation through participatory planning, knowledge management and capacity building.

The development and resourcing of a biological recording system is a very important part of meeting the objectives in this Strategy. It will provide a unified recording system and make biological data and maps publicly available. These will guide land and marine management policies and practice, and help prioritise use of resources, including identifying threats from invasive species. Fourteen NGOs and government bodies established the Manx Biological Recording Partnership in 2010 to work towards this aim. This Partnership also has an important role in promoting the recording of species by NGOs, professionals, local specialist interest groups, individual skilled amateur biologists and recorders.

Conservation measures require an understanding of changes in wildlife abundance and distribution. Surveys cannot cover everything so biodiversity indicators are monitored including trends in levels of our breeding bird species and surface water quality. Changes in these indicators may lead to a review of the sustainability of our land, sea and freshwater management practices. The Manx Marine Environmental Assessment (Hanley et al, 2013) has made an important contribution to making marine knowledge accessible and available for assessing impacts of marine developments.

Monitoring biodiversity and ecosystem services such as water quality and flood protection provides an important early warning of environmental problems likely to impact on human well-being.

It is of course impossible to know everything but where there is a risk of significant damage to important biodiversity the Precautionary Principle should be applied (see glossary in Appendix E).

Actions for objective 3

Aichi Target 19

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

9. **By 2016 develop a biological recording system which is maintained, evolved and accessible to users, working with partners to achieve this.**
10. **Continue to identify, and by 2018 prioritise and improve biodiversity knowledge through research and survey, especially the status and abundance of key species and priority habitats (as part of the development of Biodiversity Action Plans).**
11. **Continue to improve training in ecological research and survey covering identification, conservation and sustainable use of biodiversity and engaging the wider community where possible.**
12. Continue to identify areas for co-operation in research and survey with other parties to the CBD, especially islands, other UK Crown Dependencies, Overseas Territories, the UK and the Republic of Ireland.

Objective 4. Community engagement and understanding

By 2025 everyone will understand what biodiversity is, why it is important to our quality of life and will have been empowered to use it more sustainably.

Aichi Goal A

Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.

Different methods will be needed to engage different groups of people in biodiversity conservation. These include people whose activities are most likely to affect biodiversity; Government, the main users of land and sea (farmers and fishers) and private companies who manage or use our land and marine resources.

DEFA aims to achieve an understanding of biodiversity conservation among the general public, including an appreciation of the Island's known and potential impacts on global biodiversity ("our global footprint").

Businesses have an important role. "*Companies can create profitable opportunities in line with consumer preferences, which are increasingly favouring greener and more responsibly-sourced products*" (IUCN 2012). There is increasing recognition that care of biodiversity is an aspect of corporate environmental and social responsibility.

Aichi Target 1

By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

Actions for Objective 4

13. **By the end of 2015 put the Island forward as a UNESCO Biosphere Reserve**
14. **By 2016 develop and improve communication, education and public awareness of biodiversity, how it supports us (ecosystem services), how our lives and actions affect biodiversity, here and outside our territory and what we can do to conserve it.**
15. **By 2017 further integrate biodiversity into school curricula at each educational level.**
16. **By 2025 encourage all local businesses to take account of the local and global biodiversity impacts of their activities, and ensure they understand the need for and benefits of biodiversity conservation.**

Marine awareness day at the Villa Marina (Photo: DEFA)

Objective 5. Habitats and species

By 2025 all sites of critical importance for conservation of our biodiversity will be effectively protected and managed so that resident or migratory wildlife has adequate refuge to safeguard its future survival, recognising the challenge of climate change. To achieve this we will prevent loss of priority habitats, significantly reduce habitat degradation and fragmentation and, where appropriate, restore key species populations and priority habitats.

Aichi Goal C

To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity.

Biodiversity conservation is here subdivided into site protection, habitat loss, species conservation, genetic diversity and ecosystem services.

Manx landscape (Photo: DEFA)

Site protection and enhancement

Internationally statutory designation of important sites is effectively helping deliver biodiversity conservation. Designation in the Isle of Man is at a relatively early stage. A full suite of protected areas in favourable condition is critical to preventing further loss and restoring biodiversity. An ambitious time-bound target for further site protection is essential for effective species and habitat conservation (WCMC report to Isle of Man, 2004).

Selection of designated areas on land is based on widely accepted criteria; such as high species diversity, presence of threatened or migratory species, unusual or representative habitats, (DAFF 2008). The areas covered by different designations can be found in Appendix D.

Many Manx semi-natural habitats on land are fragmented and vulnerable. Designation of Areas of Special Scientific Interest (ASSIs) not only protects wildlife by defining beneficial land management practices but also acknowledges the role that landowners play in biodiversity conservation, usually encouraging the continuance of existing good practice.

In addition non-statutory Wildlife Sites enable recognition and management of areas of local importance on the Island. Wider measures to maintain ecosystem services by, for instance, tree planting and creation of waterside buffer zones, are also needed.

Marine Protected Areas and fisheries management areas are helping to manage Manx marine biodiversity. Under the OSPAR Convention (see Appendix B) Government needs to conserve sites with listed marine habitats such as eelgrass meadows, horse mussel reefs and maerl beds.

Recent experience has shown that Marine Protected Areas can be best promoted and managed by the users of the sea who will benefit from the restoration of marine biodiversity. It is important to equip them with the necessary knowledge and skills to manage these areas in the long term.

The Island is fortunate that much semi-natural habitat is in government ownership and with continued improvements in management to take more account of biodiversity this

can make a significant contribution to meeting targets, especially in the uplands, however lowland habitats are at most risk.

Recognition of the Island and its seas as a Biosphere Reserve could complement and add value to the statutory designations, which should form the Core areas.

Already landscape-scale biodiversity management has begun with the establishment of Ramsey Forest, involving and benefitting the community as well as biodiversity. The clearance of many hectares of planted larch affected by *Phytophthora ramorum* creates an opportunity for restoration of plantation to upland heath and broadleaved woodland.

Aichi Target 11

By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

Site protection actions

17. **By 2025 we will appropriately conserve and manage 20% of land and inland water through statutory designations and other effective conservation management schemes.**
18. **By 2020 at least 10% of our marine ecosystem will be conserved through effectively managed, ecologically representative and well-connected protected areas and other effective area-based conservation measures.**
19. **From 2016, when assessing developments on or adjacent to protected sites, there will be increased consideration of biodiversity and environmental sustainability.**
20. Continue to investigate and pilot landscape-scale initiatives to restore and conserve scarce or vulnerable habitats and their rare species and by 2025 improve ecosystem resilience to climate change.

Habitat loss

Biodiversity is being lost around the world despite the CBD target to halt biodiversity loss by 2010. Monitoring of indicators is required to quantify biodiversity losses, confirm the main causes and enable targeted action to halt this trend.

Aichi Target 5

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

Our knowledge of Manx terrestrial habitats and land use is based on maps made between 1991 and 1996. This urgently needs revising in order to quantify habitat changes, understand the reasons and address the causes. Loss is caused not just by active destruction, but also lack of effective management and natural changes such as scrub invasion.. Wildlife legislation on the Isle of Man is designed to prevent habitat loss.

In the marine environment, it is more difficult to measure habitat loss directly, but other indicators such as area and frequency of seabed dredged and trawled, give a measure of habitat modification and loss. In the last five or six years numbers of scallop dredging boats have increased. Fortunately new fisheries management measures are reducing the queenie footprint and are expected to reduce the scallop footprint in the coming year, slowing the rate of habitat loss and enabling recovery.

Habitat loss actions

21. **DEFA will continue to promote a policy of 'no net loss' for semi-natural Manx habitats and species and ensure that unavoidable loss is replaced or effectively compensated for.**
22. **By the end of 2015 complete a land use and terrestrial habitat assessment to understand rates of habitat loss, use this information to help prioritise habitat and species conservation, through Biodiversity Action Plans, and consider how to monitor success.**

23. By 2025 restore at least 16% of the area of degraded marine, freshwater and terrestrial ecosystems.

Species conservation

To effectively conserve rare species requires evidence-based policies and measures, which in turn need data from studies undertaken on the Island or in comparable places. Conservation measures may include law enforcement or incentives to land managers for habitat management such as grazing or control of non-native species.

The Isle of Man Delivery Plan will identify species and habitats requiring action (Biodiversity Action Plans). Work on the plans and conserving some plants and animals has already begun. For example bee orchid, basking shark and red-billed chough are subject to dedicated programmes of research and conservation. Key species and priority habitats will be identified and plans drawn up.

The protected area network (which includes land owned and managed by other organisations and individuals) needs to meet the needs of key species, especially those requiring restoration or recovery. These species will be selected using agreed criteria. Occasionally conservation within their natural habitats will not be sufficient. Facilities for conservation of native species in captivity or in cultivation will be needed, for example for animals at the Curraghs Wildlife Park and for plants in the Wildflowers of Mann nursery.

Climate change may make inevitable the extinction of some species whose habitat requirements are no longer met on the Island. Maintaining natural species diversity is valuable as this contributes towards climate change resilience. The risks to such species and the consequences of their loss to the Island need to be understood and recorded.

Species conservation actions

24. By the end of 2016 identify indicator species including migrants, as signs of environmental change, initiate monitoring and by 2020 initiate investigations into the reasons for any changes identified.
25. Continue to target conservation action on key species and priority habitats through Biodiversity Action Plans.
26. Continue to improve, maintain and enforce legislation for the protection of threatened species and habitats.

Aichi Target 15

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

Aichi Target 12

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

Bee orchid (DEFA), Yellow horned poppy (L Moore), Lesser twayblade (A Thomas), Sundew (DEFA)

Genetic diversity

Separate island genotypes of wild plants and animals are likely to have evolved since the land bridge with Britain was broken 9,000 years ago, but more work is needed to identify species with Manx distinctiveness. DNA analysis of our native oaks has shown they were not planted. There are also some distinct domesticated varieties and breeds. The Island is known for its Manx Loaghtan sheep. Less well-known local varieties and cultivars that are intrinsically Manx include Manx honey bees and apples (Andrew Johnson and Manx Codling). Some genetic strains of trout, including sea trout, are known to be specific to their home river catchments. All are part of the Island's valuable genetic resource and more work is needed to identify Manx genetic diversity.

There is potential for the Island to be a refuge from disease and other threats to vulnerable breeds or varieties of domestic animals (rare breeds) and cultivated plant varieties. This action supports the biodiversity strategies of other countries but is a lower priority for allocating Manx resources.

Aichi Target 13
By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

Aichi Target 16

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

Genetic diversity action

27. By 2025 identify genetically distinct species (and sub-species) of flora and fauna restricted to the Isle of Man (endemic), including Manx domesticated plant varieties and animal breeds, and mitigate risks to them. Where a species is suspected to be endemic take precautionary measures to conserve it. Endemic wild plants and animals will be treated as key species (see action 25).

Loaghtan sheep (Photo: Belinda Leach)

Ecosystem services

Biodiversity supplies services that are critical to human well-being and economic prosperity (NEA 2012). Two studies (Brander and McEvoy 2012, and PML 2014.) have attempted to quantify the economic value of ecosystem services in the Isle of Man. Further work is needed to evaluate the benefits of biodiversity and understand the implications of its loss on our way of life. This information needs to be integrated into government policies and decision-making and, where possible, accounting systems.

Aichi Goal D
Enhance the benefits to all from biodiversity and ecosystem services.

Site protection and management conserves species and habitats but wider measures are needed to safeguard ecosystem services. Repairing damage to ecosystem services and ameliorating the effects of climate change on land and property can be achieved through habitat creation and restoration.

One ecosystem service is carbon storage. DEFA is beginning to understand where significant carbon stocks are held. The importance of conserving these areas has been recognised and appropriate management is under discussion.

The role of marine or 'blue' carbon also needs to be better understood to ensure that the storage capacity of marine habitats is maintained.

Ecosystem services actions

28. **Continue to improve understanding of the value of ecosystem services to our economy.**
29. By 2025 undertake an audit of essential ecosystem services (many of which cannot be quantified) and take action to maintain them.
30. By 2020 minimise further loss of carbon to the atmosphere from terrestrial, wetland and marine habitats, which form important carbon stores by restricting damaging practices.

Garden Cross Spider. Pest control is an ecosystem service (Photo: R Selman)

Aichi Target 14

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

Achi Target 15

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

Objective 6. Environmental risks

By 2025 Government will monitor, understand and substantially reduce the other main pressures on biodiversity, particularly environmental pollution and the prevalence of invasive non-native species, and will take measures to meet the biodiversity challenges posed by climate change.

Aichi Goal B

Reduce direct pressures on biodiversity and promote sustainable use.

Pollution

While pollution rarely makes headlines in the Isle of Man, it does occur and contingency planning is essential. Legislation and policies to address pollution are based on the 'polluter pays' principle (see glossary in Appendix E).

Aichi Target 8

By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Major inland water and marine pollution events are covered by agreed multi-department contingency plans aimed at providing a timely and efficient response to incidents.

Government is upgrading sewage treatment to improve the effluent water quality. This should also improve bathing water quality. Other sources of pollution such as pharmaceuticals, micro-plastics, and chemicals in cleaning products continue to enter the marine environment. Although harmful anti-fouling paint, Tributyltin (TBT) is no longer permitted, past use has polluted some harbour sediments causing ecological problems. Marine litter is difficult to prevent, but the Government's 'Fishing for Litter' scheme in partnership with the fishing industry, and community beach cleans are making a difference locally.

Silt from farmland run-off is the most visible pollution in rivers and bays after heavy rain and represents loss of valuable soil, some of which is avoidable. Agricultural pollution can also include slurry, silage effluent, oils and pesticides, but farmers have a code of good practice for its avoidance (DAFF/IOMWA/DoLGE, 2004). Nutrient (excess fertility) levels have gradually increased and will be a factor in changing ecosystem structure and

function unless better managed. At its height the construction industry was responsible, if inadvertently, for some silt pollution into watercourses from building sites. There is still heavy metal pollution in water and soils from the Island's mining legacy. Finding sustainable solutions will help restore freshwater and estuarine biodiversity, thereby benefiting fisheries and wildlife.

Pollution actions

31. **Continue and improve the identification and monitoring of pollution on high-risk land, in freshwater and marine habitats, minimising risks by effective legislation, facilities, incentives and sanctions.**
32. By 2025 bring pollution, including diffuse pollution, to levels which support healthy ecosystems and biodiversity.

Invasive non-native species

Invasive non-native species are a significant and increasing cause of biodiversity loss threatening the economy, human and animal health. While isolation makes it easier to control arrivals of invasive species, the Isle of Man is likely to suffer much greater impacts from an invader than larger land masses. This is because there are fewer resident species capable of competing with or predating it, as well as resident species "naivety". We also need communication and collaboration with neighbouring jurisdictions. Action will be assisted by the forthcoming EU Invasive Species Directive and communication with the Stakeholder Forum on Non-native Species led by the UK Animal and Plant Health Agency.

Aichi Target 9

By 2020, invasive non-native species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

This is a major area of work best addressed through a separate strategy, for marine and terrestrial invasives, involving the most affected sectors especially agriculture, forestry, harbours and fisheries.

The Government's policy on deliberate introductions and re-introductions follows International Union on Conservation of Nature (IUCN) guidance and these are licensed only in specific circumstances.

Invasive non-native species action

33. **By the end of 2016 complete and begin implementing an Invasive Non-native Species Strategy and a Marine Biosecurity Plan.**

Japanese knotweed, an invasive non-native species. (Photo: A Thomas)

Climate challenges

Ecosystems vulnerable to climate change on the Isle of Man include:

- alpine plants on Snaefell which cannot move higher to avoid the warmer climate,
- saltmarshes and other coastal habitats, which may be squeezed out where they cannot move inland as the sea level rises,
- streams and rivers and their fauna, where water temperatures and flows may be affected.

There are already shifts in the ranges of cold and warm water species which may be affecting fisheries and food availability for seabirds. Shellfish may be threatened by ocean acidification (Hofmann et al. 2010). It is important that other pressures are minimised and measures taken to conserve the species in these vulnerable habitats, especially in fresh and seawater.

Whilst the Isle of Man may lose species and habitats, it could also gain others which are moving north or as migration routes shift with temperature change. Some may be beneficial or of conservation significance on a regional or global scale. Strategy revisions will need to take these into account.

The CBD stresses the importance of combating climate change through adaption and mitigation measures on all participating states. The Island is addressing both the mitigation of climate change (reduction in emissions) and adaptation (preparedness for change). Government aims to reduce carbon dioxide emissions from all government-owned buildings by 20%. Work has been undertaken to assess the potential impacts of change (Acclimatise 2006). One of the most significant appears to be flooding which is the subject of an imminent Flooding Planning Policy Statement.

Aichi Target 10

By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification, are minimized, so as to maintain their integrity and functioning.

Climate challenge actions

34. **By 2020 identify species and habitats most likely to be or already affected by climate change and start implementing appropriate adaptation measures.**
35. By 2025 ensure that no human activities contribute additional stress to vulnerable Island ecosystems already impacted by climate change or ocean acidification.

Dwarf willow, a native alpine plant growing on Snaefell (Photo: L. Moore).

Objective 7. Sustainability

By 2025, the Government will have ensured that policies are in place to promote the sustainable management of our land, freshwater and marine resources, including by means of traditional practices where these are compatible with biodiversity objectives, and taking due account of the need to conserve ecosystem services.

Aichi Goal B

Reduce direct pressures on biodiversity and promote sustainable use.

Aichi Target 4

By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

The Isle of Man Government recognises its international responsibilities under the CBD in relation to sustainable use of biodiversity and natural resources. The Agenda for Change clearly states "We must use our natural resources sustainably". Defining sustainability in relation to how activities impact on biodiversity will be vital. Demonstrating sustainability will also be important if we are to retain any Biosphere Reserve designation.

The Isle of Man Strategic Plan refers to the need for environmental impact assessments where there is risk of significant impact on the environment – including biodiversity.

Codes of good practice and guidelines are valuable tools for improving sustainable land and water use. Good data collection and robust statistics are essential for performance monitoring to demonstrate genuine sustainability. Each sector will need to address this.

Huge improvements have been made in management of Manx sea fisheries in the past 10 years. A more diverse and productive marine ecosystem is being restored by working with all relevant sea users. The new Fisheries Management Agreement negotiated in 2012 enables better control and sustainable practices can now be introduced for all boats fishing within Manx waters. Government and producers are working with sustainability assessment bodies towards seafood accreditation which is expected to bring improved profits for producers. Good fisheries management based on ecosystem connectivity needs to be promoted through training and education of key fisheries players throughout the Irish Sea.

The seabed is owned by Government and leased out for exploration and commercial development. Government can therefore ensure sustainable practices are followed.

Native freshwater fish stocks need sufficient protection from over-exploitation and illegal fishing activity to ensure their harvesting is sustainable and thereby maintain future productivity. In places poor water quality also needs addressing.

The most extensive terrestrial habitats are on private or Government owned upland. Sustainability will need to be carefully defined and appropriate conditions included in agricultural support schemes and other legal agreements with upland owners and occupiers.

General sustainability actions

36. **By the end of 2016 identify the local biodiversity which has economic, traditional or cultural value.**
37. **Continue to adopt sustainable practices across government, keeping up-to-date with new developments.**

Practise and promote sustainability in the following ways:

38. **By the end of 2016 develop and start monitoring Biodiversity Indicators for each objective of the Biodiversity Strategy and from 2017 use these for reporting on the Island and contributing to the UK's National Reports.**

39. **By 2017 evaluate the need for Environmental Impact Assessments for terrestrial and marine developments to be embodied in law and by 2020 put forward legislation if necessary**.
40. By 2020 promote best practice and voluntary codes to minimise impacts on the environment for all relevant land, freshwater and marine activities.
41. By 2025 promote responsible and sustainable production and consumption, particularly as it benefits biodiversity here and worldwide, by providing information and advice on best practice, including sustainable procurement.

Aichi Target 7
By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

Marine management actions

42. **By 2018 assess the viability of Marine Stewardship Council accreditation of all major Manx sea fisheries, with an aim of accreditation by 2020.**

43. **By 2025 demonstrate that all marine fishing activity and aquaculture, whether commercial or recreational, is sustainable based on the ecosystem approach (see Box 5).**

Aichi Target 6

By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem-based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

Land management actions

44. **By 2020 complete and start implementing a sustainable forestry and woodland strategy for government land, acknowledging recognised sustainable management standards.**

45. **By 2020 complete and start implementing a sustainable uplands strategy, acknowledging recognised sustainable management standards for these habitats.**

Greeba Mountain & Central Hills ASSI (Photo: DEFA)

Traditional knowledge

The Island is proud of its traditional practices and, where sustainable, these can contribute to the management of species and habitats. This may need active encouragement such as incentive payments for traditional hay cutting. Other practices can continue without detriment such as sustainable marram grass (bent) harvesting on the Ayres for thatch. Organisations such as Manx Museum and National Trust play a key role in managing traditional knowledge, and projects in this area will be undertaken through partnerships.

Aichi Target 18

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

Traditional knowledge actions

46. By 2023 promote a greater understanding of importance and value of sustainable traditional practices of land, freshwater and sea use and management.

7.0 Conclusions

On the Isle of Man we have made considerable progress towards slowing biodiversity loss and protecting species and habitats over the 25 years since the Wildlife Act was passed but much more still needs to be done. By setting our sights on 2025 we are recognising that we have a significant task ahead and we do have realistic expectations of the challenge.

While the Isle of Man Government is responsible for taking the lead in implementing this Biodiversity Strategy, many other organisations and individuals have their part to play as valued partners. Time taken to consult, work with and fully involve these partners will be an important investment by Government.

The climate challenges we face are likely to be a significant factor in biodiversity management in the coming years and this Biodiversity Strategy must be implemented alongside proactive measures to reduce the Isle of Man's contribution to climate change, through renewable energy development, energy efficiency, protecting natural carbon stores and reducing the carbon footprint of the Island.

Biodiversity is an important part of the Manx sense of place. People have lived with, enjoyed and celebrated the Island's natural resources for centuries.

Even if all actions are implemented today, significant improvements in biodiversity and enhancement of ecosystem services will be slow. Implementation needs to begin now if the Island is to meet these objectives by 2025.

This is the proposed programme:

- Seek Biodiversity Strategy adoption by Tynwald in October 2015
- Agree the Delivery Plan within 6 months of adoption of the Strategy.

The following actions are considered to be the highest priorities:

- Further develop a biological recording system (Action 9).
- Progress area-based conservation measures such as ASSI for habitats most at risk, many of which are in the lowlands (Action 17-19).
- Prioritise and improve biodiversity knowledge especially the status and abundance of key species and priority habitats (as part of the development of Biodiversity Action Plans) to inform priorities for action (Action 10).
- Establish strategies to address invasive non-native species on land and in sea (Action 33).
- Identify innovative ways to fund biodiversity work, enlisting the public and private sector and off-Island sources (Action 1).
- Introduce further biodiversity themes into education and raise community and business awareness of the importance of biodiversity in conjunction with the Biosphere Isle of Man project (Actions 13 - 16).
- Further integrate biodiversity considerations into everything relevant that Government does (Action 5, 7 and 8).

The Island's participation in the CBD, if cleverly thought through and effectively managed, will secure economic and other benefits for our Island, many of which will be critical in the challenging times ahead. Along with the challenges, there will be opportunities to deliver benefits for our Island community. It will position the Island squarely as a responsible player in an increasingly connected world.

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Appendix A. Organisations involved in contributing to the Strategy

This Strategy has been drafted by DEFA's Principal Biodiversity Officer, Liz Charter with a sub-committee of the Manx Nature Conservation Forum, a consultative body which includes non-governmental organisations (NGOs) including Manx Museum and National Trust (MMNT/Manx National Heritage).

The Sub-committee consisted of:

Anne-Marie McDevitt (Manx Birdlife/RSPB)
Cat Turner (Friends of the Earth)
Duncan Bridges (Manx Wildlife Trust)
Ed Pooley (Mammal Society)
Eleanor Stone (Manx Wildlife Trust)
Kate Hawkins (Manx Museum and National Trust -Manx National Heritage)
Bob Brown (advisor from Northern Ireland – past chairman of Northern Ireland Biodiversity Group)

The following organisations have also contributed to the Strategy development;

Government Departments and agencies	**Non-governmental organisations**
Department of Economic Development	Architects' Forum
Department of Environment, Food and Agriculture (Agriculture)	Bangor University
Department of Environment, Food and Agriculture (Environment)	Manx Fish Producers' Organisation
Department of Environment, Food and Agriculture (Fisheries)	Manx Game Preservation Society
Department of Environment, Food and Agriculture (Forestry, amenity and lands)	Manx National Farmers' Union
Department of Infrastructure (Harbours)	Seasearch Isle of Man
Department of Infrastructure (Highways)	
Department of Infrastructure (Planning)	
Department of Education and Children	
Isle of Man Water and Sewage Authority	

Appendix B. Multilateral Environmental Agreements with biodiversity relevance extended to the Island

Multilateral Environmental Agreements	**Associated agreements/annexes applied to the Isle of Man**
Convention on the Conservation of Migratory Species of Wild Animals	Agreement on the Conservation of African Eurasian Migratory Waterbirds Agreement on the Conservation of Albatrosses and Petrels Agreement on the Conservation of Bats in Europe (EUROBATS) Agreement on the Conservation of Small Cetaceans (ASCOBANS) Agreement on Raptors (Birds of Prey MOU) MOU on conservation of migratory sharks.
Convention on European Wildlife and Natural Habitats (which led to the EU Habitats and Birds Directives)	
Convention on International Trade in Endangered Species of Fauna and Flora (CITES)	
OSPAR Convention for the Protection of the Marine Environment	Annex I: Prevention and elimination of pollution from land-based sources Annex II: Prevention and elimination of pollution by dumping or incineration Annex III: Prevention and elimination of pollution from offshore sources Annex IV: Assessment of the quality of the marine environment Annex V: Protection and conservation of the ecosystems and biological diversity of the maritime area
Ramsar Convention on Wetlands	
Convention on Biological Diversity (CBD)	
UNESCO World Heritage Convention	Convention concerning the Protection of the World Cultural and Natural Heritage
International Convention on the Regulation of Whaling	
Common Fisheries Policy, European Union	Applied through Island's Fisheries Management Agreement as revised 2012.

Appendix C. Manx Objectives and Actions to meet the Convention's Goals and Targets

Manx Objectives	Aichi Goals	Aichi Targets
1. Strategy delivery	E	17, 20
2. Government lead	A	2, 3
3. Knowledge	E	19
4. Community engagement	A	1
5. Habitats and species	C and D	5, 11, 12, 13, 14, 15, 16
6. Environmental threats	B	8, 9, 10
7. Sustainability	B	4, 6, 7, 18

Aichi Goal A	Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society
Aichi Goal B	Reduce direct pressures on biodiversity and promote sustainable use
Aichi Goal C	To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity
Aichi Goal D	Enhance the benefits to all from biodiversity and ecosystem services
Aichi Goal E	Enhance implementation through participatory planning, knowledge management and capacity building

Aichi Targets compared with Isle of Man strategic actions

Aichi Target	Aichi Target text	Isle of Man Strategic Actions
1.	By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.	13, 14, 15, 16,
2	By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.	4, 5, 6, 7,
3	By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.	8,

Aichi Target	Aichi Target text	Isle of Man Strategic Actions
4	By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.	36, 37, 38, 39, 41
5	By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.	21, 22,
6	By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.	42, 43
7	By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	40, 43, 44, 45
8	By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	31, 32
9	By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	33
10	By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.	34, 35
11	By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.	17, 18, 19, 20
12	By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	24, 25, 26
13	By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.	27
14	By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.	28, 29

Aichi Target	Aichi Target text	Isle of Man Strategic Actions
15	By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.	23, 30
16	By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.	Not applicable currently.
17	By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.	1
18	By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.	46
19	By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	9, 10, 11, 12
20	By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.	1, 2, 3

Appendix D Land under different levels of protection (2014)

Designation under Wildlife Act 1990	Number	Area	Proportion of land or sea
Marine Nature Reserve	1	9,440 ha (23,327 acres)	2.4%
National Nature Reserve (also ASSI)	1	317 ha (783 acres)	0.46%
Area of Special Scientific Interest (including NNR area)	21	2,677 ha (6,535 acres)	4.5%
Area of Special Protection for Birds	1	4 ha (10 acres)	0.007%

Ramsar Site (also ASSI)	1	193 ha (478 acres)	0.33%
TOTAL	23	2,681 ha of land 9,440 ha of sea	4.5% of land 2.4% of sea

Please note there is overlap between categories so totals are less than expected.

Area-based management measures

Scheme	Area	Percentage of Island
Agricultural Development Scheme	41,578 ha (102,741)	71% of land
Fisheries Closed Areas	2,950 ha (7290 acres)	0.75% of sea

Appendix E Glossary

Sustainable use

Using the Convention definition "*Sustainable use" means the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations*. Another expression of sustainable use is efficient use of resources (less consumption) and minimising waste (less pollution). An example of sustainable use is the Manx queenie trawl fishery which has been accredited by the Marine Stewardship Council and is managed to ensure a sustainable fishery and a healthy marine ecosystem.

Precautionary Principle

The Convention defines this as "*where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat.*" Planning conditions are set to safeguard wildlife through controlling the timing of development to avoid disturbance to nesting birds or roosting bats. Marine habitat mapping has advanced greatly in recent years but it would require more survey to be able to give definitive areas for priority marine habitats such as horse mussel reefs, maerl beds and eelgrass meadows. However, Ramsey Marine Nature Reserve was established in 2011 to protect good examples of horse mussel reef and eelgrass and to allow maerl habitats to recover. When there is a possibility of significant reduction or loss of biodiversity but there is insufficient scientific evidence to prove it the Precautionary Principle should be applied.

Polluter Pays Principle

The cost of measures to prevent, control, minimise or restore damage to biological diversity should always be wholly borne by those who cause such actual or potential damage. An example is the inclusion of end-of-use remediation within a site's development plan so that the costs of returning the area to its former habitat are not borne by the community after its active life, eg. quarry restoration to farmland or the removal of a disused power plant or oil rig. It is also the responsibility of any developer to effectively demonstrate that a proposal doesn't involve damage to biodiversity, rather than the onus being on the approval process to show that it could.

Environmental Impact Assessment

Impact assessment is a comprehensive process and assessment tool that promotes sustainable development and is used to ensure that projects, programmes and policies are economically viable, socially equitable and environmentally sustainable. (CBD website). An Environmental Impact Assessment (EIA) is a formal assessment of the effects on the environment of developments which meet certain minimum criteria (eg size or level of impact). They should identify the likelihood and extent of any impacts on biodiversity and where appropriate offer options for the avoidance of impacts, mitigation, or compensatory action. An Environmental Impact Assessment should also assess alternative approaches to the development. A requirement for the assessment of the effects on the environment of developments is already built into the Isle of Man Strategic Plan and this is set out in section 7.18.1 of the Strategic Plan and its Appendix 5.

Mitigation: normally involves measures that reduce and/or minimise impacts within the site boundary such as: changes to timing, engineering design, use of different piling techniques, sediment by-passing to avoid sediment loss or reductions to the extent of a project.

Compensation: involves measures, such as new habitat creation, taken beyond the site boundary that offset the residual impacts that have a detrimental impact upon the conservation objectives for a protected site. Compensation is a last resort and should only be considered where there are residual adverse effects on site integrity that the competent authority agrees cannot be mitigated.

- See more at: http://www.cieem.net/mitigation-compensation-and-enhancement#sthash.d0mhDI5Z.dpuf

Enhancement opportunities can also be identified through this process and these can contribute towards national biodiversity goals identified through the Biodiversity Strategy and Delivery Plan.

Native, non-native, endemic

Plants and animals which have arrived here naturally and survived, prior to or since the Island became separated from the two main adjacent Islands are described as *native*. *Non-natives* are those brought by man either deliberately or accidentally. If they occur on an island or in a region and no-where else on earth they are described as *endemic*.

Natural capital

Natural capital is the stock of natural ecosystems that yields a flow of valuable ecosystem goods or services into the future. It is the extension of the economic notion of capital (manufactured means of production) to goods and services relating to the natural environment. For example, a stock of trees or fish provides a flow of new trees or fish, a flow which can be indefinitely sustainable. Natural capital may also provide services like recycling wastes or water catchment and erosion control. Since the flow of services from ecosystems requires that they function as whole systems, the structure and diversity of the system are important components of natural capital. (Wikipedia 2012).

Appendix F The 12 Principles of the CBD ecosystem approach

"A strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way"

12 Principles *(Summarised)*

1. The objectives of management of land, water and living resources are a matter of societal choice.

2. Management should be decentralized to the lowest appropriate level.

3. Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.

4. Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context.

5. Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach.

6. Ecosystems must be managed within the limits of their functioning.

7. The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.

8. Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.

9. Management must recognize that change is inevitable.

10. The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.

11. The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.

12. *The ecosystem approach should involve all relevant sectors of society and scientific disciplines.*