

Alderney West Coast and Burhou Islands Ramsar Site Management Strategy

Version 1

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Abstract

In 2005 Alderney's West coast and the Burhou Islands were designated as wetlands of worldwide importance. As a participant of the Ramsar Convention the States of Alderney are required to develop a framework for the conservation and wise use of the Ramsar site. On behalf of the States of Alderney this management strategy has been prepared by the Alderney Wildlife Trust and the RSPB with advice and expertise from relevant parties.

Seabirds are one of the main reasons for Alderney's Ramsar designation. Alderney supports regionally, nationally and internationally important populations of seabirds. This plan focuses on developing appropriate monitoring and management plans for the seabirds of Alderney, but also aims to establish regular monitoring of the important habitats and non-avian species present within the site.

The establishment of this plan is particularly important in view of the potential effects of the development of tidal power on Alderney's marine environment.

A five year work programme is proposed for the period 2007-2012. It is proposed that the Alderney Wildlife Trust and the RSPB (known from hereon as 'The Ramsar Managers') manage the strategy on behalf of the States of Alderney, drawing upon a range of scientific expertise where necessary. The Ramsar Managers will also advise the States with regard to the issuing of licenses for those individuals/groups who apply to the States to carry out research or management work on Alderney's seabird populations or within the Ramsar site. However, the responsibility for granting the licence will remain with the States of Alderney. This will ensure the strategy's objectives are adhered to and any environmental management within the site is carried out appropriately.

Progress against delivering the strategy objectives will be annually reviewed, and the strategy itself reviewed in 2012.

1 Introduction

The Ramsar Convention on Wetlands was adopted in Ramsar, Iran, in February 1971 to provide a framework for action and international co-operation for the wise use of wetlands and their resources. The UK ratified the Convention in 1976, extending this to its overseas territories and crown dependencies where Ramsar often provides the only policy mechanism for protecting natural resources of international or global importance.

On 25 August 2005, Alderney's West Coast and the Burhou Islands were designated as wetlands of worldwide importance and became the first Ramsar site in the Bailiwick of Guernsey. The Ramsar site covers some 1,500 hectares of land and sea, almost twice the land area of mainland Alderney.

The Ramsar Convention requires participants to develop a framework for the conservation and "wise use" of designated sites. This strategy aims to provide a framework and action plan for the long-term protection and sustainable use of the Alderney Ramsar site (and its surrounding area).

1.1 Strategic goals

- Maintain and enhance species populations and marine habitats of the Alderney West coast and Burhou Islands Ramsar site.
- Achieve the sustainable use of the Ramsar site and surrounding waters to protect the site for current and future generations
- Develop Environmental Legislation in the form of an Alderney Wildlife Act which will allow for the creation of marine and terrestrial protected areas.

1.2 Objectives

- To ensure effective monitoring of the extent and condition of key habitats and mammal species for which the Ramsar site has been designated.
- To maximise the potential of the islands and marine environment to support vibrant marine life and seabird populations, through appropriate management and protection measures.
- To ensure effective monitoring of key seabird colonies to assess populations and breeding success of priority species.
- To maintain the numbers and assemblage of seabirds within the Ramsar site (to at least Seabird 2000 levels).
- To provide a framework for decisions on use of the Ramsar site and promotion of its importance amongst local people and visitors.
- To ensure regular reporting against all plan objectives and review management actions accordingly.

1.3 Political context of strategy

The Alderney West Coast and Burhou Islands Ramsar site is one of 165 Ramsar sites designated throughout the UK and its Overseas Territories and Crown Dependencies. The Channel Islands are a Crown Dependency, and therefore outside the UK and the European Union, with an independent legislative system.

In metropolitan UK itself (Great Britain & Northern Ireland), Ramsar Sites receive protection equivalent to that currently afforded to statutory European sites such as SPAs¹ and SACs² designated under EU nature conservation legislation. Such sites receive a higher level of protection than the UK's Sites of Special Scientific Interest (SSSI). Guidance is given to local planning authorities and other public bodies on issues which should be taken into account in making decisions on development proposals likely to impact on those sites. If, unusually, consent is given to development on or affecting such sites, lost wetlands interests will have to be replaced, by restoring and recreating habitats. The UK Government also expects that developers will normally have to bear the cost of these compensatory packages, under the polluter pays principle.

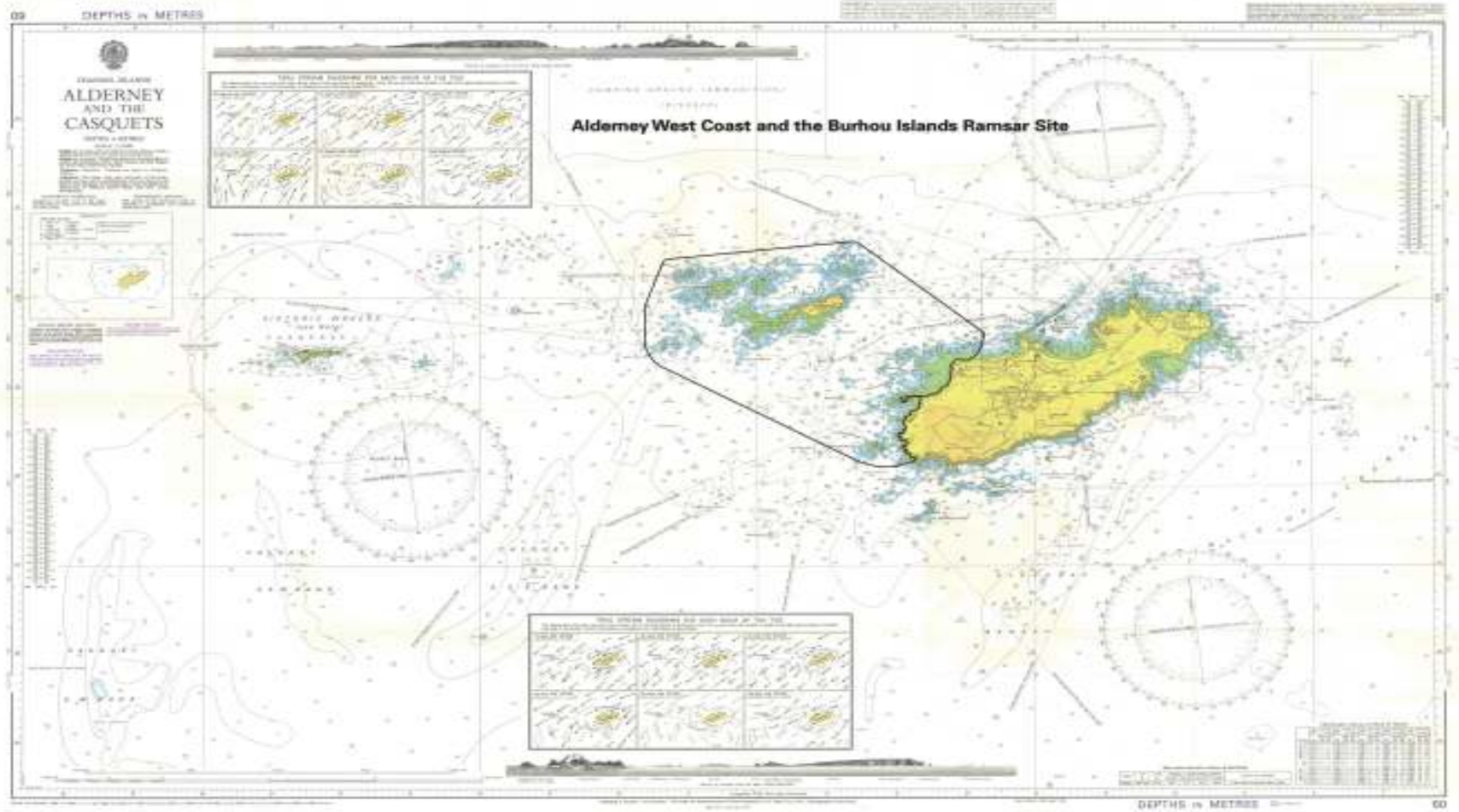
There is no domestic statutory nature conservation site system in Alderney, i.e., no SSSIs or equivalent, and therefore no legal protection in place. EU directives do not apply, and so no provision for SPA's or SAC's. The importance of the Island and its surrounding area is however demonstrated by two international recognitions: Ramsar (an inter-governmental agreement) and 'Important Bird Area' (a global scale assessment by an NGO network).

Alderney's Ramsar designation carries significant weight by its international recognition accepted by the States of Alderney and the UK Department of Constitutional Affairs. The designation is therefore a powerful tool to ensure the most important habitats and species of Alderney are protected for the long term. The extent of the designation is shown in Figure 1.

¹ SPA is a Special Protection Area, designated for internationally important bird populations and providing a high degree of legal protection to the birds and their habitats

² SAC is a Special Area of Conservation, designated for internationally important habitats and providing a high degree of protection

Figure 1 Map of the Alderney West Coast and the Burhou Islands Ramsar Site



- **Important Bird Areas**

Birdlife International, a global partnership of conservation organisations, has developed an Important Bird Areas (IBA) programme that aims to achieve protection for internationally important bird populations. Within the EU, IBAs can assist with the identification of Special Protection Areas. Sixty percent of Europe's IBAs have some sort of legal protection. Recognising the international importance of Alderney's gannet colonies, Les Etacs and Ortac are both IBAs (Heath and Evans (eds) 2000), and both are within the Ramsar site. The Alderney Ramsar designation therefore currently provides the key mechanism for protection of these IBAs.

- **Convention on Biological Diversity**

Biodiversity is the word that describes the wide range of plant, animal and microbial species and the varieties of individuals within each species.

Observations in different parts of the world throughout the 20th century indicate that biodiversity is being lost, (i.e. species are becoming extinct) at a rate that is faster than at any time since the final years of the Cretaceous period that saw the end of the dinosaurs. Whereas the high rate of extinction that occurred 70 million years ago was the result of natural (possibly astronomical) events, the changes occurring over the past century can be traced to the activities of humans. It is now appreciated that protecting biodiversity is a matter of human self-interest.

We rely on biological resources directly e.g. for food, fuel, construction materials, paper and medicines. Loss of biodiversity affects all these key resources by reducing the potential adaptability of the plant and animal organisms upon which they depend. Furthermore, it can have devastating and unpredictable effects by disturbing entire eco-systems with effects, we now know, on the world's climate.

Although it will require international collaboration to reverse the present rapid rate of extinctions, protecting relatively small areas such as the Ramsar site can make a significant contribution. From this perspective we see it is even more important to manage these sites wisely.

The Convention on Biological Diversity (CBD), triggered by the Earth Summit held in Rio in 1992, was the start of the Biodiversity Action Plan process in the UK and other participating countries. By 2000, 179 countries had signed up to taking appropriate measures to conserve biodiversity. The CBD is currently 'under consideration' within the bailiwick of Guernsey. The extension of CBD to Alderney is one of the Alderney Wildlife Trust's strategic aims for the next five years.

In the UK, the government has produced Action Plans for habitats and species of conservation concern. For example, *Coastal vegetated shingle* and *Maritime cliffs and slopes*, which are features of the Alderney Ramsar site, each have UK

Habitat Action Plans in recognition of their importance and vulnerability. The action plans have been designed to maximise knowledge of these habitats and set out actions to safeguard them for the future. The principles of these plans can be used to inform protection measures for these habitats in Alderney.

- **Convention on the Conservation of Migratory Species (Bonn Convention)**

The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) aims to conserve terrestrial, marine and avian migratory species throughout their range. It is an intergovernmental treaty, concluded under the aegis of the United Nations Environment Programme, concerned with the conservation of wildlife and habitats on a global scale. The CMS includes some direct conservation measures but it is particularly valuable in providing a framework for particular agreements; relevant current ones include:

- *Agreement on the conservation of cetaceans of the Black and Mediterranean Seas (ACCOBAMS).*
- *Agreement on the conservation of African- Eurasian migratory water-birds (AEWA).*

- **Alderney Bird Ordinance**

In Alderney, a specific statute exists for birds: The Protection of Wild Birds (Alderney) Ordinance 2005, the forerunners of which have been in place since 1950, subject to periodic review. This provides basic protection to most bird species. However, it allows for the control of “nuisance” species, such as gulls, creating a potential conflict of interest, as the gulls themselves are part of the Ramsar designation. This strategy should assist the States of Alderney in decisions concerning control of gulls.

2 The Alderney west coast and Burhou islands Ramsar site – interest features and their context

2.1 Habitats and Flora

The Ramsar Convention recognises a number of wetland types as criteria for designations. The following wetland habitat types are designated within the Alderney West Coast and Burhou Islands Ramsar site:

- **Permanent shallow marine waters (20% of site)**

See section 2.3 for species interests.

- **Marine subtidal aquatic beds (45% of marine area)** Seagrass beds are one of the 45 habitats with a Habitat Action Plan (appendix 2) as part of the UK BAP. Seagrasses (*Zostera spp*)(also known as eelgrass) are marine flowering plants found in shallow coastal habitats around the world. They most commonly occupy sandy intertidal and subtidal areas to a maximum depth of about 10 m. Seagrasses typically grow in monospecific stands called ‘beds’ or ‘meadows’. These beds create a habitat of considerable importance from an ecological, economic and biodiversity perspective.

The beds support a high density and diversity of associated flora and fauna, and provide valuable nursery and feeding grounds for fishes and birds. The binding of sediment by seagrass root networks also acts to stabilize the shoreline and reduce coastal erosion.

Three species of *Zostera* occur in Great Britain, and all are considered to be scarce. The shelter provided by seagrass beds makes them an important nursery for flatfish and cephalopods. Adult fish frequently seen in *Zostera* beds include pollack, two spotted-goby and various wrasse species.

- **Rocky marine shores (30% of site)**

Rocky shore habitats are common within the UK, and the majority of species belonging to them have extensive geographical ranges. In Alderney, Clonque bay supports a huge diversity of species, the flora representing an important net exporter of energy to both marine and terrestrial ecosystems. In 2004 over 100 different seaweed species were recorded at Clonque and Hannaine Bay (J. Salado, Pers. Comm.) including knotted wrack *Ascophyllum nodosum*, a brown seaweed identified by UKBAP as a species of conservation concern due to its specific habitat requirements and the fact that over 75% of the worlds population of this species occur in the UK. Another seaweed with unfavourable conservation status in Europe that is found at Clonque is *Halimenia latifolia* , which had undergone a 25-49% decline in range in Great Britain over the last 25 years. The huge diversity of seaweeds present provide important habitat for the marine fauna in the area.

- **Maritime Cliff and Slopes**

This UK BAP habitat (Habitat Action Plan, appendix 3) occurs on the coastal fringes within the Ramsar site area of mainland Alderney). The habitat comprises soft cliffs hosting many species of plant such as prostrate broom (*Cytisus scoparius subsp. maritimus*) and greater broomrape (*Orobanche rapum-genistae*). The cliffs also support breeding populations of fulmar, herring gull and puffin, and did once support a breeding population of kittiwake.

The stretch of Clonque Bay between Fort Tourgis and the Clonque causeway is the island's only known breeding-site of *Polyphaenis sericata*, the Guernsey Underwing moth, which is otherwise known from Guernsey and Jersey but has never been seen in in the UK. The larva feeds on honeysuckle, where this grows through clumps of bramble surrounded by bracken, apparently always within 100 metres of the shoreline. Clonque bay is an ideal site for this extremely rare species.

- **Sand, shingle and pebble shores (5% site)**

Coastal vegetated shingle is also UK BAP habitat, and therefore has its own Habitat Action Plan (appendix 4). This habitat type is globally restricted with few occurrences outside north-west Europe. Shingle beaches are widely distributed in the UK, where they develop in high energy environments.

In Alderney, it occurs in Clonque Bay and the western end of Platte Saline beach, on the edge of the Ramsar site, supporting vegetation such as sea kale *Crambe maritime* and sea beat *Beta vulgaris*. It also supports many bird species, particularly wintering populations of oystercatcher, curlew, little egret, turnstone and other wading birds. Platte Saline beach also supports Alderney's only breeding population of ringed plover.

2.2 Seabirds

The UK, Ireland, Isle of Man and the Channel islands support some of the most important breeding seabird populations in the north Atlantic. This includes most of the world's gannets, great skuas, Manx shearwaters and the *graellsii* subspecies of lesser black-backed gull. A series of seabird surveys covering these areas enables trends for most species to be well understood and for individual sites to be considered within an international, national and regional context. The most recent, Seabird 2000 (1998-2001), and its predecessors the Seabird Colony Register (1985-88) and Operation Seafarer (1969-70) are used here to provide context for Alderney's seabirds.

All seabirds breeding in and around Alderney (with the exception of great black-backed gull) are "amber" listed under the UK's Birds of Conservation Concern, in part due to the proportion of their global populations breeding in Britain (Gregory et al, 2002). Great black-backed gulls are not currently listed as being of conservation concern.

The seabird species breeding on each island, or mainland site in and around Alderney, are detailed in Appendix 1. Important seabird populations of Alderney's Ramsar site are given in Table 1 at the end of this section. Brief accounts of these most important species are given below and ordered according to their level of importance. Internationally important species are those where over 1% of the population of the biogeographic region is present within the Ramsar site. Nationally important species are those where over 1% of the UK population is present in the Ramsar site. Local (or Channel Islands) importance is where over 25% of the Channel Islands population occurs within the Ramsar site.

2.2.1 Internationally important species

Northern gannet

Gannets are the Ramsar site's (and in fact the Channel Islands') most important seabird because of the sheer size of the colonies. Supporting 2% of the world population, the islets of Ortac and Les Etacs are of global importance for this species.

Gannets first colonised Ortac in 1940 and steadily increased in number until by Seabird 2000 there were 5,950 pairs: 2,500 pairs on Ortac and 3,450 on Les Etacs. By 2005, this had increased further to 2,547 pairs on Ortac and 4,861 on Les Etacs, making a total of 7,408 pairs. Both colonies are now considered to be at full capacity (Sanders, 2005).

At the top of the food chain, gannets feed on medium sized fish prey such as mackerel and herring for which they plunge dive to depths of up to 20 metres. They can also surface feed on large quantities of sand eels, and will follow trawlers scavenging for discards. Satellite tracking has shown that gannets can travel huge distances to feed, for example, Bass Rock birds were recorded 540km from the colony (Hamer et al, 2001). Birds breeding off the Brittany coast were tracked feeding mostly within the English Channel (Gremilett *et al* (2006).

The most common cause of adult mortality, accounting for 34% of deaths, involves fishing gear, either entanglement in fishing nets or becoming caught on baited hooks. Their position at the top of the food chain also leaves gannets vulnerable to accumulation of pollutants in the food chain and like many other seabirds, to surface pollutants, especially oil (Mitchell et al, 2004).

Gannets in Alderney are one of the most southerly distributed colonies in their range. A recent study on the most southerly colony of gannets off the Brittany coast revealed that these gannets displayed a greater foraging effort than their British relatives, feeding mainly within the tidal front between Eastern and Western Channel water, North West of Guernsey. Using the data collected, Gremilett *et al* (2006) concluded that the gannets breeding in Les Sept Iles will

be more sensitive to alterations of their foraging conditions, which is a matter of concern as the area that the gannets feed is a heavily fished area and an oil spill hotspot. These concerns may also relate to Alderney's gannet populations.

2.2.2 Nationally important species

Lesser black-backed gull (sub species: *graellssii*)

Nationally important populations of the *graellssii* sub species of lesser black-backed gull occur on the Channel Islands. Seabird 2000 recorded 383 pairs of lesser black-backed gulls within the Ramsar site, mostly on Burhou, out of a Channel Islands total of 1,734 pairs. Between seabird 2000 and 2005, lesser black-backed gulls increased sharply to 1085 pairs on Burhou, indicating Burhou alone now supports a nationally important population of lesser black-backed gull (Soanes and Michel, 2005).

Across the UK, lesser black-backed gulls, like other large gulls, increased in number during the 20th century, taking advantage of edible rubbish from landfill sites, discards from fishing vessels and greater protection under UK wildlife law. However, since the 1990s, local declines are evident; culls and changes in the disposal of household waste and fish discards are thought to be the main reasons.

2.2.3 Locally important species

European storm petrel

Within the Channel Islands, storm petrels breed only on Burhou, nesting in the stone walls and in natural rock crevices. The Burhou population is small (60 AON (apparently occupied nest) recorded during Seabird 2000) and close to the southern edge of the breeding range of the species (Mitchell et al, 2004). In 2006, 90 occupied burrows were recorded (L. Soanes Pers. Comm.).

There is anecdotal evidence that storm petrels were common on Burhou in the 19th century, while population estimates in the late 1950s and early 1960s suggested the population was some 10,000 pairs (Sanders, 2005).

Storm petrels travel vast distances to forage on zooplankton, small fish and fishery discards, which they pick from the surface. The biggest threat to storm petrels is mammalian predators at their breeding sites. In the UK, all but two storm petrel colonies are free of mammalian predators (Mitchell et al, 2004). A priority for the conservation of this species (and all seabirds) is to maintain Burhou, and all other seabird islets, free of such predators in particular, rats.

Puffin

Within the Ramsar site puffins breed only on Burhou and at Hannaine Bay. This is one of few breeding sites at the southern edge of the species' breeding range. Maintaining a species' range is a nature conservation priority and often a greater challenge than conserving the core of a population.

Puffins have been recorded on Burhou since the early 20th century, with vast numbers (100,000 birds) reported by Lockley in 1948. Like other colonies in southern Britain, a sharp decline occurred in the 1950s and 1960s. Food availability and oil spills (e.g. Torrey Canyon in 1967) are thought to be behind the declines. Since 1980, the population on Burhou appears to have stabilised, with 120 breeding pairs recorded in 2005 (Danchin & Cordonnier, 1980; Soanes and Michel, 2005).

Puffins on Burhou are the subject of a detailed study to guide conservation measures for this and other seabird species on the island.

Table 1: Priority seabird populations within the Ramsar Site.

Species	Population within Channel Islands (Seabird 2000) AON	International Importance	National Importance	Local Importance	Population within the Ramsar site	% of CI population occurring in Ramsar site
Storm petrel	60			✓	60	100%
Gannet	5,950	✓			5,950	100%
Lesser black-backed gull	1,734		✓		383 (1999) 1085 (2005)**	22% >60%**
Puffin*	312			✓	203	65%

NB:

All figures are based on Seabird 2000 results and refer to Apparently Occupied Nests

* Population given as individuals

** Population of lesser black-backed gull has increased to over 1,000 pairs in the Ramsar site (Burhou) since Seabird 2000. It has therefore been included as a nationally important species (1% of UK population. = 882).

International Importance = at least 1% of biogeographic population

National Importance = at least 1% of UK population

Local importance = at least 25% of Channel Islands population

2.3 Non-avian Fauna

The intertidal rocky shore of Clonque Bay supports many rare species including the green ormer *Haliotis tuberculata*, a shellfish, which, within the British Isles, are found only in the Channel Islands.

Many rare marine species, which include a representative sample of north-west European fish fauna, are found in the marine area of the site. Although ormers are the most significant, there is also a high diversity of fish and shellfish, such as the squat lobster *Galathea squamifera* and the blue rayed limpet *Helicon pellucida*.

Grey seals are also present most of the year although breeding is unconfirmed. The seals are often seen basking on the Nannels and Renoquet rocks.

3 An overview of potential factors affecting Ramsar features around Alderney.

3.1 Developments and other commercial activities

Built developments or land reclamation for developments can also lead to the direct loss of important marine habitats and coastal features. Gravel extraction occurs on the edge of the Ramsar site at Platte Saline beach, where ringed plovers breed. Physical disturbances such as dredging, or use of demersal fishing gear can also harm marine habitats like seagrass beds.

Kittiwakes bred in Alderney for much of the 20th century. Construction work on cliffs above the colony at Quatre Vents is considered to be a factor which may have caused the desertion of that site by kittiwakes in 1998 (Sanders 2004). Should kittiwakes attempt to breed again, protection will be important.

Within the next five years, Alderney could become a test site for tidal power devices. Depending on the location and type of device, this could potentially have a detrimental impact on the habitats and species within and around the Ramsar site. These impacts could occur in a number of ways either as direct impacts such as diving bird strikes, or indirect impacts caused by the use of heavy machinery and large vessels to install the devices. This could potentially increase the risk of pollution from oil leakage. Once installed, devices may have more subtle negative impacts on the surrounding environment by altering the tidal flow and the movement of currents sufficiently to change the sediment movement and ecology of this system. This is potentially the most important change in use of the Ramsar site since its designation and must be a top priority for ensuring “wise use” of the site. Environmental baseline surveys are being conducted by the operator currently and will continue until 2007. These surveys record bird and marine mammal activity around the seas of Alderney. The tidal power operator is also likely to have to carry out benthic and tidal flow surveys as part of the environmental survey.

In the UK a Strategic Environmental Assessment (SEA) is required for all offshore plans or programmes such as oil and gas developments and also for offshore renewable plans and programs under the EU Directive 2001/42/EC. Entec UK (the environmental consultants hired by Alderney Commission for Renewable Energy (ACRE)) have recommended to ACRE that an SEA should take place in Alderney’s waters. The defined objective of an SEA is ‘*to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development*’. This management plan would support and encourage the development of an SEA.

3.2 Habitat change

Habitat degradation has the potential to detrimentally affect all habitats within the Ramsar site, typically through the introduction of invasive species, or through changes in use or management practices.

On Burhou, there have been concerns that vegetation change, particularly bracken, was reducing the availability of nesting space for puffins (Sanders, 2005). Sea campion has also been discussed as a cause for concern, however there is no evidence that native species such as sea campion should prevent puffins from nesting.

More seriously, hottentot fig *Carpobrotus edulis* has colonised much of Alderney's coastline and was recorded on Burhou for the first time in 2006. This species is not native to the British Isles, originating from the South African Cape and was introduced into Britain in the 1800s. It is increasing in natural places, especially in coastal locations of Devon and Cornwall where it can form dense stands and out compete native species. It often grows in inaccessible locations making removal very difficult and can fix salts into the soil leaving it unsuitable for other native species (website: introduced-species.co.uk)

Where ever possible, invasive species should be removed from 'natural' systems to prevent damage to the ecosystem.

3.3 Human disturbance

Worldwide, human disturbance and exploitation has damaging impacts on seabirds and their habitats. In many cases, at breeding sites, such negative impacts can be ameliorated through appropriate access management and guidance to walkers and other site users.

Seabirds on small islets within and around the Ramsar site are generally safe from disturbance, while those on accessible islands and mainland Alderney are perhaps more vulnerable. On the edge of the Ramsar site, Platte Saline Bay beach on mainland Alderney is the only breeding site supporting ringed plover. Nesting on a beach regularly used by walkers, dog owners and gravel extraction, ringed plovers are vulnerable to nest trampling and excess disturbance. Similarly, outside the boundaries of the Ramsar site, but important to consider in this context, common terns breed at Haumet Des Pies and Corbletts Point, both of which are connected at low tide to the Alderney mainland.

Inappropriate recreational use can also have detrimental impacts on sensitive marine habitats, in particular vegetated shingle banks and maritime cliffs and slopes which support sensitive plant species. Collapse of puffin and storm petrel burrows on Burhou is also a potential consequence of unmanaged recreational use of the island.

3.4 Pollution

All seabirds and marine habitats rely on a pollution-free environment. Seabirds are especially vulnerable to oil pollution, and major incidents can have serious impacts on seabird populations. The wreck of the Torrey Canyon in 1967, in which 119,000 tonnes of crude oil was spilt into the sea off Cornwall, caused the deaths of 25,000 seabirds along the English coast. The type, level and speed of response to these incidents affect the extent of environmental damage.

Far more regularly, small oiling incidents also occur, in particular from tank washings. These often pass unnoticed, but cause seabird mortalities that should be easily avoided. Alderney's emergency planning for oil spill incidents should include an assessment of the environmental impacts.

Seabirds and marine habitats are also vulnerable to other pollutants such as heavy metals and other industrial chemicals. Alderney's sewage is discharged into the sea with minimum filtration, and while not directly discharged into the Ramsar site, it is carried into it by the current. The effects of this pollution may have consequences in the future, particularly if sewage outfall increases following a predicted growing population and the opening of two new large hotels.

3.5 Climate change

Global warming is having a measurable effect on sea temperatures, and has already increased sea surface temperatures by 0.5 °C per decade since 1980 (FRS, 2003). Temperature change affects plankton species and consequently, all trophic levels of the food chain. In general terms, a pole-ward shift in species distribution is predicted, with impacts most evident at the southern limits of a species' range.

In Alderney, puffins are at the southern edge of their breeding range, so such predictions indicate a possible demise in the puffin population. Despite this, maintaining optimal habitat conditions for puffins will ensure their presence on Burhou for as long as sea temperatures remain suitable. Gannets in Alderney are also at the southern edge of their breeding range but their foraging habits and prey species may help buffer them from changes, at least in the short term. Future monitoring will be important to detect any negative changes in the breeding success of the colony.

Research has revealed that southern warm water species on rocky shores in the UK have increased in abundance and range with rising sea temperatures (for example the purple acorn barnacle has extended its range by 170km since the mid 1980's), whilst northern, cold water species (for example the common tortoiseshell limpet) have decreased in abundance (Marine Biological Association 2006). Little information exists on the changing distribution of Alderney's non-avian species.

3.6 Seabird specific factors

3.6.1 Introduced mammalian predators

Introduced (or alien) predators, most often mammalian, have been demonstrated to have significant negative impacts on breeding seabirds throughout the world. The most harmful of these are the domestic cat (*Felis catus*), brown rat (*Rattus norvegicus*) and black or ship rat (*Rattus rattus*) (Burger and Gochfeld 1994). The exact interactions of seabirds with introduced mammals is not always fully understood because of the long period that elapses between introduction and scientific study. However, it is safe to assume that cats tend to have the most rapid impacts because of predation of adults, whereas rats tend to slowly reduce populations by depressing productivity.

Within and around the Ramsar site, Burhou, Les Etacs, Ortac, Renonquet reef and Coque Lihou are believed to be free from mammalian predators. In contrast, mainland Alderney and small islets connected to Alderney at low tide, have populations of brown rats (see appendix 1). Black rats have also been recorded on occasions but there are few records and their current status is unknown. For the long term conservation of seabird populations on islands, ensuring key sites remain rat-free must be a priority.

3.6.2 Native avian predators

A number of naturally occurring avian predators occur within the Ramsar site, including large gulls, peregrines and corvids, such as carrion crows, ravens and jackdaws.

The large gulls and carrion crow are the only avian predators that may take seabirds in significant numbers. However, as the gulls are of key value to the Ramsar site, especially lesser black-backed gulls, control of gulls should only be considered in extreme situations. In all cases, prior to the control of any native avian species, adequate research is required so that any course of action is evidence based.

Within the Ramsar site, local concerns that increasing gull numbers were causing the demise of the puffins on Burhou, almost triggered an indiscriminate gull cull without this evidence. Subsequently, research has shown that predation of puffins by a small number of great black-backed gulls could be significant, based on national figures. It also showed that high densities of nesting lesser black-backed and herring gulls in and around the puffins, could be sufficient to depress recruitment of young puffins back into the colony, based on studies elsewhere. This evidence has allowed for targeted management to provide the puffins with a gull free nesting area using non-lethal methods, as well as removal of great black-backed gulls specialising in puffin predation (Soanes and Michel 2005).

Evidence from other seabird colonies indicates that the impact of naturally occurring predators on breeding seabirds tends to be small compared to the major predation events associated with the introduction of mammalian predators (Newton and Crowe 2000).

3.6.3 Food availability

Prey species and foraging behaviour varies amongst seabirds and the availability of food is key to adult survival and the success of chick growth. The level and type of fishing effort and other exploitation of waters around Alderney, such as the development of tidal power technology, could potentially impact on seabird breeding success and adult survival.

In 2004, Alderney had four full time fishing boats and two part time registered boats, all of which focus their catch on crab and lobster. The island is visited regularly by charter fishing/angling boats, which mainly catch bass, pollack, ray, bream and mullet (Alderney Fisheries Statistics, 2005). In 2006, a small trawler vessel was also registered to fish within Alderney's waters, however, the activities of unregistered boats are currently unquantified. Most seabirds travel tens of kilometres to feed, so far beyond the limits of the Ramsar site and Alderney's fishing activity. Hence food availability is not currently a key issue for this strategy.

4 Review of management and monitoring in and around the Ramsar site

4.1 Marine habitats

There has been no previous systematic monitoring of marine habitats in and around Alderney.

4.2 Seabird management

In and around Alderney, conservation management for seabirds has focussed on the puffin colony on Burhou. For decades, great black-backed gull eggs have been removed from this island, although the exact date this activity commenced is unknown. The Burhou warden has removed the eggs under licence from the States of Alderney since 1996, preventing breeding every year between then and 2004 (and for many years before). No eggs were collected in 2005, although this activity has since resumed. The aim has been to reduce predation of the puffin colony. However, this management has not prevented predation of puffins, and may have serious consequences for Burhou's great black-backed gull population once the aged birds die.

Since 2005, the Burhou Project has been established, which has studied the interactions between puffins and gulls and is implementing a targeted programme of management aimed at conserving both puffin and gull populations (Soanes and Michel, 2005).

The States of Alderney allows visitor access to Burhou between July 27th and March 15th, using facilities maintained by the Burhou warden. This avoids the main seabird breeding season although some juvenile puffins may not fledge until the end of July and storm petrels will still be breeding until late September/October. An information leaflet and Code of Practice for visitors has been prepared by the States of Alderney, Alderney Wildlife Trust and RSPB, to reduce disturbance and habitat damage as much as possible.

Until 2006, very little targeted habitat management had been carried out on Burhou, except for bracken control, which the States of Alderney carried out in 2000 using herbicide. In 2006, as part of the project to discourage gulls from nesting close to the puffins, targeted bracken control has been undertaken and is planned to continue in the long term. Hottentot fig was also discovered in 2006 and consequently removed.

4.1.1 Seabird ringing

Seabirds have been part of a ringing programme for the Guernsey based Channel Island Ringers for a number of years. This work includes the ringing of gannet chicks on both Ortac and Les Etacs every year, gulls on Burhou every year, auks until this practice was banned in the 1980s and storm petrels every year. Until 2005, storm petrels were attracted to mist nets by a taped call, but

this method was deemed ineffective in determining population size and was replaced in 2005 and 2006 by tape play back methodology. Since 2004 more scientific purpose has been given to the ringing of storm petrels including the abandonment of the use of tape lures.

Shags and cormorants on Burhou and Coque Lihou were ringed again in 2006 after a break of almost 15 years.

4.3 Non-avian species

Baseline data on marine alga and invertebrates have been recorded in both Clonque and Hannaine Bays (J. Salado Pers. Comm.). No other specifically designed monitoring studies have taken place on non-avian fauna.

5. Ramsar Site monitoring and management strategy

Understanding the condition of the Ramsar site and the factors that influence the condition of its various components is key to developing conservation actions and a strategy for sustainable use. This section addresses the monitoring and current management needs of the key species and habitats in and around the Ramsar site.

5.1 Monitoring of non-avian Ramsar interest features

Marine Sub-tidal Aquatic Beds

The subtidal areas of the Ramsar site should be surveyed and biotypes mapped. Development of a monitoring programme in conjunction with the JNCC/Marine Conservation Society SeaSearch programme should be instigated to gather baseline species data within this habitat and establish future monitoring.

Rocky Shores

It is proposed to complete a Phase I habitat survey and Phase II species survey, initially targeting the accessible areas of Clonque and Hannaine Bay. The diversity of shore fauna and flora should then be monitored every 5 years using methods described by the JNCC in the Marine Monitoring Handbook.

Grey Seals

It is proposed that grey seal numbers (including number of each sex) are monitored every 5 years and breeding status be determined.

5.2 Seabird Monitoring

Future seabird monitoring within the Ramsar site should be designed to:

- Monitor the population levels and trends of key species within the Ramsar site. This will include productivity monitoring of certain species.
- Contribute to the UK's monitoring effort and database on seabirds and breeding success, as co-ordinated by JNCC.
- Monitor the total breeding assemblage of seabirds and assess the numbers against those at the time of Ramsar designation (Seabird 2000).

Proposals for key species are given below and a table detailing the monitoring strategy for each seabird site is given in table 2, part 1.

Storm petrel

The first reliable assessment of population was the Seabird 2000 census. No information exists on productivity.

It is proposed to establish some artificial nest sites on Burhou to facilitate monitoring of productivity on a regular basis and provide additional nest sites on the island.

Ringed studies can also play a useful role in determining population size and annual survival rates of storm petrels on Burhou. These studies should be carried out at the beginning of June, which is the optimum time to trap breeding adults before non-breeders return to the colony. A sample of the birds ringed should also have their body mass index recorded.

Comparisons of estimated population size from tape playback census and ringing estimates will also be made to determine the most effective census method.

Puffin

Historical population estimates for puffin have been reported since the early 20th century (Sanders, 2005). Puffins are relatively well understood, monitored through the national seabird surveys and since 2005, as part of the Burhou project which includes an assessment of productivity.

It is proposed that puffin monitoring continues annually as part of the Burhou project, including an assessment of population, distribution and productivity.

Puffins at Hannaine Bay should be monitored every 5 years.

Gannet

The gannet population is well monitored, as part of the national surveys and also through interim surveys by local enthusiasts.

It is proposed that the gannet populations are monitored every 5 years and that productivity studies from a sample of nests are undertaken annually.

Adult survival in gannets is poorly understood, and so presents an opportunity for Alderney to contribute to this knowledge, using ringing data. This would involve a change of emphasis from the current ringing programme.

Gulls

Herring gull, lesser and great black-backed gulls are monitored as part of the national surveys and Burhou's gulls are monitored as part of the Burhou project.

It is proposed that gulls on Burhou continue to be monitored as part of the Burhou project, involving annual population and distribution assessments. Gull monitoring is especially important on Burhou to ensure that management to protect puffins does not adversely impact on the gull populations.

Common tern

Mainland Alderney has a small common tern population, monitored as part of the national surveys and also by local enthusiasts. Productivity is reported to be poor (Sanders, 2005), but the reasons are poorly understood and speculative.

Because of the fragility of this population, it is proposed that the common terns are monitored more closely to understand the reasons for breeding failures and allow mitigation measures to be put in place.

Other birds

Table 2 in outlines monitoring requirements for all other seabirds and associated bird species within and around the Ramsar site.

5.3 Ramsar Site management plan

Management within the Ramsar site must address the factors outlined in section 3 above and must be regularly reviewed to respond to the outcomes of the monitoring programme. The management plan detailed in *table 2* sets out a programme of monitoring and actions over a 5 year period, but in the context of a longer term strategy.

Table 2: Ramsar monitoring and action plan
Part 1: Seabirds

Site	Importance for seabirds	Seabird Monitoring plan	Seabird Action plan	Priority for action	Who?
Les Etacs	High	<ul style="list-style-type: none"> Population census every 5 years, next census recommended 2010. Productivity monitoring of a sample of nests in 2007 then annually for five years 	<ul style="list-style-type: none"> Determine adult survival rates and report to UK biologists 	Medium	AWT and volunteers Channel Island ringing group
Ortac	High	<ul style="list-style-type: none"> Population census every 5 years next census recommended 2010. 		Medium	AWT and volunteers
Burhou	High	<ul style="list-style-type: none"> Annual monitoring of puffin numbers, distribution and productivity through Burhou project Monitor storm petrel breeding success annually (through Burhou project) and if possible, also shag, cormorant, and herring gull 	<ul style="list-style-type: none"> Implementation of Burhou Project with annual review Visitor management and awareness raising to protect puffin and storm petrel nest sites Establish artificial nest sites for storm petrel to facilitate productivity assessments. Determine adult survival rates for storm petrels. Compare population monitoring techniques, tape playback and ringing 	High Ongoing	AWT and Burhou Steering Group Channel Island Ringing Group AWT and Channel Island Ringing Group
Hannaine Bay	Medium	<ul style="list-style-type: none"> Census of breeding puffins and assessment of productivity in 2007. 		High	Organised by AWT carried out by suitable volunteers
Coque Lihou	Medium	<ul style="list-style-type: none"> Monitor populations of guillemot, razorbill, cormorant and shag every 5 years 	<ul style="list-style-type: none"> Assessments for rats Feasibility study for rat eradication and implement 	High	Organised by A WT carried out by suitable volunteers

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Corbletts Point	Medium	<ul style="list-style-type: none"> Annual population and productivity of common terns 	<ul style="list-style-type: none"> Assessments for rats Feasibility study for rat control and implement as necessary. Awareness raising to reduce disturbance 	Medium	Organised by AWT carried out by suitable volunteers
Houmet des Pies	Medium	<ul style="list-style-type: none"> Annual population and productivity of common terns 	<ul style="list-style-type: none"> Assessments for rats Feasibility study for rat control and implement as necessary. Awareness raising to reduce disturbance to breeding birds 	Medium	Organised by AWT carried out by suitable volunteers
The Casquets	Unknown	<ul style="list-style-type: none"> Initial assessment to determine numbers and species of breeding seabirds in 2007 	<ul style="list-style-type: none"> Bring into national monitoring programmes Assessment for rats 	Medium	Organised by AWT carried out by suitable volunteers
Renonquet	Low	<ul style="list-style-type: none"> Monitoring through national surveys only, approximately every 15 years 		Low	Organised by AWT carried out by suitable volunteers
The Nannels	Low	<ul style="list-style-type: none"> Monitoring through national surveys only, approximately every 15 years 		Low	Organised by AWT carried out by suitable volunteers
Platte Saline	Med	<ul style="list-style-type: none"> Annual population and productivity monitoring of ringed plover 	<ul style="list-style-type: none"> Protect breeding sites including demarcation of ringed plover breeding sites and visitor awareness Awareness raising to reduce disturbance to breeding birds 	High	Organised by AWT. Survey carried out by suitable volunteers and awareness raising by AWT
Trois Vaux – Hannaine Bay Cliffs	Med	<ul style="list-style-type: none"> Monitor fulmar populations every 5 years beginning in 2007 Determine productivity in 2007 		Med	Organised by Alderney Wildlife Trust. Survey carried out by suitable volunteers

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Part 2: Marine habitats and non-avian fauna

High priority = instigate in year 1; medium priority = instigate by year 3; low priority = no timescale

Site	Conservation Importance	Monitoring Plan	Action plan	Priority for action	Who?
Clonque Bay	High	<ul style="list-style-type: none"> Survey of intertidal biotypes every 5 years 	<ul style="list-style-type: none"> Monitor every 5 years, but more if environmental change occurs eg. Tidal power device is deployed/oil spill 	Medium	Organised by Ramsar Managers carried out by suitable volunteers
Renoquet and Nanales	Med	<ul style="list-style-type: none"> Census of grey seal population in 2007 Determine breeding status 		High	Organised by Ramsar Managers carried out by suitable volunteers
Ramsar waters	High	<ul style="list-style-type: none"> Detailed monitoring of tidal power installations. (To include tidal flows, sediment movements and distribution and abundance of marine habitats and species.) Surveys of sub-tidal areas 	<ul style="list-style-type: none"> Ensure close communication between tidal power company and Ramsar Managers to guide use of the Ramsar site and surrounding waters Work within the Marine Conservation Societies SEASEARCH program 	High	Ramsar Managers and tidal power company
Alderney coast	Medium		<ul style="list-style-type: none"> Hottentot fig. Feasibility study for eradication or control? 	Med	AWT
Ramsar waters	High		<ul style="list-style-type: none"> Review Oil Spill Action Plan in light of Ramsar designation and interest features. Develop programme for recording oiled seabirds and other marine life (if not already in existence). 	High	Ramsar Managers and Harbour Office
			<ul style="list-style-type: none"> Review the impact of raw sewage disposal within the Ramsar site 	Med	AWT and States of Alderney
Platte Saline			<ul style="list-style-type: none"> Review the proposal from the States of increased gravel extraction 	High	AWT

6 Education and public relations

A key objective of this management plan is to promote the importance and wise use of Alderney's Ramsar site to the public. In 2006 the Alderney Wildlife Trust installed two Ramsar information boards at prominent sites on Alderney's coastline. To further increase public awareness and support it is proposed that Ramsar information leaflets are produced within the next two years and that public displays / press releases should be organised annually to coincide with national events such as 'World Wetland Day' and the anniversary of Alderney's site designation.

It is important that the current programme of guided walks and boat trips led by the Alderney Wildlife Trust should continue to promote and raise awareness of the features of the Ramsar site. Chartered boats that operate around Island tours should be given appropriate information on the Ramsar site so that they too can publicise its importance.

Events / publicity particularly aimed at children should take place at least annually, including organised events such as 'rock pooling' and 'snorkelling' (however consideration should be given to the potential detrimental effects of these activities on the environment). The Alderney Wildlife Trust should aim to give presentations / talks to classes and to act as advisors on related school research projects. University's which offer courses related to biology or marine biology should be contacted to offer their students working placements to carry out research on aspects of the Ramsar site.

It has been suggested that a 'gannet cam' could be installed which will be able to relay live shots of Les Etacs back to a computer station in the Alderney Information Centre. This would be beneficial to the tourism of the island and also for raising awareness among the local population, in particular school children. The RSPB have already scoped this project, however for the project to develop private sponsorship will be required.

7 Costs and resource requirements

The objectives and actions proposed in this report will not be possible without adequate funding and/or sponsorship. Expected costs for developing and acting upon the plan will include; educational resources (such as Ramsar leaflets, poster displays), staff wages, staff training, project materials, boat hire costs, production of reports, flight and accommodation costs for professionals to advise on the project. Priorities have been assigned to assist resource allocation. The continued financial support for the important Burhou project is currently the highest priority for funding of seabird work within the Ramsar site.

The costs associated with each of the key actions presented in chapter 5 are detailed in appendix 5.

8 Project management

This management strategy document proposes that the Alderney Wildlife Trust and the RSPB manage the agreed strategy on behalf of the States of Alderney, drawing upon a range of scientific expertise where necessary.

The following group of individuals have been consulted and have agreed to make themselves available to assist with this project:

Louise Soanes/Roland Gauvain (AWT), Helen Booker/Norman Ratcliffe/Mark Bolton (RSPB), Mark Atkinson (County bird recorder & Alderney Ornithological Group), Jamie Hooper (La Société Guernesiaise), Jennie Page (local botanist) and Juan Salado (Marine officer AWT). Paul Veron (Channel Island bird ringer), Dr Charles David (President La Société Guernesiaise). Bridget Ozanne (Guernsey Biological Records Centre), Dr Phil Atkinson (BTO), Professor Charles Michel.

Other scientific expertise will be invited to participate as and when necessary.

The Ramsar Managers will also advise the States with regard the issuing of licences for those individuals/groups who apply to the States to carry out any research or management work on both Alderney's Ramsar site and Alderney's seabird populations. However, the responsibility for granting the licence will remain with the States of Alderney. This will ensure the strategy's objectives are adhered to and any environmental management or other work within the areas identified in the management strategy is carried out appropriately. Work carried out under the licences referred to above should be monitored and supervised by the Ramsar Managers. This would include co-ordinating access to seabird islands once the States have granted a licence.

It is recommended that all licenses and permissions for access to and landing on the Ramsar islets are authorised and coordinated by one officer of the States. In the first instance, we believe that this should be the Chief Executive. This should ensure that any work that is carried out on these sites is undertaken as part of the Ramsar five year management plan. Requests for access to any islets for scientific or management reasons other than those stated in this plan should be reviewed by the Ramsar Managers before the States grant a licence for access.

Delivery against the plan should be reported by the Ramsar Managers annually and any issues arising will be discussed with the States with recommendations with regard to any corrective action which needs to be taken.

9 Strategy review

Progress against the work will be reviewed annually, and the work programme partnership arrangements and funding agreed for the coming year. A programme of annual meetings is recommended between the States and the Ramsar Managers.

A full review of the strategy and progress against actions should take place in 2011.

10 Acknowledgements

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Appendix 1

Seabird occupancy in Alderney and vulnerability to rat predation

<i>Island/site Name</i>	<i>In Ramsar Site</i>	<i>Connected to mainland?</i>	<i>Rats present?</i>	<i>Species Present</i>	<i>Populations (Seabird 2000)</i>	<i>Importance for birds</i>
Les Etacs	Yes	No	No	Gannet Guillemot	3,450	High
Ortac	Yes	No	No	Gannet Razorbill Guillemot	2,500 16 individuals	High
Burhou	Yes	No	No	Puffin Storm petrel Herring gull Lesser black-backed gull Shag Great black-backed gull. <i>Shelduck</i>	180 60 125 313 18 (1987) 27 2	High
Hannaine Bay	Yes	Yes (low tide)	Unknown	Puffin Great black-backed gull Herring gull	24 (1987) 1 18	Medium
Renoquet	Yes	No	No	Cormorant Shag Great black backed gull		Low
The Nannels	Yes	No	No	Great black-backed gull		Low
Sister Rocks	Yes	Yes at low tide	Unknown	Herring gull Lesser black-backed gull Razorbill Guillemot	64 6 ? 5 9	Low
Trois Vaux Bay- Hannaine Bay	Yes	Mainland	Yes	Fulmar	45	Medium
Fourquie	No	Yes at low tide	Unknown	<i>Peregrine</i>		Low
Coque Lihou	No	No	No	Guillemot Razorbill	20 individuals 46 individuals (1987)	High

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				Fulmar Herring gull Shag Cormorant Great black- backed gull	47	
South Cliffs	No	Mainland	Yes	Fulmar	9	Low
L'Etac de la Quoire	No	Yes at low tide	Unknown	Herring gull		Low
Queslingue	No	Yes	Unknown	Great black-backed gull		Low
Ile de Fort Raz	No	Yes – low tide	Yes	<i>Oystercatcher</i>		Low
Corbletts Point	No	Yes (at low tide) – mainland?	Yes	Common tern	25 individuals	High
Haumet des Pies	No	Yes (at low tide)	Yes	Common tern		High
The Casquets	No	No	Unknown	Shag Lesser black-backed gull	5 (1987)	Unknown
Platte Saline	Yes	Yes	Yes	<i>Ringed Plover</i>		High

Waders, water birds and raptors in italics

Appendix 2 Seagrass beds UK Habitat Action Plan

Current Status

Physical and biological status

Seagrass beds develop in intertidal and shallow subtidal areas on sands and muds. They may be found in marine inlets and bays but also in other areas, such as lagoons and channels, which are sheltered from significant wave action.

Three species of *Zostera* occur in the UK, and all are considered to be scarce (present in 16-100 ten km squares). Dwarf eelgrass *Zostera noltii* is found highest on the shore, often adjacent to lower saltmarsh communities, narrow-leaved eelgrass *Zostera angustifolia* on the mid to lower shore and eelgrass *Zostera marina* predominantly in the sublittoral. The plants stabilise the substratum, are an important source of organic matter, and provide shelter and a surface for attachment by other species. Eelgrass is an important source of food for wildfowl, particularly brent goose and widgeon which feed on intertidal beds. Where this habitat is well developed the leaves of eelgrass plants may be colonised by diatoms and algae such as *Enteromorpha* spp, *Cladophora rectangularis*, *Rhodophysema georgii*, *Ceramium rubrum*, stalked jellyfish and anemones. The soft sediment infauna may include amphipods, polychaete worms, bivalves and echinoderms. The shelter provided by seagrass beds makes them important nursery areas for flatfish and, in some areas, for cephalopods. Adult fish frequently seen in *Zostera* beds include pollack, two-spotted goby and various wrasse. Two species of pipefish, *Entelurus aequoraeus* and *Syngnathus typhie* are almost totally restricted to seagrass beds while the red algae *Polysiphonia harveyi* which has only recently been recorded from the British Isles is often associated with eelgrass beds.

Five different community types have been identified for seagrass beds from the southern North Sea and the Channel and 16 microhabitats including the seagrass itself, sessile epifauna, infauna and free swimming animals not confined to a special part of the community. The diversity of species will depend on environmental factors such as salinity and tidal exposure and the density of microhabitats, but it is potentially highest in the perennial fully marine subtidal communities and may be lowest in intertidal, estuarine, annual beds.

The Cromarty Firth supports what is most probably the largest total area of dwarf eelgrass and narrow leaved eelgrass in Britain (approximately 1200 ha) while the Maplin Sands is estimated to be the largest surviving continuous population of dwarf eelgrass in Europe (covering around 325 ha). The Fleet has the most extensive population of all three *Zostera* species in Britain. Other important sites are the Exe Estuary, Maplin Sands, the Solents marshes and the Isles of Scilly, Morfa Nefyn, Milford Haven, the Moray Firth, Carlingford Lough, Dundrum Bay, Strangford Lough and Lough Foyle.

Links with other action plans

Reference should be made to the habitat action plans for [saline lagoons](#), [saltmarsh](#) and [mudflats](#).

Current factors affecting the habitat

Disease. A wasting disease was responsible for die-back of large areas of seagrass in the UK in the 1930s. The fungus and slime mould which colonised the weakened seagrass have recently reappeared in seagrass beds around the Isles of Scilly.

Natural cycles . The extent of seagrass beds may change as a result of natural factors such as severe storms, exposure to air, and freshwater pulses. Grazing by wildfowl can have a dramatic seasonal effect with more than 60% reduction in leaf cover reported from some sites. Warm sea temperatures coupled with low level of sunlight may cause significant stress and die back of seagrass.

Physical disturbance, for example by trampling, dredging, and use of mobile bottom fishing gear, land claim and adjacent coastal development through the construction of sea defences and potential for changes in the hydrological regime.

Introduction of, and competition from, alien species such as *Spartina anglica* and *Sargassum muticum*

Increased turbidity reducing photosynthesis.

Nutrient enrichment , at low levels, may increase production in *Zostera* while high nitrate concentrations have been implicated in the decline of mature *Z. marina* Phytoplankton blooms, resulting from nutrient enrichment, have been shown to reduce biomass and depth penetration of eelgrass. Eutrophication can also result in a shift to phytoplankton epiphyte or macroalgal dominance.

Marine pollution. Eelgrass is known to accumulate Tributyl, tin and possibly other metals and organic pollutants. Several heavy metals and organic substances have been shown to reduce nitrogen fixation which may affect the viability of the plant, particularly in nutrient poor conditions. Accumulated pollutants may become concentrated through food chains.

Current Action

Legal status

Areas of seagrass are included in some coastal ASSIs/SSSIs, Ramsar sites, SPAs (under the EC Birds Directive) and voluntary marine protected areas. Two out of the three UK Marine Nature Reserves have seagrass beds and the habitat occurs in a number of areas proposed as SACs under the EC Habitats Directive.

Management, research and guidance

Information on the distribution of seagrass beds is being collected as part of the JNCC Marine Nature Conservation Review.

Seagrass beds around the Isles of Scilly were monitored for several years in the late 1980s by the Nature Conservancy Council and have been re-surveyed by volunteers. This work is on-going.

In Milford Haven, re-mapping of the location, extent and density of narrow-leaved eelgrass was completed by the Pembrokeshire National Park, as part of a rolling programme of research and monitoring administered by the Milford Haven

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Waterway Environment Monitoring Steering Group. Repeat surveys of eelgrass in Milford Haven are likely to be the next focus for attention. Eelgrass in North Haven, Skomer, is monitored on a regular basis as part of the Marine Nature Reserve work programme. This work has been given an extra focus by the events surrounding the Sea Empress oil spill in 1996.

In Northern Ireland research, part funded by the Department of Agriculture (NI), has examined the utilisation of seagrass by wildfowl in Strangford Lough. There have also been investigations by the Department of the Environment (NI) into methods of controlling *Spartina*, which in some situations is encroaching onto seagrass beds. *Spartina* control in Strangford Lough using the herbicide Dalapon was resumed in 1997.

A report on the status of eelgrass in Scotland was published in 1993 covering latest information on taxonomy and systematics, distribution, threats and suggestions for further work.

A major review of the key conservation, management and monitoring requirements of the genus *Zostera* in the UK was completed in 1997 on behalf of EHS.

A two year research project at the Royal Botanic Gardens, Kew, to improve understanding of seagrass seed biology and conserve eelgrass in the seed bank, has also been completed.

A baseline study of the mudflats (including detailed *Zostera* work) at the north end of Strangford Lough has been completed ahead of a major up-grade of the sea wall in the area.

Action plan objectives and targets

Maintain extent and distribution of seagrass beds in UK waters.

Assess feasibility of restoration of damaged or degraded seagrass beds. Until surveys assess the extent of the seagrass resource, it will not be possible to assess whether restoration is necessary, or to specify a final target. An interim target of 1,000 ha has been costed.

Proposed actions with lead agencies

Policy and legislation

When the Annexes of the Habitats Directive are reviewed by the EC, consider proposing inclusion of *Zostera* as appropriate. (ACTION: DETR, JNCC)

Ensure that development schemes, dredging operations and fishing activities do not affect the integrity or the conservation interest of intertidal and subtidal seagrass beds. (ACTION: CEC, LAs, MAFF, Ports/harbour authorities, SE)

Explore options for using statutory measures, aside from those specifically designed for nature conservation, to protect seagrass beds. Particular consideration should be given to fisheries legislation and port and harbour regulations. (ACTION: CCW, DoE(NI), EN, SNH)

Site safeguard and management

Determine the extent and quality of the seagrass resource which falls within protected areas and notify further sites, if required, to fill significant gaps. In particular, ensure that there is adequate representation of the full range of variation in seagrass communities found around the UK in the network of protected areas. (ACTION: CCW, EHS, EN, SNH)

Identify seagrass beds of particular significance as nursery grounds for fish and ensure these are covered by the protected areas network. (ACTION: CCW, DANI, EHS, EN, MAFF, SE, SFCs, SNH)

Identify suitable sites for reintroduction or restoration of seagrass and draw up a strategy to enable the target to be met. (ACTION: CCW, EHS, EN, SNH)

Seek to control high nutrient loads from agricultural sources that are adversely affecting, or could affect, important areas of seagrass through the designation of nitrate vulnerable zones, where the water body is affected by eutrophication (as defined in the EC Nitrate Directive). (ACTION: DANI, MAFF, NAW, SE)

Take account of the conservation requirements for seagrass beds in the development and implementation of coastal zone management plans and ensure that they are not managed in isolation from other habitats and communities in these areas. (ACTION: DANI, MAFF, NAW, SE)

Define statutory water quality objectives for coastal waters. (ACTION: EA, MAFF, SEPA)

Advisory

Publish guidelines on the designation of intertidal SSSIs/ASSIs for their marine biological importance and assess whether, in light of these, seagrass beds are adequately covered by the network. (ACTION: CCW, EHS, EN, JNCC, SNH)

Standardise procedures for monitoring of seagrass beds. (ACTION: JNCC, Research institutes)

Provide advice to local authorities and others on minimising impacts of plans and operations on seagrass beds. (ACTION: CCW, EHS, EN, SNH)

International

Liaise with research institutes and coastal managers in Europe and elsewhere to exchange data and information on the conservation of seagrass beds and the developing of techniques for transplanting and germination of the three species of *Zostera* found in UK waters. (ACTION: CCW, EHS, EN, JNCC, SNH)

Research and monitoring

Compile and publish an up-to-date record of the extent, quality and distribution of seagrass around the UK. (ACTION: CCW, EHS, EN, JNCC, SNH)

Complete a classification of the different types of seagrass communities around the UK as part of the EC BIOMAR project. (ACTION: JNCC)

Advise on the establishment of a programme to set up a network of seagrass monitoring stations across the full range of types of seagrass beds in the UK. (ACTION: JNCC, Marine Laboratories)

Carry out further research into the factors which adversely affect seagrass beds to understand how these may be avoided or minimised. (ACTION: CCW, EHS, EN, JNCC, SNH)

Carry out research and feasibility studies on the restoration of seagrass beds through transplanting and germination. (ACTION: CCW, EHS, EN, JNCC, SNH)

Communications and publicity

Promote awareness among coastal users of the conservation importance of seagrass beds and how to avoid impact on these habitats. (ACTION: CCW, EHS, EN, SNH)

Costing

Limited data on habitat restoration and management of seagrass beds does not permit a full costing to be undertaken for this action plan. However, an estimate of potential costs is provided on the basis of several recent US studies. One project, in Tampa Bay, Florida, will require approximately £6,000 per hectare for full restoration of a 263 hectare site. It should be noted that this project incorporates other objectives as well as seagrass restoration. In the UK, a 1974 study concluded that transplanting of seagrass was feasible at a cost of approximately £4,200 (1994/95 prices) per hectare.

Until surveys to ascertain the extent of the seagrass resource are completed it is not feasible to provide a specific target for restoration. However, the data in Table 1 below provide indicative costs on the basis of assumptions that at least 1,000 hectares will require restoration during the programme and that this will be at an average cost of £5,000 per hectare.

Appendix 3 Maritime cliffs and slopes UK Habitat action plan

Current Status

Physical and biological status

Maritime cliffs and slopes comprise sloping to vertical faces on the coastline where a break in slope is formed by slippage and/or coastal erosion. There appears to be no generally accepted definition of the minimum height or angle of slope which constitutes a cliff, but the zone defined as cliff-top (also covered in this plan) should extend landward to at least the limit of maritime influence (ie limit of salt spray deposition), which in some exposed situations may continue for up to 500 m inland. This plan may therefore encompass entire islands or headlands, depending on their size. On the seaward side, the plan extends to the limit of the supralittoral zone and so includes the splash zone lichens and other species occupying this habitat. Approximately 4000 km of the UK coastline has been classified as cliff.

Cliff profiles vary with the nature of the rocks forming them and with the geomorphology of the adjoining land. While most maritime cliffs have been formed by coastal erosion, steep slopes falling to the sea in mountainous districts may have been formed long before the sea level reached its present position; in such cases only the lower part of the slope will have been steepened by the sea.

Maritime cliffs can broadly be classified as 'hard cliffs' or 'soft cliffs', though in practice there are a number of intermediate types. Hard cliffs are vertical or steeply sloping; they are inclined to support few higher plants other than on ledges and in crevices or where a break in slope allows soil to accumulate. They tend to be formed of rocks resistant to weathering, such as granite, sandstone and limestone, but can be formed of softer rocks, such as chalk, which erode to a vertical profile. Soft cliffs are formed in less resistant rocks such as shales or in unconsolidated materials such as boulder clay; being unstable they often form less steep slopes and are therefore more easily colonised by vegetation. Soft cliffs are subject to frequent slumping and landslips, particularly where water percolates into the rock and reduces its effective shear strength.

The vegetation of maritime cliff and slopes varies according to several factors: the extent of exposure to wind and salt spray, the chemistry of the underlying rock, the water content and stability of the substrate and, on soft cliffs, the time elapsed since the last movement event. Cliff-top habitats can also be transformed by soil erosion processes.

Vegetation of a strictly maritime nature occurs where exposure to the waves and winds is at its greatest. In the UK, such conditions are found principally on the northern and south-western coasts. In extreme conditions, such as on the Isle of Lewis, saltmarsh vegetation can occur on cliff-tops. In other areas, where cliffs occur adjacent to sand dunes, sufficient wind blown sand can accumulate on the cliff-tops to allow cliff-top dune vegetation to develop (perched dunes). On exposed hard cliffs giving little foothold to higher plants, lichens are often the predominant vegetation. Ledges on such cliffs support a specialised flora with species such as rock samphire *Crithmum maritimum* and rock sea spurrey *Spergularia rupicola* in the south and Scots lovage *Ligusticum scoticum* and in the north. Seabird nesting ledges enriched by guano support a particular community characterised by oraches *Atriplex* spp and sea beet *Beta vulgaris* ssp *maritima*. Maritime grasslands occur on cliffs and slopes in less severely exposed locations; a maritime form of red fescue *Festuca rubra* is a constant component, together with

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maritime species such as thrift *Armeria maritima*, sea plantain *Plantago maritima*, buck's-horn plantain *P. coronopus* and sea carrot *Daucus carota* ssp *gummifer*. Species of inland grasslands which also commonly occur in maritime grasslands include ribwort plantain *Plantago lanceolata*, bird's-foot trefoil *Lotus corniculatus*, common restharrow *Ononis repens* and several species of grass.

On cliffs and slopes which are more sheltered from the prevailing winds and salt spray, the vegetation communities are more similar to those found inland, and are increasingly influenced by the chemistry of the substrate. [Calcareous grassland](#) communities with a few maritime specialist species occur on sheltered chalk or limestone cliffs. The upper sections and cliff-tops of hard cliffs on acidic rocks may support maritime heaths characterised by heather *Calluna vulgaris*. Mobile soft cliffs support a wide range of vegetation from pioneer communities on freshly exposed faces through ruderal and grassland communities to scrub and woodland. Wet flush vegetation commonly occurs on soft cliffs where groundwater issues as seepage.

Maritime cliffs are often significant for their populations of breeding seabirds, many of which are of international importance. Some 70% of the international population of gannet *Morus bassanus* and important proportions of the European populations of shag *Phalacrocorax aristotelis*, razorbill *Alca torda* and guillemot *Uria aalge* nest colonially on cliff ledges whilst significant populations of Manx shearwater *Puffinus puffinus* and puffins *Fratercula arctica* nest in burrows in turf on cliff-tops or slopes. Coastal cliffs are also important for crag nesting species, such as raven *Corvus corax* and peregrine *Falco peregrinus*, and cliff-top vegetation may provide important feeding grounds for chough *Pyrhocorax pyrrhocorax*.

Hard cliffs are widely distributed around the more exposed coasts of the UK, occurring principally in south-west and south-east England (the latter area having the bulk of the 'hard' chalk cliffs), in north-west and south-west Wales, in western and northern Scotland and on the north coast of Northern Ireland. Soft cliffs are more restricted, occurring mainly on the east and central south coasts of England and in Cardigan Bay and north-west Wales. There are also examples on the coasts of Fife and Skye in Scotland and Antrim in Northern Ireland.

Soft cliffs provide important breeding sites for sand martins *Riparia riparia*, which burrow into soft faces exposed by recent slippages, but they are particularly important for invertebrates as they provide a suite of conditions which are rarely found together in other habitats. The combination of friable soils, hot substrates and open conditions maintained by cliff slippages offer a continuity of otherwise very restricted microhabitats and these support many rare invertebrates which are confined to such sites. These include the ground beetle [Cicindela germanica](#), the weevil *Baris analis*, the shore bug *Saldula arenicola*, and the Glanville fritillary *Melitaea cinxia*.

Seepages, springs and pools are a feature of many soft cliff sites and these provide the wet muds required by many species of solitary bees and wasps for nest building. They also support rich assemblages of other invertebrates including many rare species which are confined to this habitat. These include the craneflies *Gonomyia bradleyi* and *Helius hispanicus*, and the water beetle *Sphaerius acaroides*.

The hard coastal cliffs of west Britain supports a western oceanic invertebrate assemblage of European significance. Important species include the snail *Ponentina subvirescens*, weevils such as the highly restricted *Cathormiocerus attaphilus* and moths such as Barrett's marbled coronet *Hadena luteago*. Other species are confined to certain rock types. For example, the fiery clearwing [Bembecia chrysidiformis](#) is restricted to the chalk cliffs of Kent and Sussex and the water beetle *Ochthebius poweri* occurs predominantly in small seepages on red sandstone cliff faces in south-west England and south Wales.

The supralittoral zone represents the lowest belt of terrestrial vegetation on maritime cliffs and is usually exemplified by a zone of orange and grey maritime lichens. The zone tends to be dominated by species such as *Caloplaca marina*, *Ramalina siliquosa* and *Verrucaria maura*, but may also include uncommon species such as *Roccella filiformis* and *R. phycopsis*.

Links with other action plans

The [lowland heathland](#) and [littoral and sublittoral chalk habitat](#) action plans have objectives and actions which are relevant to this plan.

The following BAP priority species have significant populations on maritime cliffs:

Bombus humilis [Brown-banded carder bee](#)

Bombus ruderatus [Large garden bumble bee](#)

Lasioglossum angusticeps [a mining bee](#)

Osmia xanthomelana [a mason bee](#)

Cathormiocerus britannicus [a weevil](#)

Cicindela germanica [a tiger beetle](#)

Caloplaca aractina [a lichen](#)

Heterodermia leucomelos [Ciliate strap-lichen](#)

Acaulon triquetrum [Triangular pygmy moss](#)

Lygephila cracca [Scarce blackneck](#)

Polymixis xanthomista *statices* [Black-banded moth](#)

Zygaena loti scotica [Slender scotch burnet](#)

Zygaena viciae [New Forest Burnet](#)

Asparagus officinalis ssp *prostratus* [Wild asparagus](#)

Coincya wrightii [Lundy cabbage](#)

Euphrasia campbelliae [an eyebright](#)

Euphrasia rotundifolia [an eye bright](#)

Limonium (endemic taxa) [Sea lavender](#)

Rumex rupestris [Shore dock](#)

Current factors affecting the habitat

Erosion . Erosion is a highly significant factor in soft cliffs. High rates of erosion do not imply a loss of the cliff resource, either in geological or biological terms. Cliff face communities are able to retreat with the cliff line, and erosion is vital for constantly renewing geological exposures and recycling the botanical succession on soft cliffs. However, cliff-top vegetation may be destroyed where it is squeezed between a receding cliff face and cultivated land. Cliff erosion in many places provides an essential supply of sediment to coasts lying down-drift of the cliffs.

Coastal protection . Coastal protection systems have been built on many soft cliff coasts in order to slow or stop the rate of erosion and thus protect capital assets behind the cliff line. Cliff faces may also be re-profiled and sown with hardy grasses of little value for nature conservation. All such works have the effect of stabilising the cliff face, resulting in geological exposures being obscured, bare soil and early pioneer stages being progressively overgrown, and wet flushes drying out. A MAFF survey in 1994 identified over 90 km of new cliff protection works likely to be needed in the next 10 years, resulting in a potential loss of 36% of the remaining soft cliff resource. Additional effects of such defences include both accelerated erosion and sediment starvation at coastal sites down-drift of defended sites. It has been estimated that sediment inputs may have declined by as much as 50% over the past 100 years due to cliff protection works.

Built development . There have been many instances in the UK of urban or industrial development and holiday accommodation being built too close to cliff-tops. Where the cliffs are subsequently discovered to be eroding, there is often political pressure to build the type of defensive works described above. Built development also prevents cliff-top biological communities from retreating in response to cliff erosion, subjecting them to a form of 'coastal squeeze'.

Agriculture . In traditional low-intensity grazing systems, livestock were grazed on cliff grasslands where they maintained open maritime grassland vegetation. Post-war intensification of agriculture has led to maritime grassland on more level terrain being ploughed out, while that on sloping ground has been abandoned and, where not maintained by exposure, is frequently overgrown by scrub. Localised eutrophication can be caused by fertiliser run-off from arable land above and this encourages coarse, vigorous 'weed' species at the expense of the maritime species. Agricultural land drains discharging on the cliff face may cause local acceleration of erosion.

Recreational use . The siting of holiday accommodation on cliff-tops not only reduces the landscape value of a site, but can also cause heavy localised erosion and disturbance to nesting birds. An increase in the number of walkers and dogs along some coastal footpaths has increased livestock worrying and even losses and forced a number of farmers to remove their stock from these sites. Consequently, some of the sites are now suffering from a lack of appropriate grazing, and scrub encroachment is likely to become a problem.

Introduced species . Predators, such as cats and rats, can have a significant impact on populations of cliff or burrow nesting seabirds, particularly on island sites. Also the spread of certain alien, invasive plants, especially members of the flowering plant family Aizoaceae such as the hottentot fig *Carpobrotus edulis*, can have a devastating impact on indigenous maritime plant communities.

Current Action

Legal status

A high proportion of the hard cliff coast in England has been notified as SSSIs, and in areas such as the south-west of England almost the whole cliffed coast has been notified. Notification of soft cliffs has been less extensive, but areas such as north-west Norfolk and the Isle of Wight have a high proportion of their soft cliffs notified. In Wales approximately half of the total maritime cliff resource has been notified as SSSIs, but as yet only a small proportion has been notified as ASSIs in Northern Ireland. Nine lengths of coastline in the UK have been nominated as 'Vegetated sea cliffs of the Atlantic and Baltic coasts' candidate Special Areas of Conservation (SAC) under the EC Habitats Directive for their cliff features (two of which include substantial representation of soft cliffs). Under the EC Birds Directive, 38 Special Protection Areas (SPA) in the UK have been designated which include cliff sites - these comprise 30 sites in Scotland, 5 in Wales, 2 in England, and 1 in Northern Ireland.

Management, research and guidance

The UK Government has set out its commitment to sustainable management of the coast in a number of publications. These include the DETR *Policy Guidelines for the Coast and Planning Policy Guidance - Coastal Planning* (PPG 20), the Scottish Office *Coastal Planning* (NPPG 13), and the Welsh Office Technical Advice Note 14 *Coastal Planning*. The DoENI *Planning Strategy for Rural Northern Ireland* has provisions relating to development, access and conservation of the coast. MAFF and the Welsh Office have also produced a *Strategy for Flood and Coastal Defence in England and Wales* and the DETR has produced *Coastal Zone Management - Towards Best Practice*.

The DETR Coastal Forum was set up in 1994; similar fora have recently been initiated in Scotland and Wales. Certain coastal fora have also been set up by the country nature conservation agencies. These include the Estuaries Initiative, in England, Focus on Firths in Scotland, and in Wales an independent partnership of coastal practitioners (Arfordir). More general countryside management initiatives (Tir Cymen and the Habitats Scheme in Wales and Countryside Stewardship in England) offer options applicable to grazing management of cliff grassland. Recent figures show that 104 ha of cliff grassland had been entered into Tir Cymen, and 184 ha into the Habitats Scheme, but no separate figures are available for cliff land entered into Countryside Stewardship. The Tir Cymen pilot scheme which was restricted to just a few areas in Wales has been superseded by an all-Wales agri-environment scheme (Tir Gofal).

Over 700 km of cliff coastline in England, Wales and Northern Ireland is owned by the National Trust, who are actively reinstating grazing on many of these properties. Other non-governmental organisations, such as RSPB and the Wildlife Trusts,

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own or manage a number of other important maritime cliff sites. A large proportion of the cliff coast of south-west England and western Wales is within designated Heritage Coasts, while three National Parks (North York Moors, Exmoor and Pembrokeshire Coast) include cliffed coastlines. A number of cliff coasts in western Scotland are within National Scenic Areas. These designated areas often have the benefit of a warden/ranger service which encourages appropriate management and control of damaging activities, and provides interpretative and educational services.

Shoreline Management Plans and the work of their associated Coastal Groups will provide one of the main mechanisms for ensuring that the requirements of this plan are carried forward.

A Sea Cliff Management Handbook was produced jointly by the University of Lancaster, JNCC and the National Trust in 1991, and in 1998 The National Trust produced a report entitled *Grazing Sea Cliffs and Dunes for Nature Conservation*.

Action plan objectives and targets

Seek to maintain the existing maritime cliff resource of cliff-top and slope habitat, of about 4000 km.

Maintain wherever possible free functioning of coastal physical processes acting on maritime cliff and slope habitats.

Retain the amount of maritime cliff and slope habitats unaffected by coastal defence and other engineering works.

Where possible increase the amount of maritime cliff and slope habitats unaffected by coastal defence and other engineering works.

Increase the area of cliff-top semi-natural habitats by at least 500 ha over the next 20 years.

Improve by appropriate management the quality of at least 30% of the maritime cliff and slope habitats, including cliff-top vegetation, by 2010.

Improve by appropriate management the quality of as much as possible of the remaining maritime cliff and slope habitats, including cliff-top vegetation, by 2015.

Proposed actions with lead agencies

Policy and legislation

Promote sea defence and coastal protection policies which encourage the free functioning of the coastal physical processes of maritime cliffs wherever possible. (ACTION: DANI, DoE(NI), EA, LAs, MAFF, NAW, SE)

In the light of research findings, give consideration to how planning policy might discourage new built development within appropriate buffer zones in the vicinity of retreating cliff-tops. (ACTION: CCE, DETR, DoE(NI), EHS, EN, LAs, NAW, SE, SNH)

Look into the feasibility of developing provisions within the planning systems to encourage the re-siting of housing and holiday developments which are vulnerable to cliff erosion. This will be initiated on completion of the research outlined in 5.5.3. (ACTION: DETR, DoE(NI), NAW, SE)

Where appropriate promote agri-environment schemes which encourage management and restoration of maritime grassland, heathland and other cliff-top habitats. (ACTION: CCW, DANI, MAFF, NAW, SE, SNH)

Site safeguard and management

By 2004 apply conservation designations to all remaining areas of maritime cliff and slopes which meet national or international criteria and ensure appropriate management of all designated sites. (ACTION: CCW, EHS, EN, SNH)

Encourage a presumption against stabilisation of any cliff face except where human life, or important natural or man-made assets, are at risk. (ACTION: DANI, DoE(NI), LAs, MAFF, NAW, SE)

Where stabilisation of a cliff face is necessary (as defined in 5.2.2), ensure adequate mitigation and/or compensation to maintain the overall quantity and quality of maritime cliff and slopes habitat. (ACTION: CCW, DANI, DoE(NI), EHS, EN, LAs, MAFF, NAW, SE, SNH)

Encourage the increased use of soft (eg foreshore recharge) rather than hard engineering techniques where some degree of cliff stabilisation is essential. (ACTION: MAFF, DANI, DETR, DoE(NI), LAs, NAW, SE)

Consider non-replacement of coastal cliff defences which have come to the end of their useful life. (ACTION: MAFF, DANI, DETR, DoE(NI), LAs, NAW, SE)

Promote the management of maritime grassland and heath habitats by scrub control and grazing where appropriate, through relevant agri-environment schemes and management agreements. (ACTION: CCW, DANI, EHS, EN, MAFF, NAW, SE, SNH)

Conduct operations to remove rats, cats or other introduced predators affecting breeding seabirds on maritime cliff and slope sites, identified by 'Seabird 2000' and other surveys. (ACTION: CCW, EHS, EN, SNH)

Assess the impact of agricultural land drainage on maritime cliffs and slopes, especially in SACs, and carry out a review of the effectiveness of the current consents procedure. (ACTION: MAFF)

Advisory

Encourage by 2002 the adoption of policies and practices in the engineering management of soft cliffs which are sympathetic to the nature conservation interest, by preparing and disseminating 'best practice' guidance material. (ACTION: DANI, EA, MAFF, NAW, SE)

Encourage by 2002 appropriate habitat management of maritime cliff and slope habitats by preparing and disseminating 'best practice' guidance material. (ACTION: CCW, EHS, EN, SNH)

International

Promote the exchange of information on maritime cliff ecology and management among European maritime states through the European Union for Coastal Conservation and Eurosite. (ACTION: CCW, EHS, EN, JNCC, SNH)

Research and monitoring

By 2003 commission a literature review and full survey of the maritime cliff and slope resource in the UK to assess its relative conservation value, how much can be improved by alternative management, and to what extent it is affected by coastal defence and engineering works. (ACTION: CCW, EHS, EN, JNCC, SNH)

By 2003 commission a study to identify areas in the UK suitable for the re-creation of maritime grasslands and heathlands. (ACTION: CCW, EHS, EN, JNCC, SNH)

By 2003 commission a study to identify possible coastal and sea defence strategies that may be more sympathetic to the nature conservation interests of maritime cliffs, and identify stretches of coastline where such sympathetic modifications are feasible. (ACTION: DoE(NI), EA, MAFF, NAW, SE)

By 2003 implement a baseline study to determine the extent and quality of the maritime cliff and slope resource in the UK in order to enable the effective assessment of progress towards meeting the objectives of this plan. (ACTION: CCW, EHS, EN, JNCC, SNH)

By 2003 complete an assessment of the maritime cliff sites in the UK where the native flora and fauna is being affected by introduced species. (ACTION: CCW, EHS, EN, SNH)

Carry out an evaluation of cliff erosion and how its contribution to the marine sediment budget could be affecting other key habitats. (ACTION: MAFF)

Carry out an assessment of how the conservation interest of maritime cliffs may be affected by climate change. (ACTION: CCW, EHS, EN, MAFF, SNH)

By 2003, in order to meet objective 4.3, develop an inventory of coastal defences that impact on maritime cliff and slope habitats and identify the most appropriate defences for removal. (ACTION: CCW, EA, EHS, EN, SNH)

Communications and publicity

Raise public awareness of the mobile nature of soft cliffs and the value of maintaining unrestricted coastal processes. (ACTION: CCW, EHS, EN, SNH)

Promote awareness of the implications of the policies outlined in this plan among coastal Local Authorities, and ensure that the relevant details are incorporated into coastal zone management plans including Shoreline Management Plans. (ACTION: CCW, DETR, EHS, EN, MAFF, NAW, SE, SNH)

Raise public awareness of the potential damage that can be inflicted on the native flora and fauna of maritime cliffs by introduced species. (ACTION: CCW, EHS, EN, SNH)

Costing

The successful implementation of this habitat action plan will have resource implications for both the public and private sectors. The data in the table below provide an estimate of the current expenditure on the habitat, primarily through agri-environment schemes, and the likely additional resource costs to the public and private sectors. These additional resource costs are based on the annual average over 5 and 10 years. The total expenditure for these time periods is also given. Three-quarters of the additional resources are likely to fall to the public sector.

Appendix 4 Coastal vegetated shingle UK Habitat Action Plan

Current Status

Physical and biological status

Shingle is defined as sediment with particle sizes in the range 2-200 mm. It is a globally restricted coastal sediment type with few occurrences outside north-west Europe, Japan and New Zealand. Shingle beaches are widely distributed round the coast of the UK, where they develop in high energy environments. In England and Wales it is estimated that 30% of the coastline is fringed by shingle. However most of this length consists of simple fringing beaches within the reach of storm waves, where the shingle remains mobile and vegetation is restricted to temporary and mobile strandline communities.

Shingle structures take the form either of spits, barriers or barrier islands formed by longshore drift, or of cusped forelands where a series of parallel ridges piles up against the coastline. Some shingle bars formed in early post-glacial times are now partly covered by sand dunes as a result of rising sea levels leading to increased deposition of sand.

The origin of coastal shingle varies according to location. In southern England, much of it is composed of flint eroded out of chalk cliffs. Shingle deposits of Ice Age origin lying on the sea bed may be reworked by wave action and redeposited or moved by longshore drift along the coast. In northern and western Britain, shingle may derive from deposits transported to the coast by rivers or glacial outwash. Shingle structures are of geomorphological interest.

The vegetation communities of shingle features depend on the amount of finer materials mixed in with the shingle, and on the hydrological regime. The classic pioneer species on the seaward edge include sea kale *Crambe maritima*, sea pea, *Lathyrus*

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japonicus, Babington's orache, *Atriplex glabriuscula*, sea beet, *Beta vulgaris*, and sea campion *Silene uniflora*; such species can withstand exposure to salt spray and some degree of burial or erosion. Further from the shore, where conditions are more stable, more mixed communities develop, leading to mature grassland, lowland heath, moss and lichen communities, or even scrub. Some of these communities appear to be specific to shingle, and some are only known from Dungeness. On the parallel ridges of cusped forelands, patterned vegetation develops, due to the differing particle size and hydrology. Some shingle sites contain natural hollows which develop wetland communities, and similar vegetation may develop as a result of gravel extraction.

Shingle structures may support breeding birds including gulls, waders and terns. Diverse invertebrate communities are found on coastal shingle, with some species restricted to shingle habitats.

Shingle structures sufficiently stable to support perennial vegetation are a comparatively rare feature even in the UK. The major vegetated shingle structures surveyed in 1987-1991 by Sneddon and Randall totalled some 5000 ha in England, 700 ha in Scotland and 100 ha in Wales. Dungeness, in southern England, is by far the largest site, with over 2000 ha of shingle, and there are only five other structures over 100 ha in extent in the UK. The main concentrations of vegetated shingle occur in East Anglia and on the English Channel coast, in north-east Scotland, and in north-west England and south-west Scotland. The Welsh coast has a number of small sites. This habitat is poorly represented in Northern Ireland, where the key site is Ballyquintin in County Down.

Links with other action plans

The following BAP priority species have significant populations on vegetated shingle sites: [toadflax brocade](#) *Calophasia lunula*, [white spot](#) *Hadena albimaculata*, [stinking hawk's-beard](#) *Crepis foetida*, [small-flowered catchfly](#) *Silene gallica*, endemic [sea lavenders](#) *Limonium* spp, [red hemp-nettle](#) *Galeopsis angustifolia*, [brown-banded carder bee](#) *Bombus humilis*, [large garden bumble bee](#) *Bombus ruderatus*, [short haired bumble bee](#) *Bombus subterraneus*, and the [hopper](#) *Aphrodes duffieldi*. Wetlands within shingle sites are also important for the following species: [medicinal leech](#) *Hirudo medicinalis*, and [great crested newt](#) *Triturus cristatus*.

Current factors affecting the habitat

Sediment supply. The health and ongoing development of a shingle feature depend on a continuing supply of shingle. This may occur sporadically as a response to storm events rather than continuously. It is frequently lacking owing to interruption of coastal processes by coast defence structures, by offshore aggregate extraction or by artificial redistribution of material within the site (eg Dungeness). Attempts have been made to rectify the situation by mechanical reprofiling, which is likely to fail in the long run because it does not address the lack of new material, or by beach recharge.

Natural mobility. Shingle features are rarely stable in the long term. Many structures exhibit continuous longshore drift, and ridges lying parallel to the shoreline tend to be rolled over towards the land by wave action in storm events. This movement has a knock-on effect on low-lying habitats behind the shingle. Movement is likely to be accelerated by climate change resulting in sea level rise and increased storminess.

Exploitation. Shingle structures have been regarded as a convenient source of aggregates, and have been subject to varying degrees of extraction resulting in severe alteration of morphology and vegetation (eg Dungeness and Spey Bay) or almost total destruction of major parts of the feature (eg Rye Harbour). Industrial plant, defence infrastructure and even housing have been built on shingle structures (eg Dungeness, Orfordness, Spey Bay), destroying vegetation and ridge morphology. At Dungeness water is abstracted from the groundwater system; there is some evidence of drought stress on the vegetation, but it is difficult to distinguish the effects of water abstraction from those of gravel extraction.

Access. Shingle vegetation is fragile; the wear and tear caused by access on foot, and particularly by vehicles, has damaged many sites. The causes include military use, vehicle access to beaches by fishermen, and recreational use. Such disturbance can also affect breeding birds.

Grazing. In a few cases areas of shingle were traditionally grazed, but this management has now largely ceased, leading to domination by willow carr on wetlands and changes to vegetation structure. The impacts of removal of grazing on breeding birds and other shingle species are not fully understood.

Current Action

Legal status

Vegetated shingle is a rare habitat; all major examples and many minor ones have therefore been notified as SSSIs or ASSIs. Many are also declared as NNRs or LNRs, or are owned by voluntary conservation bodies. Vegetated shingle is listed as a habitat type under Annex I of the EC Habitats Directive ('Perennial vegetation of stony banks'), and five sites in England and two in Scotland are proposed as SACs. Three of the former have also been submitted or classified as SPAs under the EC Birds Directive.

Management, research and guidance

Shingle sites which are reserves and/or hold designations receive some protection from further damage, but many of them have been damaged in the past, and there is little positive management of the habitat. It is often impossible to control recreational use by third parties. The main exception is Orfordness, which was acquired by the National Trust in 1993 and is a candidate SAC. Here, EU LIFE funding has been obtained for rehabilitation of the site and experimental re-creation of the ridge system, and public access is being controlled. The management plan for the MoD's holding on Dungeness proposes positive measures for the re-establishment of vegetation.

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A survey of the major vegetated shingle structures of Great Britain was commissioned by NCC in 1987. The results were published by JNCC in 1993 and 1994, and comprise a new classification of shingle vegetation and descriptions of all major and many minor vegetated shingle sites.

The UK Government has set out its commitment to sustainable management of the coast in a number of publications. These include DETR's (formerly DoE) *Policy Guidelines for the Coast* and *Planning Policy Guidance - Coastal Planning* (PPG 20), and SO's *Coastal Planning* (NPPG 13). A *Coastal Planning Technical Advice Note* has been prepared for Wales. DoE(NI)'s *Planning Strategy for Rural Northern Ireland* has provisions relating to development, access and conservation of the coast. MAFF and the Welsh Office have also produced a *Strategy for Flood and Coastal Defence in England and Wales* and DETR has produced *Coastal Zone Management - Towards Best Practice*. DETR's Coastal Forum was set up in 1994; similar fora have recently been initiated in Scotland and Wales, and one is expected shortly in Northern Ireland.

Environmental Impact Assessment is a statutory requirement for certain proposed developments where there is likely to be a significant effect on the environment.

Action plan objectives and targets

Prevent further net loss of existing vegetated shingle structures totalling about 5800 ha. (However local gains and losses due to storm events occur sporadically and should be accepted provided that the national and regional resources are maintained overall.)

Prevent, where possible, further exploitation of, or damage to, existing vegetated shingle sites through human activities.

Maintain the quality of existing plant and invertebrate communities which are currently in favourable condition.

Achieve the restoration, where possible, of degraded or damaged habitats of shingle structures, including landward transitions, where such damage has been extensive and natural recovery is not likely to be initiated, by 2010.

Proposed actions with lead agencies

Policy and legislation

Permit as far as possible the natural movement of coastal sediments through coastal processes which maintain shingle structures in favourable condition, including the natural landward movement of shingle banks. (ACTION: CCW, DETR, DoE(NI), EN, MAFF, NAW, SE, SNH)

Continue the current presumption against the extraction of the sub-tidal shingle resources unless environmental and coastal impact concerns, including those affecting coastal shingle structures and future supply of material to shingle shorelines, can be satisfactorily resolved. Continue to seek opportunities for the revocation or surrender of existing licences where appropriate. (ACTION: CEC, DETR, DoE(NI), NAW, SE)

Subject applications to extract aggregate from coastal shingle structures to the most rigorous examination and, where appropriate, seek opportunities for the surrender or revocation of existing permissions. (ACTION: DETR, DoE(NI), LAs, NAW, SE)

Ensure that the importance of shingle structures and offshore shingle resources is recognised in flood and coastal defence strategies and, where appropriate, encourage such strategies to contribute to the objectives and targets of this plan. (ACTION: DANI, DoE(NI), EA, MAFF, NAW, SE)

Site safeguard and management

Apply conservation designations (including NNR status where appropriate) to remaining areas of shingle which meet national or international criteria for site selection, and ensure appropriate management of designated sites by 2004. (ACTION: CCW, EHS, EN, SNH)

Negotiate positive management agreements on vegetated shingle SSSIs and ASSIs. (ACTION: CCW, EHS, EN, SNH)

If pilot projects (see 5.5.4) are successful, promote the application of techniques, where appropriate, in a wider programme of rehabilitation on major shingle sites suffering from gross and extensive damage. (ACTION: CCW, EHS, EN, MoD, SNH)

Encourage reinstatement of wetland vegetation on shingle sites (where appropriate) by scrub clearance and grazing. (ACTION: EN)

Advisory

Promote and develop demonstration sites for the management and rehabilitation of shingle structures and disseminate best practice. (ACTION: CCW, EHS, EN, SNH)

Ensure all relevant agri-environment project officers and members of regional agri-environment groups are advised of the location of existing examples of this habitat, its importance and the management requirements for its conservation. (ACTION: CCW, EN, SNH)

Allowing natural landward movement of shingle features (see 5.1) will, in some cases, affect other habitats such as saline lagoons, grazing marsh, fens and reedbeds, some of which will be designated sites. The implementation groups for the relevant HAPs should be advised on how to make appropriate provision for habitat creation. In some cases, breaches in shingle banks may lead to the development of saltmarsh habitats and this needs to be taken account of in the respective HAPs. (ACTION: CCW, EA, EN, SNH)

International

Develop international links to promote the exchange of information and development of best practice in the management of coastal vegetated shingle. (ACTION: JNCC)

Research and monitoring

Assess the current extent of damage to shingle vegetation and geomorphology in order to inform the setting of restoration targets within the first three years of this plan. (ACTION: CCW, EHS, EN, SNH)

Collate and disseminate information on changes in the extent and quality of the vegetated shingle resource in the UK in order to enable effective monitoring of the objectives of this plan. (ACTION: CCW, EHS, EN, JNCC, SNH)

Continue research into the use of remote sensing for monitoring soft coast habitats including shingle structures. (ACTION: EA)

Carry out pilot projects to test the methods for the practical restoration of damaged shingle structures and their vegetation and morphology, and disseminate the results. (ACTION: EN)

Initiate research to determine the relationship between offshore shingle banks and onshore shingle structures in relation to aggregate extraction. (ACTION: CEC, DETR, DoE(NI), MAFF, NAW, SE)

Initiate research to assess the likely medium to long-term demand for offshore shingle in order to maintain the current vegetated shingle structures and their associated shingle shorelines. (ACTION: CEC, DETR, DoE(NI), MAFF, NAW, SE)

Communications and publicity

Increase public awareness of the value and fragility of vegetated shingle through on-site interpretation. (ACTION: CCW, EHS, EN, SNH)

Costing

The successful implementation of the habitat action plans will have resource implications for both the private and public sectors. The data in the table below provide an estimate of the likely additional resource costs to the public and private sectors. These additional resource costs are based on the annual average over 5 and 10 years. The total expenditure for these periods of time is also given. Three-quarters of the additional resources are likely to fall to the public sector.

Appendix 5: Ramsar management plan costs

The total costs of delivering the Ramsar Management Strategy over the next 5 years are estimated to be approximately £70,800. The greatest costs will fall in the first year (£17,800) due to additional baseline survey work. These costs are projected to fall to approximately £13,300 in years 2 to 5.

However, the Ramsar Manager believes it can source unpaid volunteers, subsidised equipment, donated services and sponsorship which will very significantly reduce the cash requirements for the project. If successful this should reduce the total costs to only £22,000 over a 5 year period – of this **approximately £6,000 will be required in year 1 and £4,000 in years 2 to 5**. This is a very small price to pay for such a valuable and important environmental project and the island of Alderney will benefit from nearly £55,000 of value for which it will not have to pay.

Budget assumptions

1. Any work that is carried out has been costed at an average of £14 per hour.
2. Boat costs are estimated at £50 per return trip to Burhou assuming that a coded boat and a commercial skipper are not required. Commercial operations are estimated at £100 per hour.
3. Any ringing work is paid for by the Guernsey ringing team.
4. 113 boat trips are estimate to be required over the 5 year period.

The full costed programme is set out below. Top priority work is presented in bold.

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Year of management plan	Work	Estimated costs	Number of days per year	Cost breakdown
2007	<p><i>Burhou</i></p> <ul style="list-style-type: none"> • Puffin research and management • Storm petrel productivity monitoring • Establishing new nesting sites for storm petrels • Shag & Cormorant productivity • Visitor management & awareness. <p><i>Other seabird work</i></p> <ul style="list-style-type: none"> • Gannets productivity monitoring • Determine adult survival rates • Census of puffins and productivity study on Hannaine Bay • Census razorbill, guillemot & shag on Coque Lihou. • Census of tern population and productivity. • Seabird survey on Casquets and rat assessment. • Fulmar census and determine productivity. 	<p>£12,200</p> <p>£588</p> <p>£686</p> <p>£392</p> <p>£492</p> <p>£392</p> <p>£346</p>	<p>50 Days</p> <p>6 days (April-September)</p> <p>5 days analysis of existing data 2 days ringing</p> <p>4 Days</p> <p>4 Days</p> <p>4 Days</p> <p>2 Days</p>	<p>Boat costs (£1000) 2x people carrying out practical work (£9800) Materials (£500) Ringing team costs (£200) Practical management costs (£200) Consultancy/advisory costs (£300) Analysis & planning (£200)</p> <p>Payment at £14 per hour for surveyor.</p> <p>Payment for time to analyse data, boat costs,</p> <p>Payment ay £14 per hour for surveyor.</p> <p>Payment at £14 per hour for surveyor and boat costs</p> <p>Payment at £14 per hour for surveyor</p> <p>Payment at £14 per hour for two surveyors, Boat costs, materials for rat assessment.</p> <p>Payment at £14 per hour for</p>

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	<ul style="list-style-type: none"> • Ringed Plover census and determine productivity <p><i>Non avian Fauna</i></p> <ul style="list-style-type: none"> • Census of seals, Determine breeding status <p><i>Habitats & Flora</i></p> <ul style="list-style-type: none"> • Survey of Inter-tidal biotypes. • Phase 2 habitat survey • Baseline 'Seasearch' data collection <p><i>Advisory roles</i></p> <ul style="list-style-type: none"> • Formulate policies and advice ACRE on environmental impacts of tidal power devices. • Review impact of raw sewage disposal • Review proposal from States of increased gravel extraction. • Review oil spill action plan. 	<p>£294</p> <p>£196</p> <p>£492</p> <p>£1200</p> <p>?</p>	<p>3 Days</p> <p>2 Days</p> <p>4 Days</p> <p>6 Days</p> <p>2 Days</p> <p>?</p>	<p>surveyor</p> <p>Payment at £14 per hour for surveyor</p> <p>Payment at £14 per hour for surveyor. Boat Costs to get onto Islet</p> <p>Payment at £14 per hour for surveyor. Boat Costs, Diving equipment costs, Seasearch training, report writing.</p>
2008	<p><i>Burhou</i></p> <ul style="list-style-type: none"> • Puffin research and management • Storm petrel productivity monitoring • Establishing new nesting sites for storm petrels <p><i>Other seabird work</i></p>	<p>£12,200</p>	<p>50 days</p>	

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	<ul style="list-style-type: none"> • Tern census and productivity assessment. £392 • Ringed plover census and productivity assessment £196 • Determine gannet productivity. And adult survival £588 <p><i>Publicity</i></p> <ul style="list-style-type: none"> • Production of a Ramsar information leaflet £500 			
2009	<p>Burhou</p> <ul style="list-style-type: none"> • Puffin research and management • Storm petrel productivity monitoring • Establishing new nesting sites for storm petrels <p><i>Other seabird work</i></p> <ul style="list-style-type: none"> • Tern census and productivity assessment. £392 • Ringed plover census and productivity assessment £196 • Determine adult gannet survival. £588 	£12,200	50 days	
2010	<p>Burhou</p> <ul style="list-style-type: none"> • Puffin research and management • Storm petrel productivity monitoring • Establishing new nesting sites for storm petrels 	£12,200	50 days	

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	<p><i>Other seabird work</i></p> <ul style="list-style-type: none"> • Tern census and productivity assessment. £392 • Ringed plover census and productivity assessment £196 • Determine adult gannet survival £588 			
2011	<p><i>Burhou</i></p> <ul style="list-style-type: none"> • Puffin research and management £12,200 • Storm petrel productivity monitoring • Establishing new nesting sites for storm petrels <p><i>Other seabird work</i></p> <ul style="list-style-type: none"> • Tern census and productivity assessment. £392 • Ringed plover census and productivity assessment £196 • Determine adult gannet adult £588 		40 days	