3. The Ecosystem Approach

3.1 Introduction

3.1.1 This review of the Llŷn AONB Management Plan is based on the ecosystem approach of managing the natural environment. This has been undertaken by following the guidance prepared on behalf of Natural Resources Wales by Craggtak, as well as a number of other relevant background documents.

3.1.2 In essence, the Ecosystem approach is a method of considering nature and the natural environment before anything else. Although the landscape and coastline of Llŷn is very beautiful with a wealth of wildlife, more than this is provided by nature and the natural environment. In reality there is a great value to the services the natural environment and ecosystems provide, and it is important to recognise them, to appreciate them and aim to sustain them.

3.2 Ecosystems

3.2.1 Defining an ecosystem is an important starting point. The Convention on Biological Diversity – CBD) and the Millennium Ecosystem Assessment (MA) defines an ecosystem as:

"A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit".

3.2.2 Biodiversity is the foundation of the ecosystem. Nature has an inherent value and contributes a great deal to the continuous well-being of people and society. It is not only beauty and views that are provided but food, jobs, building materials, and a basis for farming, forestry and quarrying.

3.2.3 The Millennium Ecosystem Assessment (MA) was established in 2001 by the United Nations. The purpose of the Assessment is to try and anticipate what the impact of change will be on ecosystems, on the wellbeing of people and communities in the future and to suggest measures to care for and enhance the condition of ecosystems globally. Over 1,300 experts contributed to the work that assessed the condition of the world's ecosystems and the services they contribute, and measures were suggested in order to maintain, restore and promote making sustainable use of ecosystems.

3.2.4 The findings of the MA were that human actions had depleted a great deal of the earth's natural resources placing a strain on the environment and making it difficult for the world's ecosystems to sustain future populations. It was concluded that it would be possible to undo a great deal of the

damage by changing policies and practices – but the essential changes have not thus far been adopted.

3.3 Ecosystem Services

3.3.1 As we have explained the natural environment provides 'services' for us to live. These provisioning services include food, work opportunities, trees, building materials and a wide range of other products. In addition, the environment is responsible for matters such as water purification, nutrient cycling, provision of fresh air etc. By now there is an agreement that it is possible to place these Ecosystem Services in four categories as follows:

- **Provisioning Services** – products such as food, fibre and medicine.
- **Regulating Services** – water purification, maintaining air standards and climate regulation.
- **Cultural Services** – well-being by contact with nature and education.
- **Supporting Services** - processes required for other services such as soil formation and nutrient cycling.

3.3.3 The following is a more detailed analysis of the Ecosystem Services in the above four categories:

Provisioning Services

- Food – ecosystems provide the circumstances for food to grow. The majority of food comes from farming systems but there are also natural sources such as fish, trees and food from natural sources e.g. blackberries, mushrooms.
- Raw materials: Ecosystems provide a variety of materials for building and fuel - including trees, fuel and oil.
- Fresh water: Ecosystems play an essential part in the water cycle, by regulating the flow of water and water purification. Forests and vegetation regulate how much water is available locally.
- Medical Resources: A variety of plants that are used as natural medicines are provided by wildlife and ecosystems and providing raw materials to the pharmaceutical industry.

Regulating Services

- Local climate and air quality standards. Trees provide shelter whilst forests regulate rainfall and water provision. Trees are also important to dispose of air pollution.
- Carbon storage – ecosystems regulate global climate through carbon dioxide storage and treatment – greenhouse gases.

- Limiting extreme climate events – ecosystems form a buffer in the case of some extreme circumstances e.g. trees stabilise steep hills and wetland areas absorb water.
- Treating waste water – wetlands and peat lands filter and purify water.
- Preventing erosion and maintaining soil fertility - vegetation protects land from erosion and healthy ecosystems maintain land fertility.
- Pollination – insects and wind pollinate trees and other plants, and so do some birds.
- Biological Regulation – ecosystems control pests and diseases via the natural order of predators and parasites e.g. birds, bats and insects.

Habitat or Supportive Services

- Habitat for species – everything is provided for species – food, water, shelter. Some species will be dependent on different ecosystems at different times e.g. birds, fish, mammals.
- Sustain genetic diversity – namely the difference between different populations and species.

Cultural Services

- Recreation and physical and mental health e.g. walking or outdoor sports affording an opportunity to keep healthy and to relax.
- Tourism – Ecosystems and biodiversity are the basis for special types of tourism that contribute to the economy of areas/countries and benefit communities.
- An aesthetic appreciation and inspiration for the culture of art and design. There is a close connection between language, knowledge and the natural environment and wildlife and the natural environment have inspired art, culture and science.
- Spiritual experience and sense of place – there is a spiritual link with special locations e.g. Bardsey and wildlife and the natural environment is linked to religion and customs.

3.4 What is the Ecosystem Approach Management Method?

3.4.1 Management based on the ecosystem is defined by the Convention on Biological Diversity as follows:

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

3.4.2 In addition, the Convention has defined 12 principles to implement EA – however they may be adapted for a purpose. The Welsh Government has

accepted the 12 principles for implementation according to the ecosystem approach in this country. A summary of the principles are noted below:

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

Principle 2: Management should be decentralised to the lowest appropriate level.

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

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

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

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

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

Principle 8: Recognising the varying temporal scales and lag-affects that characterise ecosystem processes, objectives for ecosystem management should be set for the long term.

Principle 9: Management must recognise that change is inevitable.

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

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

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

3.5 How can the Ecosystem Approach entail making better policies?

3.5.1 There are a number of benefits from using the ecosystem approach to making effective policies:

- Gives a better analysis of the matters in question.
- A means of defining options and discussing with others.
- A way of assessing costs / benefits of options
- Taking decisions with the minimum cost and the maximum benefits
- Working with partners to realise the policy
- Evaluating and adapting the policy bearing in mind the benefits provided by the Natural Environment

3.6 Incorporating the Ecosystem Approach in the Management Plan

3.6.1 The Ecosystem approach seeks opportunities to work with natural systems to realise the objectives and policies. It will measure the negative and beneficial impact of policies on the services provided by nature/the natural environment. Undertaking this effectively will in the long term, on a wide scale, entail looking beyond the usual policy boundaries, undertaking an evaluation of the services in question and include those that benefit from the Services and those who provide.

3.6.2 As part of the review of this Management Plan, we have sought to give attention to all the relevant issues in terms of incorporating the Ecosystem Approach. The relevant matters are listed below, but it has to be noted that resources did not permit us to give detailed attention to all the matters noted.

- Confirm what are the area's Special Qualities
- Consider all the designated area in terms of the ecosystem and services as well as the adjacent area if required.
- Identify services/benefits of the area’s ecosystem and consider how policies would change /influence them.
- Give value to the changes in eco services, in order to consider them as part of the cost/benefit.
- Seek opportunities to use ecosystem services to realise policies.
- Identify legal and biophysical limitations in terms of the policy options and see how these will change over time.
- Identify the risks to the natural environment from the policies and how these could change over time.
- Consider all who may be affected by the changes to ecosystem services as a result of the policies contained in the Plan.