ALDERNEY WILDLIFE TRUST

Alderney West Coast and Burhou Islands Ramsar Site Management Strategy 2012 – 2016

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Alderney West Coast and Burhou Islands Ramsar Management Strategy 2012 – 2016

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Abbreviations

ACRE	Alderney Commission for Renewable Energy
AON	Apparently Occupied Nests
ARS1	Alderney West Coast and the Burhou Islands Ramsar Management Strategy 2007-11
ARS2	Alderney West Coast and the Burhou Islands Ramsar Management Strategy 2012-16
AWT	Alderney Wildlife Trust
BAP	Biodiversity Action Plan
BTO	British Trust for Ornithology
EIA	Environmental Impact Assessment
GSC	General Steering Committee
HAP	Habitat Action Plan
IUCN	International Union for the Conservation of Nature
JNCC	Join Nature Conservation Committee
RIS	Ramsar Information Sheet
RSG	Ramsar Steering Group
RSPB	Royal Society for the Protection of Birds
SSG	Stakeholder Steering Group

1. Introduction

1.1 Executive Summary

- This management strategy has been prepared by the Alderney Wildlife Trust with advice and expertise from relevant parties, on behalf of the States of Alderney.

- The management and monitoring work will be under taken by Alderney Wildlife Trust, working in the role of advisor to the States of Alderney.

- This is the second Alderney West Coast and the Burhou Islands Ramsar Management Strategy covering 2012-16 (here after referred to as ARS2), the first covered the period 2007-2011 (ARS1).

- ARS2 will continue with the high level of seabird monitoring, established in ARS1, whilst extending the wider ecological monitoring to establish a baseline for the marine and terrestrial environments, resulting in a broader range of focus (see 2.1).

- The ARS2 will attempt to investigate the spread of invasive species within the Ramsar site, with specific attention given to hottentot fig (*Carpobrotus edulis*), japweed (*Sargassum muticum*), and slipper limpets (*Crepidula fornicate*).

- The development of an educational programme which will look to establish work from school age groups to PhD level.

- Renewed efforts will be put into engaging with the community and stakeholders to involve people with the Ramsar process and area.

- Efforts will be made to connect with similar conservation efforts within the geographical area, for data and idea sharing, such as the other Channel Islands with Ramsar sites or the French Normand-Breton Marine Natural Park.

1.2 Background

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 with advice and expertise from relevant parties. The management and monitoring work will be under taken by Alderney Wildlife Trust, working as a government advisory group.

This is the second Alderney West Coast and the Burhou Islands Ramsar Management Strategy, covering 2012-16 (here after referred to as ARS2), each of which are created covering a five year period. The first ARS (ARS1), covering 2007 -11 primarily focused on seabird monitoring work, as seabirds are one of the main reasons for Alderney's Ramsar designation. Alderney supports locally, nationally and internationally important populations of seabirds. ARS2 will continue with the high level of seabird monitoring whilst extending the ecological monitoring, resulting in a broader range of focus (see 2.1).

Alderney Wildlife Trust will continue to manage the strategy on behalf of the States of Alderney, drawing upon a range of scientific expertise where necessary. Alderney Wildlife Trust will also advise the States with regard to the issuing of licenses for those individuals/groups who apply to the States of Alderney 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 of the ARS2 will be reviewed and a presentation put towards the States of Alderney annually, with a full review of the ARS2 at the end of the five year period.

1.3 Changes affecting the Alderney Ramsar Site

There have been no changes to the Ramsar policy since the production of ARS1. With the Ramsar Convention mission being,

> "the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world." ('The Ramsar Convention on Wetlands', n.d.).

Neither have there been any physical changes to the Alderney Ramsar site with regard to area, with only a change in focus and updated objectives, as outlined within ARS2.

It is of interest to note here that during the five year term covered by the ARS1, as a result of the potential for tidal power in the Race and Swinge, the Alderney Commission for Renewable Energy (ACRE) was established by the Renewable Energy (Alderney) Law 2007 and its related Ordinances.

ACRE is the regulatory body for renewable energy and is responsible for licensing and regulating the operation, deployment, use or management of all forms of renewable energy in the island of Alderney and its territorial waters.

The Commission's licensing process involves the comprehensive examination of an applicant's technical and financial proposal. The Commission is responsible for ensuring that any development;

- is not a danger to human life or detrimental to the environment including, without limitation, the land, marine and air environment and natural habitats including the seabed,

- does not interfere with shipping, fishing and any other lawful activities within the Island of Alderney and the territorial waters of Alderney, or of any other place.

In this context, the Commission is a formal Consultee of the Ramsar Site Management Strategy.

The Commission's consenting process is robust, transparent and straightforward. It is reviewed regularly and updated to meet with current best practice. The requirement therein for an Environmental Statement is fully detailed in the Commission's "Guide to the Consents Process – Marine" which is available to download (http://www.acre.gov.gg/library.php).

1.4 Alderney West Coast and the Burhou Islands Ramsar Process

The ARS2 is prepared on behalf of the States of Alderney by the Alderney Wildlife Trust (AWT) with the advice and support of the Ramsar Steering Group (RSG). This is a semi-formal voluntary group made up of professional practitioners from the Channel Islands and UK including:

Charles Michel	Alderney Wildlife Trust (AWT)
Helen Booker	Royal Society for the Protection of Birds (RSPB)
Jamie Hooper	Societe Guernsaise and Environment Guernsey
Paul Veron	Channel Island Ringers
Phil Atkinson	British Trust for Ornithology (BTO)
Dan Laffoley	International Union for the Conservation of Nature (IUCN), Marine Vice Chair IUCN's World Commission on Protected Areas

The Strategy, once drafted is considered and approved by the States of Alderney General Services Committee (GSC), once approved an annual Timetable of Works is prepared and put to the GSC for approval. The year's works are then reviewed annually and presented to the GSC along with any recommended alterations to the ARS as a whole. Following the GSC's review any alterations are then made to the ARS and the new Timetable of Works for the coming year is prepared the December prior to the year the work will be undertaken.

This procedure enables the GSC, which has a changing membership with limited professional expertise in this area, to stay aware of the project whilst at the same time

building a formal process of review into the ARS. This allows both the AWT and RSG to fully document their actions, which, as voluntary bodies undertaking government commitments, is vital to the continuing transparency of the ARS.

By creating a rolling programme of development, practical work, review and appraisal by the RSG and GSC on the work undertaken as part of the ARS it is hoped that this document will not be a static, stale set of commitments. It should, however, be a clear and consistent set of aims, objectives and targets, which through regular review and develop, retain their focus whilst achieving clear measureable results with limited resources.

1.5 Alderney West Coast and the Burhou Islands Ramsar Site Outline

Alderney's site comprises the western coast of Alderney and adjacent shallow waters and islets in the strongly tidal, high-energy system of the northern Channel Islands. The site includes diverse and inter-related ecosystems. The following wetland types are designated within the Ramsar site;

1.5.1 Permanent shallow marine waters (20% of site)
Locations;

The marine aspect of the Ramsar site supports many rare species, this includes the green ormer (*Haliotis tuberculata*), this shellfish are only found in the Channel Islands out of the whole of the British Isles. The site also supports a representative sample of rare marine species of north-west European fish fauna, as well as a high diversity of shellfish, including squat lobster (*Galathea squamifera*) and blue rayed limpet (*Helicon pellucida*). Grey seals can been seen through most of the year basking on the Nannels and Renoquet rocks, breeding and population numbers are currently unconfirmed but monitoring is one of the objectives for ARS2, (see 2.3.1.1.6).

1.5.2. Marine subtidal aquatic beds (45% of marine area)
Locations; Clonque Bay and Hannaine Bay

Seagrass beds are one of the 45 habitats with a Habitat Action Plan (HAP) (appendix 1) as part of the UK Biodiversity Action Plan (BAP)[1]. 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 10m. 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.

[1] The ARS2 uses UK BAP as a reference for current status and management, although Alderney is not a part of the UK.

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 cephlapods. Adult fish frequently seen in *Zostera* beds include pollack, two spotted-goby and various wrasse species.

1.5.3. Rocky marine shores (30% of site)
Locations; Alderney west coast, the Burhou Islands, Ortac and Les Étacs.

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 world's 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.

1.5.4. Maritime Cliff and Slopes
Locations; Alderney west coast

This UK BAP habitat (Habitat Action Plan, appendix 2) occurs on the coastal fringes within the Ramsar site on Alderney's west coast. This habitat comprises soft cliffs hosting many species of plant such as prostrate broom (*Cytisus scoparius subsp. maritimus*) and greater broomrape (*Orobanche rapumgenistae*). The cliffs support breeding populations of Fulmar (*Fulmarus glacialis),* Herring Gull (*Larus argentatus*) and Atlantic Puffin (*Fratercula arctica).*

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 found in 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.

1.5.5. Sand, shingle and pebble shores (5% site)
Locations; Platte Saline (west end), Clonque Bay and Hannaine Bay

Coastal vegetated shingle is also a UK BAP habitat, and therefore has its own Habitat Action Plan (HAP) (appendix 3). 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 beet (*Beta vulgaris*). It also supports many bird

species, particularly wintering populations of Oystercatcher (*Haematopus ostralegus*), Curlew (*Numenius arquata*), Little Egret (*Egretta garzetta*), Turnstone and other wading birds. Platte Saline beach also supports Alderney's only breeding population of Ringed Plover *(Charadrius hiaticula)*.

1.5.6. Designation criteria

The criteria for designation as required under the Ramsar convention were; 1, 3, 6, and 7. The criteria taken from 'The Criteria for Identifying Wetlands of International Importance' (n.d.).

Criteria 1	A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.	Among global priority habitats, sea-grass beds occur at and below low-water mark. These form part of a rich complex of habitats, including vegetated shingle banks, sand dunes, dune & coastal grassland, soft cliffs, sandy, gravelly and rocky shores (including the offshore islands of Burhou, Les Etacs & Ortac).
Criteria 3	A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.	Burhou island has a flora and fauna which has had relatively little modification by man. Large nesting seabird populations, which include the only Storm Petrel colony in the Channel Islands, Puffins, and Lesser & Greater Black-backed Gulls. Les Etacs and Ortac support the only Gannet colonies in the Channel Islands. The intertidal rocky shore supports many rare species of fauna including the Green Ormer, which is found in the Channel Islands but not in the UK.
Criteria 6	A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.	A large nesting population of Gannets are established on the Les Etacs and Ortac. Here there are 11,000 breeding birds, about 1,000 non-breeding birds, and perhaps 5,000 immature birds. This constitutes 2.3% of the world population.
Criteria 7	A wetland should be considered internationally important if it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.	Many rare 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.

Table 1. Showing the criteria and justification for the Alderney West Coast and the Burhou Islands Ramsar designation

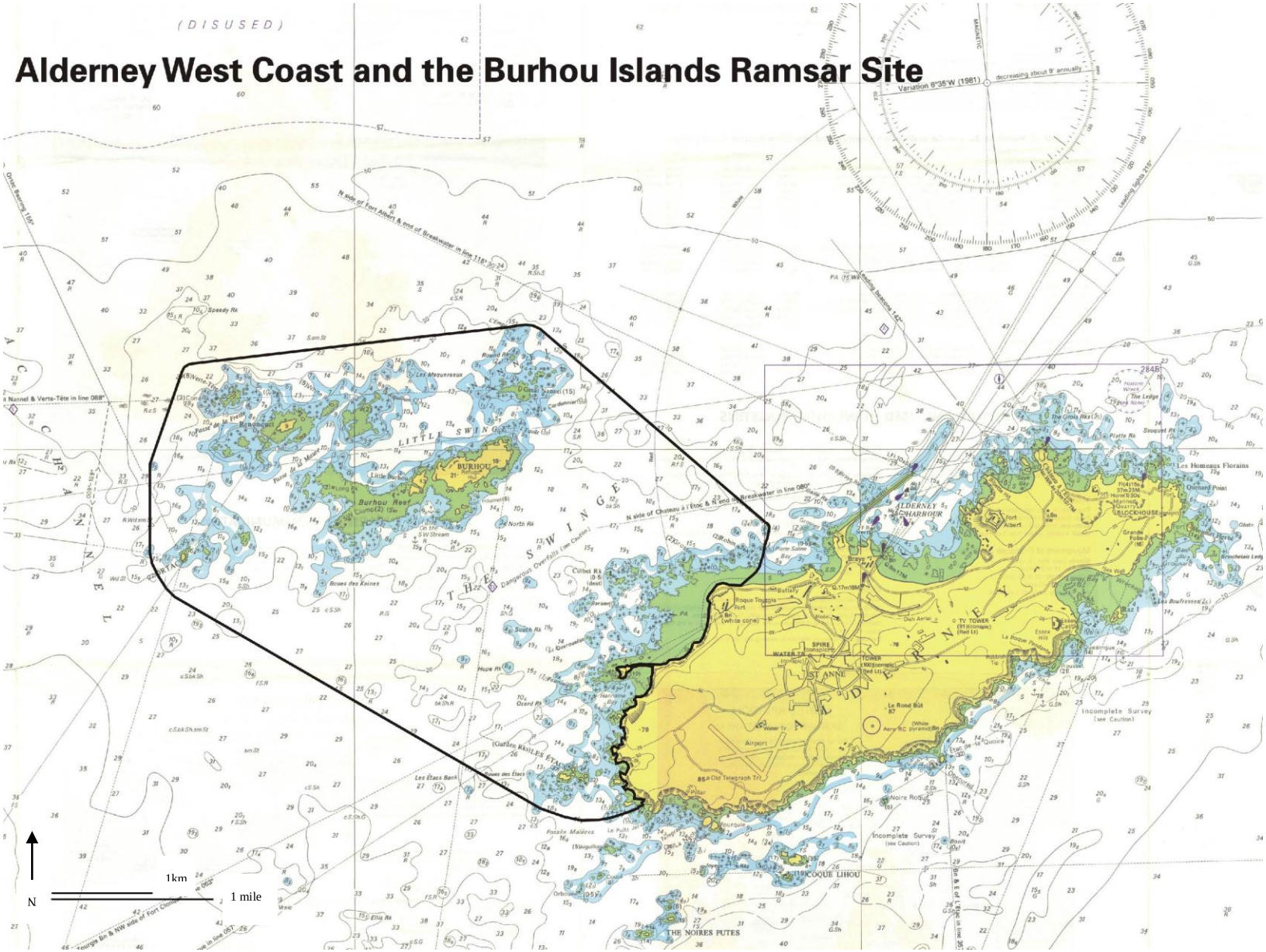

Figure 1. Map showing the Alderney West Coast and the Burhou Islands Ramsar boundaries

2. Strategy Targets

2.1 Alderney West Coast and the Burhou Islands Ramsar Strategic Focus

This sets out the clear focus for the ARS2 for the next five years, with an explanation for this decision.

To broaden the scope of work in order to gain a greater understanding of all aspects of the ecological status of the Ramsar site, whilst maintaining a key interest in seabird populations.

Establishing true baseline ecological data for the whole site will provide us with a better platform to establish current impacts, potential threats and potential sustainable uses of the site, therefore enabling the development of a longer term strategy for 'wise use' of the site.

2.2 Strategic Aims

The aims of the ARS2 are defined in the following three goals, from which Strategic Objectives (2.3) have been identified and drawn up:

2.2.1 Facilitate a greater understanding of the ecological status of the Ramsar site by establishing an environmental baseline for both the marine and terrestrial environments within the site.

2.2.2 Maintain and where appropriate enhance species populations and marine habitats of the Alderney West coast and Burhou Islands Ramsar site. Special attention will be given to the sites with colonies of breeding seabirds as indicators of site health.

2.2.3 Develop environmental legislation for Alderney which can be used to help ensure the sustainable use of the Ramsar site and surrounding waters and protect the site for current and future generations.

2.3 Strategic Objectives

The Strategic Objectives are steps set out in order to meet the Strategic Aims. These will work as measurable objectives, by which we can monitor work progression.

2.3.1 Marine

2.3.1.1 To increase our understanding of the marine environment within the site by collecting baseline data;

2.3.1.1.1 Establish baseline data for benthic (seabed) environment

2.3.1.1.2 Establish baseline data for pelagic (open water) environment

2.3.1.1.3 Intertidal Phase I and II habitat surveys for Hannaine bay, Burhou, other islets within the Ramsar site and Casquets

2.3.1.1.4 Benthic bathymetry, video works and sediment analysis

2.3.1.1.5 Pelagic physical parameters

2.3.1.1.6 Marine Mammal Surveys

2.3.2 Terrestrial

2.3.2.1 To increase our understanding of the terrestrial elements of the site by

collecting baseline data;

2.3.2.1.1 Terrestrial Phase I and II habitat surveys for Burhou and other islets within the Ramsar site and Casquets

2.3.2.1.2 Production of floral species lists of islets and South Cliffs of Alderney

2.3.3 Seabirds

2.3.3.1 To continue building on the ARS1 work monitoring seabird populations and breeding success in the site and its surrounding waters;

2.3.3.1.1 Annual gull population and productivity monitoring.

2.3.3.1.2 Annual Puffin population and productivity monitoring

2.3.3.1.3 Gannet aerial photograph census survey 2016

2.3.3.1.4. Productivity monitoring of Gannets

2.3.3.1.5 Annual Storm Petrel population monitoring and artificial nest maintenance

2.3.3.1.6. Investigation into Great Black-backed Gull productivity monitoring

2.3.3.1.7. Annual Shag population and productivity monitoring

2.3.3.1.8 Annual Fulmar population and productivity monitoring

2.3.3.1.9 Annual Ringed Plover population and productivity monitoring

2.3.3.1.10 Annual Common Terns population and productivity monitoring

2.3.3.2 Review population trends annually and where appropriate implement management to help maintain or enhance populations;

2.3.3.2.1 Contribute data towards Seabird survey 2013-16

2.3.3.2.2 Habitat management on Burhou

2.3.3.2.3 Continuation of gull exclusion zone (through nesting deterrence)

2.3.3.2.4 Expand effort to establish rotation survey plan to identify key seabird colonies which may require monitoring

2.3.3.2.5 Rat monitoring on Burhou and islets in the Ramsar site

2.3.4 Invasive Species

2.3.4.1 Marine and terrestrial surveys to map and monitor the potential invasive species slipper limpet (*Crepidula fornicate*), japweed (*Sargassum muticum*), and hottentot fig (*Carpobrotus edulis*)

2.3.5 Education & Publicity

2.3.5.1 To develop an academic research programmes using a combination of PhD (Case) and taught MSc students. This will allow the development of academically reviewed research for low residual costs and will thus support the continued development of the site's education and publicity programmes;

2.3.5.1.1 MSc Study

2.3.5.1.2 PhD between 2012 -2016

2.3.5.3 To increase awareness of the site for both locals and visitors

2.3.5.1. Time spent with local schools and groups to increase awareness of the site's importance and provide first hand access to the marine environment

2.3.5.3.3 Educational events/programmes for the public

2.3.5.3.4 Improve signage

2.3.5.3.5. Development of Puffin Cam and investigation into development of Storm Petrel Cam

2.3.6 Advisory & Legislative

2.3.6.1. Production of Ramsar Stakeholder List and Ramsar Stakeholder Group

2.3.6.2. Production of a list of Conventions Alderney is signatory to

2.3.6.3. Production of Oil Spill Action Plan

2.3.6.4. Development of environmental legislation for Alderney

2.3.6.5. Develop and utilise links with the French Normand-Breton Marine Natural Park

2.3.6.6. Investigate scope for a co-operative Channel Islands Ramsar network

3. Work Areas

3.1 Marine

With a change in strategic focus for the period of the ARS2 it is proposed that a more rounded and complete baseline of the Ramsar site be compiled, with a focus on the marine environment.

This approach will focus at developing an understanding of the sites environmental resources from shoreline to seabed. The following sub-sections will describe the aims of the work for the next five years. These will only be outlined at this stage, as finances will need to be assessed before the purchase of equipment to carry out the survey work.

3.1.1 Intertidal ecology

The sub-littoral zone covers from the high water line out to the continental shelf.

Phase I and II surveys will be carried out in the intertidal zone at Hannaine bay as well as Burhou, some of the rock islets and Casquets. Phase I surveys are a rapid way to gain habitat type information on an area, and map out the biotope habitats within an area. Phase II surveys provide detailed data on present species, giving details on abundance and community composition and are carried out through quadrat surveys along transects.

Through Phase I and II surveys we can get a clear indication of the habitats and species within the Ramsar site at these locations and they are a well-used tool for monitoring purposes (pollution accidents, etc.).

3.1.2 Benthic Ecology and topography

The benthic zone relates to the sea floor.

Through the ARS2, AWT will be looking to carry out a bathymetry survey for a better understanding of this zone. This work will be carried out using sonar equipment (echosound) to map out the sea floor and video works to study the benthic ecology. This will give an indication on the profile of the sea bed, including different elevation levels, and its ecology. Alongside the bathymetry mapping, AWT will be looking at carrying out sedimentary analysis. This will give extra data to the bathymetry mapping as to the sedimentary composition of the sea bed.

3.1.3 Pelagic Ecology and geography

The pelagic zone refers to the body of water, i.e. above the sea bed to the top of the water column.

Pelagic work carried out will be looking to assess water quality in the Ramsar site. This will assess different physical parameters like turbidity, flow, pH, temperature, dissolved oxygen and salinity. A clear data on water quality will provide an indication as to the health of the waters within the Ramsar site. It is also important to note here that as water is not a static

body, adjacent waters outside of the Ramsar site will also have effects on the water quality. So a larger scale assessment should be carried out to full ascertain the water quality within Alderney's waters.

It would also be beneficial if initial assessments were made as to the population sizes and health of fish and crustacean species (ecological survey). These population assessments could be run in conjunction with university projects that have been proposed (see section 3.4.2.2) looking into social, cultural, economic and environmental population assessments.

3.1.4. Marine Mammals

Seals can often be seen within the Ramsar site and are known to haul out on Renonquet. The ARS2 will be looking to complete a seal census and establishing a photography identification catalogue. The seal census will look to establish numbers of seals, including their sex and life stage, i.e. whether they are a pup, young adult or adult. Habitat mapping will also be carried out for their current, and to try and identify potential breeding haul-out sites.

3.2. Seabirds

Seabirds are one of the main reasons for the designation of the Alderney Ramsar site and have been the predominant focus for scientific monitoring during the ARS1, and its preceding work, the Burhou Project. The Burhou Project was the initial seabirds monitoring project undertaken by AWT during 2005 and 2006 before the designation and production of a ARS.

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 Northern Gannet, Great Skua, Manx Shearwater 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 Herring 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). The status of the Herring Gull (*Larus argentatus*) was updated in 2009 to 'red' listed by IUCN (Eaton *et al.,* 2009).

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 importance is where over 25% of the Channel Islands population occurs within the Ramsar site.

3.2.1. Internationally important species

Northern gannet (*Morus bassanus)*
Gannets are a very important seabird within the Ramsar site (and in fact the Channel Islands) because of the sheer size of the colonies. Supporting 2.3% of the world population, and 3.4% of the British isles population, the islets of Ortac and Les Etacs are of global importance for this species (global and British isles figures taken from 'Northern Gannet Morus bassanus', n.d.).

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. At the end of the ARS1 in 2011, it was found that the Gannet colonies had increased further on Les Etacs (5765 pairs), but decreased on Ortac (2120 pairs). This gives a total of 7885 pairs of Gannets between the two gannetries.

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, Gannets from Bass Rock, Scotland 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. The Gannet's position at the top of the food chain also leaves them 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.

3.2.2. Nationally important species

Lesser Black-backed Gull (*Larus fuscus,* sub species: *graellsii*)
Nationally important populations of the *graellsii* sub species of Lesser Black-backed
Gulls occur on the Channel Islands. Seabird 2000 recorded 383 pairs of Lesser Black-backed Gull within the Ramsar site, mostly on Burhou, out of a total of 1,734 pairs in the Channel Islands. Between 2000 and 2005, the Lesser Black-backed Gull population increased sharply to 1085 pairs on Burhou, indicating Burhou alone now supports a

nationally important population of Lesser Black-backed Gulls (Soanes and Michel, 2005). This figure has since increased again, in 2011 AWT recorded 1236 Apparently Occupied Nests (AON) on Burhou. The productivity of Lesser Black-backed Gulls on Burhou was very low on three years during the period of ARS1; 2007, 2008 and 2011. This will be something the ARS2 will continue to look at in terms of the population of breeding numbers for the future.

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, although this does not seem to have affected the Burhou population.

3.2.3. Locally important species

European Storm Petrel (*Hydrobates pelagicus*)
Within the Channel Islands, Storm Petrels breed only on Burhou, nesting in the stone walls and in natural rock crevices. The Burhou population is close to the southern edge of the breeding range of the species (Mitchell *et al.*, 2004) and small, 60 AON recorded during Seabird 2000. However, this figure is thought to be an under-estimate. The Guernsey Ringing Group, who use mark recapture methods for work on Burhou, give population figures close to 1000. Establishing accurate population figures for Storm Petrels will be looked at during the five year term of ARS2 and also for the 2013-16 national seabird census.

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), although this figure is thought to be exaggerated.

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 particular, the brown rat (*Rattus norvegicus*). 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 manage Burhou, and all other seabird islets, to ensure that they continue to be free of such predators (see section 3.2.1.1).

Atlantic Puffin (*Fratercula arctica)*
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).

The ARS1 saw a slight increase in Puffin numbers: in 2007 there were 127 AOB and in 2011 there were 160 AOB. This correlated with a slight increase in the numbers of rafting Puffins, in 2007 there were 127 and in 2011 there were 174.

Location	Species	Latin name	Seabird 2000 levels	Seabird 2000 Methods	Burhou Project 2005	2006	Ramsar Management Strategy 2007 -11 2007	2008	2009	2010	2011	Methods 2005 - 2011
Les Étacs and Ortac	Northern Gannet	*Morus bassanus*	5950		7409	-	-	-	-	-	7885	AON
Burhou	Shag	*Phalacrocorax aristotelis*	47[1]	AON	-	-	31	21	16[2]	24[3]	20	AON
	Atlantic Puffin	*Fratercula arctica*	180	Individuals on land	120 (139)	127 (92)	114 (127)	132 (134)	(131)	153 (157)	160 (174)	AON (and Raft)
	Herring Gull	*Larus argentatus*	125	AOS	202	109	148	164	52	85	73	AON
	Lesser Black-backed Gull	*Larus fuscus*	313	AOS	1103	937	994	1001	640	1074	1236	AON
	Great Black-backed Gull	*Larus marinus*	27	AOS	18	18	16	17	-	23	23	AON
Alderney	Fulmar	*Fulmarus glacialis*	50	AOS	-	-	26	-	38	34	-	AOS

Table 2, showing bird numbers for specific species covering Seabird 2000 and 2005 to present

3.2.4. Predators

Peregrines are thought to be a main predator of the majority of the seabirds nesting on Burhou (all three gull species, Puffin, Storm Petrel). Studies have also shown that some Great Black-backed Gull individuals specialize in Puffin predation and so predate Puffins and their chicks (Soanes and Michel, 2005).

Lesser Black-backed Gulls are also known to steal fish from Puffins as they attempt to feed their chicks (known as kleptoparasitism). If the degree of kleptoparatism within a puffin colony is high this can affect Puffin breeding success.

3.2.5. Monitoring and management

The strong bird surveys will continue on from previous work through this five year ARS2. This will include population and productivity assessments on gulls, Puffins, Ringed Plovers, Common Terns and Gannets. Population monitoring will also be carried out on Storm Petrels, as well as maintenance of artificial nest boxes, and productivity monitoring on Shags. The ARS2 will also look into establishing an expanded rotational survey plan, allowing for the identification and regular monitoring of key seabird colonies, namely Casquets, Coque Lihou, Sister Rocks, the south cliffs of Alderney, Hannaine bay and Houmet des Pies. In line with the continued monitoring work carried out by AWT, the data collected will go to the Joint Nature Conservation Committee (JNCC) their Seabird survey 2013-16, a national British bird assessment.

In parallel to survey monitoring works, habitat management will be conducted on Burhou. This will include bracken control on Burhou, especially ensuring paths are clear and bracken does not grow up around the hut. This will mean that any nesting Great Black-backed Gull nests will be more evident and can therefore be removed to deter nesting near the main Puffin colonies.

The gull exclusion zone will continue to be managed with nests of Lesser Black-backed Gulls and Great Black-backed Gulls lying within 50m of Puffin burrows in the Hut colony being deterred (eggs and nest removed). Due to the increase in Puffin population recruitment, gull management in the exclusion zones in the East and West colonies will no longer be continued from ARS1. However, nests of Lesser Black-backed Gulls within 5m of any Puffin burrow will be removed. Due to the national decrease in Herring Gull numbers, now red-listed (IUCN), Herring Gull nests will not be disturbed. Due to the difficulty in distinguishing Herring Gull nests from Lesser Black-backed Gull nests, only nests which have been seen to be incubated by Lesser Black-backed Gulls will be removed.

The exclusion zone will be re-evaluated in light of significant changes in gull and Puffin populations on Burhou.

The nest of the Great Black-backed Gulls nesting in close proximity to the eastern Puffin colony should be continued to be removed.

Invasive species, such as hottentot fig will also be continued to be removed from Burhou.

3.2.6. Associated birds

3.2.6.1. Common Tern *(Sterna hirundo)*

All Tern populations in NW Europe were bought to the brink of extirpation at the end of the 19th century by hunting of adults for the millinery trade, but recovered in response to protective legislation in the early 20th Century. However, over the last three decades the UK Common Tern population has remained broadly stable. Common Terns are Amber listed in Birds of Conservation Concern.

Common Terns nest on the east side of Alderney, normally around Bibette head. They are the only species of Tern to regularly breed in the Channel Islands, with Alderney usually holding approximately 15 – 20% of breeding pairs. This is normally around 20-30 pairs but there is high variation from year to year (Seabird 2000).

3.2.6.2. Ringed Plover *(Charadrius hiaticula)*

Ringed Plovers are Amber listed in Birds of Conservation Concern. Ringed Plovers that choose beaches for nesting are especially vulnerable to disturbance. Human usage of beach areas severely restricts the availability of this habitat to nesting Plovers. This marked increase in nest failures at the egg stage has earned Ringed Plover a place on the BTO Nest Record Scheme concern list (Leech and Barrimore 2008).

Between two and four pairs of Ringed Plover are normally observed nesting on the upper shingle of Platte Saline every year. Monitoring of these nesting pairs have indicated that they have a relatively low success rate, most likely due to the high disturbance from human use due to Platte Saline being available for dog-walkers during the breeding season.

3.3 Terrestrial

3.3.1 Fauna

3.3.1.1. Rats

There is lots of evidence that birds, especially ground nesting such as the Puffin, are particularly vulnerable to predation by rats (Hobson, Drever and Kaiser, 1999). With the Alderney Ramsar site in a large part being designated for its bird species (see Table 1, p.11), invasive rat populations and their potential predation have to be considered. Rat monitoring was undertaken in 2006 and again in 2008, which found that rats were present at Houment des Pies and at Hannaine Bay. Both of these are, or have a causeway, attaching them to Alderney. Rat monitoring of all the islands and key rocks for birds should have monitoring work continued and where rat population status currently unknown (Sister rocks, Fourquir, L'Etac de la Quoire, Queslingue and Casquets) it should be established. Positively, prior work has not found rats on any rocks or islands not connected to the mainland of Alderney. Chew stick (candles and oily wooden dowels) methodology will be used as it is non-destructive and does not impact non-target species (Quy *et al*., 1993).

3.3.2 Flora

In view of the revised Strategic Focus for the ARS2 (see section 2.1), the ARS2 will seek to establish an ecological baseline of flora through Phase I and II surveying for Burhou and associated islets. In conjunction with this a floral species list will be produced for the South Cliffs of Alderney.

3.4 Invasive species

Invasive species, whether introduced intentionally or unintentionally, can have potential devastating consequences on natural ecosystems, and may lead to great changes in the functioning of the ecosystem (Bergstrom *et al.*, 2009), effecting diversity and processes (Mooney and Hobbs, 2000, pg. xiii). Biodiversity loss, of which invasive species are considered to be the primary direct factor ('Invasive Alien Species', n.d.), is a global issue and an underlying consideration of the Convention of Biological Diversity.

It is worth mentioning that Spanish bluebells (*Hyacinthoides hispanica*) are an invasive species which has become very prolific within Alderney, as in the rest of the British Isles. However, it has been decided that due to the great extensive spread of the Spanish bluebell it would be too much to consider mapping and monitoring them within this Strategy.

Within Alderney and its Ramsar site there are three main invasive species for consideration; slipper limpets (*Crepidula fornicate*), japweed (*Sargassum muticum*), and hottentot fig (*Carpobrotus edulis*). These species are considered to be important and management could have a noticeable difference.

3.4.1 Slipper limpet (*Crepidula fornicate*)

Slipper limpets are an invasive species from North America, which came to the British Isles around 1890 alongside oysters (*Crassostrea virginica*) (Slipper limpet Crepidula fornicate, n.d.). Slipper limpets have been found within the bay of Mont Saint-Michel in France and in Jersey. Although there are no large-scale shellfisheries within Alderney's waters, so economic issues are not as important, if slipper limpet colonies are allowed to build up to significant numbers they can change the benthic community (Blanchard, 2009).

3.4.2 Japweed (*Sargassum muticum*)

Japweed was introduced into the Solent in Britain in the 1970's from China and Japan (Wireweed Sargassum muticum, n.d.). Like the slipper limpet, japweed is thought to have been introduced through the importation of oysters. Japweed is fast growing and can potentially choke out other algae within the intertidal zone. Japweed is present in Alderney and needs to be monitored as to the extent and spread around the island.

3.4.3 Hottentot fig (*Carpobrotus edulis*)

Hottentot fig in an invasive species from South Africa that is rapidly smothering the coastline of Alderney. It was exported as an ornamental and ground cover plant, arriving in

Alderney around 1880, with the first record in its wild form in 1953 (S. Lewington, Pers. Comm). It thrives in our mild climate, without any natural controls or predators, forming thick mats that shade out the wide variety of native coastal flowers. Carpets of hottentot fig, which can be up to 50cm thick, alter the soil resulting in high levels of acidity, salt and nitrogen make it hard for any other plants to grow.

Careful monitoring and removal of this species needs to be set up in order to ascertain its current spread and work towards reducing it.

3.5 Education & Publicity

Education and publicity will help to underpin support and appreciation of the Ramsar site from local people and visitors. Burhou and its Puffin population are already an emotive issue for both locals and visitors alike, which in turn helps drive an interest towards protection and conservation efforts of the Puffins, as outlined within the ARS2.

The ARS2 and its work will be promoted through AWT events and website, enabling those interested to keep up to date on Alderney's wildlife and the development of the Ramsar site. AWT has also invested in the production of signs and leaflets to help inform the public on the Ramsar site and the species within it.

AWT will develop educational events for the public, for example within Wildlife Week (a weeklong series of events held by AWT), as well as sessions with the local school children. As a part of the ARS2, AWT will try and secure university placements to develop our knowledge and give students an opportunity to extend their knowledge.

3.5.1 Public

The 'public' referred to within this section is defined as the general public as a whole, those who have a vested interest, or a specific interest within the site as to its management will be classed as stakeholders. (See section 3.5.1 for stakeholder engagement.)

The public engagement and education will continue in the same manner as it has since the sites inception. This includes:

- leaflets on birdlife and the Ramsar site, already published by AWT,
- the continuation of successful and popular walks held by AWT, which are lead by various specialists on aspects within the Ramsar site.
- events held by AWT such as rock pooling sessions are held, allowing children and adults access to the shore with experts on hand to teach about various species and issues relating to coastal conservation. three detailed sign boards placed within the Ramsar area to help inform and educate the public, as well as notices on Burhou stating the 'closed season' in order to restrict disturbance to nesting birds such as puffins and storm petrels. These signs will continue to be maintained and when necessary updated.

Previous public engagement work under the Ramsar site management has led to the development of a highly popular and successful 'Puffin Cam', which was the second to be developed in the British Isles. Going forward, the ARS2 will look to further develop Puffin Cam to enable a live stream of the puffins whilst on Burhou, as well as the potential for a Storm Petrel Cam, which to date[2] has never been managed. If successful, these two cameras will provide an invaluable educational and promotional tool for puffins, storm petrels and the Alderney Ramsar site as a whole.

3.5.2 Education

3.5.2.1. School sessions

Throughout the five years of the ARS2, AWT will liaise with both schools on Alderney, (St. Anne and Ormer House) and appropriate groups (such as the Scouts) to design educational talks and activities associated with the Ramsar site and Alderney's wildlife. These will be aimed at educating the local children about their important local wildlife as well as giving them a firsthand experience of it. These activities can range from rock pooling events, to seabird talks and the production of publicity materials for wildlife campaigns. These activities will be carried out throughout the ARS2 term in conjunction with main AWT events and as separate events.

3.5.2.2. University projects

The ARS2 will see the development of an academic research programme, this will allow for the generation of academically reviewed research within the Ramsar site to inform on the continued management of the area. The academic research programme will compose of looking to successfully secure a PhD case study within the five years of the ARS2 and two taught MSc projects. There will also be the potential, depending on the projects that can be supervised by AWT staff, for undergraduate projects, whether they could be short term projects or form a part of a final year dissertation.

The MSc or undergraduate projects will be designed to cover social, cultural, economic and environmental resource studies of the Alderney Ramsar site. Such topics could cover fish or crustacean population assessment, the establishment of key foraging locations of specific target species (i.e. Shag, Gannet).

The projects offered will be dependent on the skill sets of the current AWT staff, who normally have a year placement with the staff and so areas of expertise will change on a annual basis. This will help to provide a range of different projects being offered to help keep attracting student placements and broadening the knowledge of AWT who manage the Ramsar site on behalf of the States of Alderney.

3.5.2.3. PhD project

[2] At the time of publishing

By the time of publication, a join PhD proposal, with the University of Liverpool, BTO, ACRE and AWT, on the impacts of marine resource exploitation on Alderney's seabirds had been approved by the University of Liverpool. The project is funded by ACRE, who will be provided with information gathered detailing the impacts of tidal energy developments on Alderney's seabird populations, as a result of the study.

This PhD will aim to establish the foraging behaviour and locations of Alderney's Gannets and Shags using the latest low-cost GPS tracking methodology. It will also aim to monitor the size, success and behaviour of Alderney's seabirds at the population level. Individual behaviour and population data will then be combined into a behaviour-based model. This model will aim to understand what changes in seabird behaviour and populations might take place during the installation of the small-scale marine renewable energy installations project, and also to predict the potential impacts of any future larger-scale operations.

This PhD has been established after an initial pilot study between the organizations, with funding from ACRE, in 2011. Within which 23 data loggers were attached to gannets breeding on Les Etacs. Within six days 17 loggers had been retrieved, revealing the locations of 34 foraging trips (see figure 2).

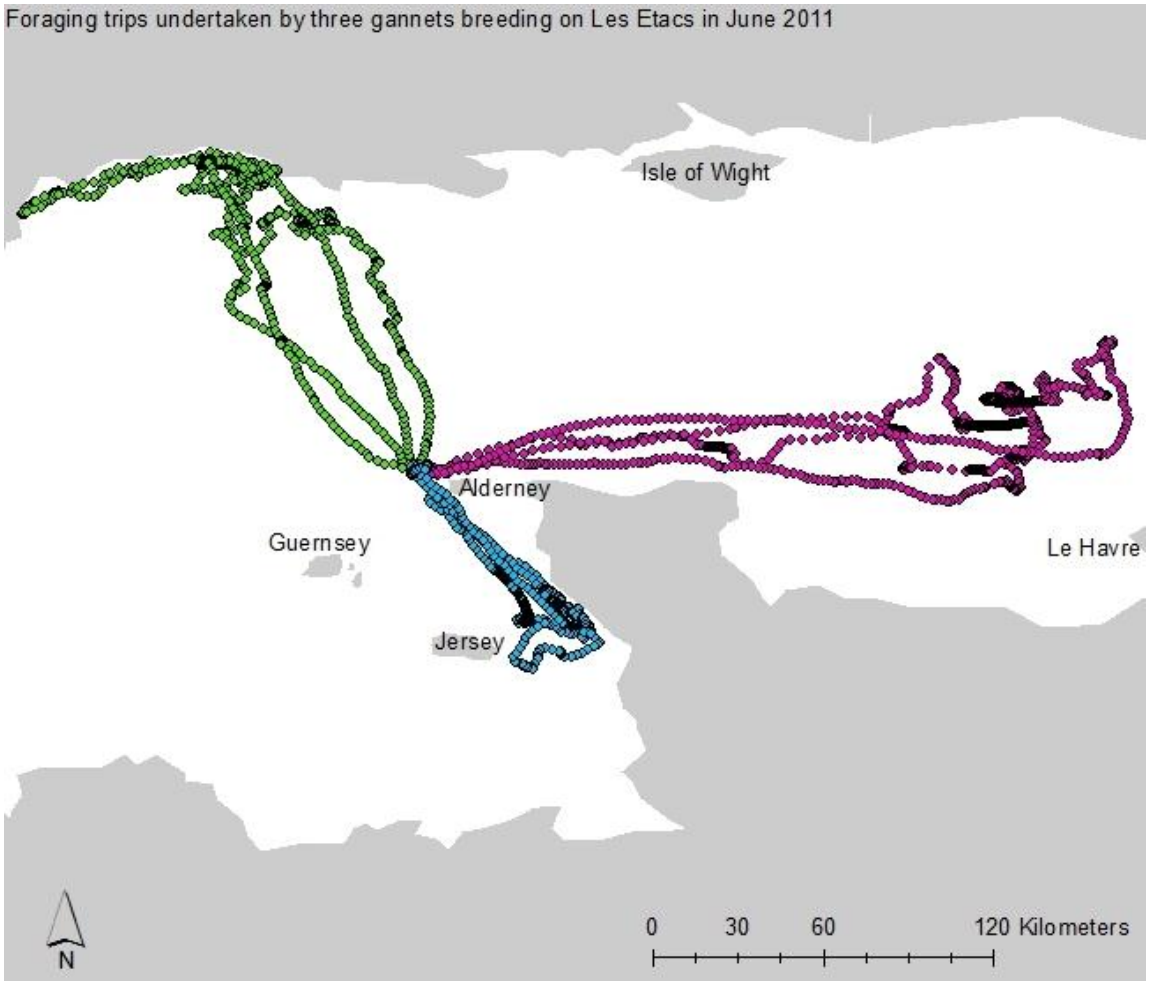

Figure 2, Preliminary results from GPS tagging of Northern Gannets on Les Etacs, Alderney

3.6 Advisory & Legislation

The advisory and legislative aims of this five year ARS2 are focused on developing a stakeholder advisory group and developing and enacting policy and legislation protecting the natural environment of Alderney as a whole, including the Ramsar site.

3.6.1 Stakeholder Engagement

Stakeholders within this context are people or organizations which have a vested interest within the Ramsar Site and could range could range from fishermen, who use the area everyday for their livelihood to walkers who may only walk along the edge of the site every other month.

It is a priority agreed by the GSC that better communication with the public and vested parties is key to the sites future and to do this a stakeholder group and links with similar organizations within the geographical area need to be established.

A stakeholder list of the Ramsar site would help to promote and demonstrate the Ramsar Convention's 'wide use' principle. A dedicated Stakeholder Steering Group (SSG), which is to be set up by 2016 in order to review and advise on the following five year ARS, should be developed from initial works on a user and uses list for the Ramsar site. The Stakeholder group would be able to advise on their areas of interest or specialty, be that fishing, botany or recreational use, and an interested varied group would also ensure that full consideration is given to all aspects when considering management or protection decisions.

It is important to note that although ecological conservation is of the highest importance within the Ramsar site, environments are not only important for their resources but for aesthetic value and cultural associations.

> 'It has become more than evident that the fate of wetlands depends on human attitudes and activities, and that incorporating cultural values in our work can be beneficial for conservation and wise use efforts.' (Ramsar Culture Working Group, 2008)

The Ramsar Convention viewed the incorporation of cultural values as so integral to their guiding principles they approved two resolutions;

Resolution IX.21	Taking into account the cultural values of wetlands
Resolution VIII.19	Guiding principles for taking into account the cultural values of wetlands for the effective management of sites

Table 3, Resolutions relating to the incorporation of cultural values in The Ramsar Convention (Resolutions of the Conference of the Contracting Parties, n.d.)

Due to the fluid nature of the seas and migratory patterns, observed networks within the Channel Islands and with similar organizations in France should be looking into being developed. The rational being that through establishing and managing networks, organisations can more easily liaise on common problems experienced and develops more coherent sightings of migratory marine species (sea birds and marine mammals) within shared ecosystems (De Fountanbert, Downes and Agardy, 1996, pg18).

With this in mind, it is suggested that:

- further strengthened links with the French Normand-Breton Marine Natural Park programme should be developed.
- the potential for a co-operative Channel Islands Ramsar network be investigated, with potential for a shared website for resource, data (particularly focusing on invasive species) and communication, for use of the different Ramsar managing bodies and the public.

3.6.2 Development of Policy & Legislation

In accordance with being a signatory of the Ramsar Convention 1971, Alderney is required to review and update its Ramsar Information Sheet (RIS) regularly. As well as publishing an up to date RIS when required by the Ramsar Convention. AWT will, as part of its commitment to this Strategy, review any significant changes and update the RIS annually as part of the yearly review process e.g. species population changes.

An Oil Spill Action Plans will also be produced detailing what course of action to take place in the event of an oil spill within the Ramsar area and responsible parties to consult and inform. Alderney's Harbour Office has an Oil Pollution Response Control plan, this details what to do in response to an oil spill from a tank within the harbour, and the migration of oil from this point. This plan deals solely with light oil. Alderney is a small island which has a large amount of shipping trade, commercial shipping as well as passenger boats. Added to this Alderney is situated close to one of the busiest shipping lanes in the world, the English Channel. Therefore, in order to be proactive in protection of Alderney's Ramsar site and wildlife an Oil Spill Action Plan details how to respond to an oil spill located outside the harbour will help to reduce the damaging effects of a potential oil spill.

The ARS1 contained a main objective to see the development of an Alderney Environmental Protection Act. This Act would allow for the designation of marine and terrestrial protected areas and specific protection awarded to threatened or endangered species, in line with legislation in the UK and EU. In the development stages of an Act a list of Conventions, of which Alderney are signatory to alongside the Bailiwick of Guernsey, will be produced. This list will then be used to establish existing requirements from these Conventions, which can then be consolidated in an Alderney Environmental Protection Act. To pass an environmental Act in Alderney, as a Crown Dependency, it is a long process where the Act will have to go to the Privy Council to be ratified. The first stages of this will be for Alderney to create an Ordinance, before going to the Privy Council.

4. Planned Works

This section covers the planned works which have been timetabled for 2012 along with a timetable of works for the whole five years of the ARS2. The timetable of works for the five years is subject to change as is seen fit by AWT, and each year's work will be timetabled and put to the States of Alderney for formal approval the December prior to the survey year. So for the survey year 2013 a timetable of works will be produced and put for the States of Alderney's approval in December 2012.

4.1. Timetable of Works 2012

Figure 3 shows the dates during which the surveys will take place. The times given are a guide, during which period the most suitable days for surveying will occur, taking into account weather, tides, ecological factors and resources.

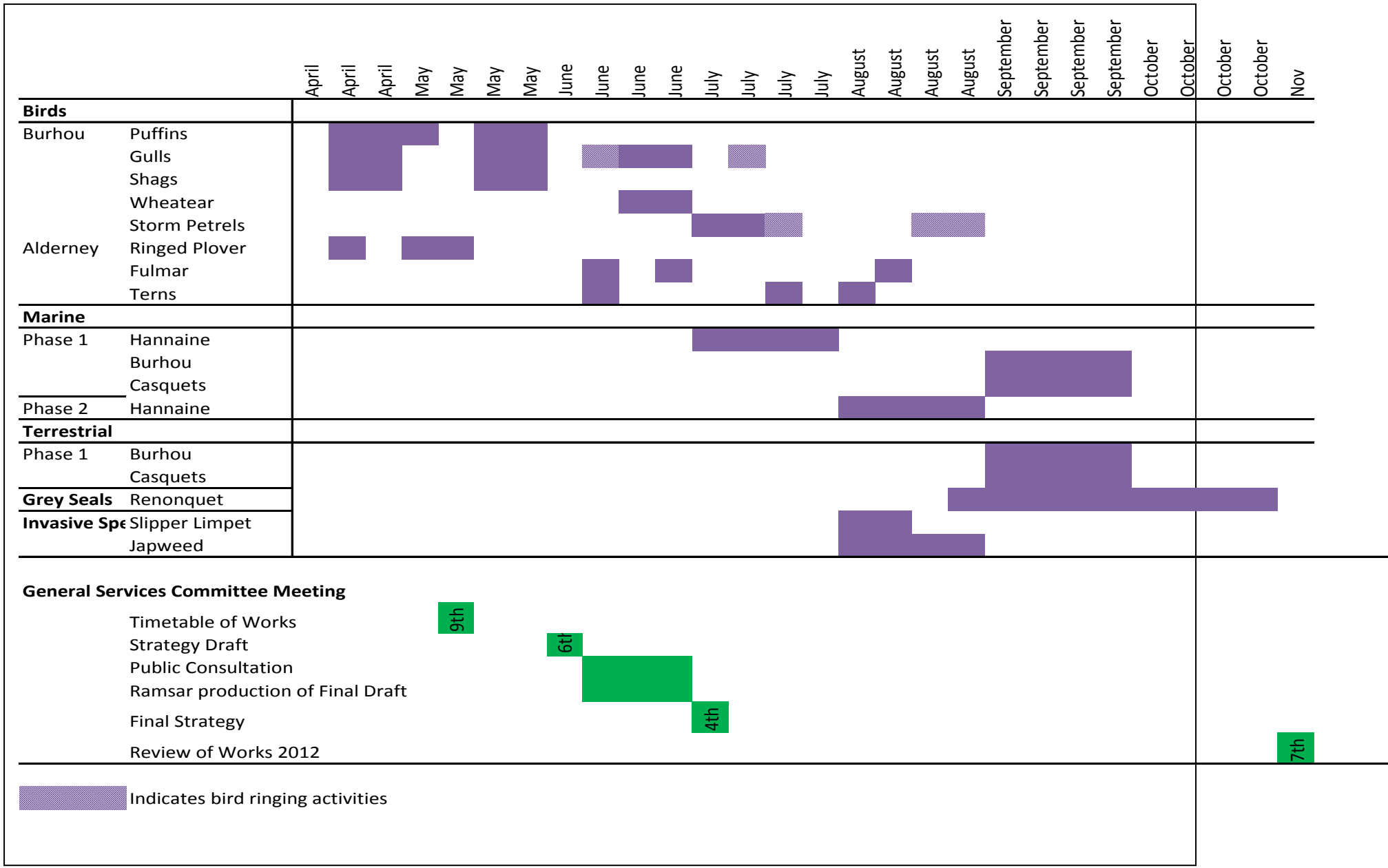

Figure 3. Timetable showing the weeks during which surveying will occur

4.2. Outline of Works 2012-2016

Table 3 outlines a guide plan for what work will be carried out each year. This is not the definitive plan for the five years of the ARS2 but should be used as a guiding plan and has been designed to help AWT plan their work load per year.

	2012	**2013**	**2014**	**2015**	**2016**
Marine	**Intertidal ecology:** Marine intertidal biotope habitat mapping project of Hannaine Bay (Phase I) Intertidal species quadrat project of Hanaine Bay (Phase II) Marine intertidal biotope habitat mapping project of Burhou and associated rock (Phase I) **Marine Mammals:** Seal population study at Les Rocquets.	**Intertidal ecology:** Marine intertidal biotope habitat mapping and quadrat project of Burhou and Clonque bay (Phase I &II) **Benthic ecology & topography** Large Scale Bathymetry, Video Works, Sediment Analysis	**Benthic ecology & topography** Large Scale Bathymetry, Video Works, Sediment Analysis	**Benthic ecology & topography** Large Scale Bathymetry, Video Works, Sediment Analysis **Pelagic ecology & geography** Tidal Flow, Turbidity, pH, Salinity, **Marine Mammals:** Seal population study at Les Rocquets.	**Pelagic ecology & geography** Tidal Flow, Turbidity, pH, Salinity,
Terrestrial	Phase I Burhou	Phase I Burhou and Phase I Casquets	Terrestrial Phase I Habitat Survey Map Review Phase I & II Habitat Survey South cliffs of Alderney	Phase I & II Habitat Survey South cliffs of Alderney	Phase I & II Habitat Survey South cliffs of Alderney
Seabird	Burhou Seabird Monitoring	Burhou Seabird Monitoring Full Seabird Survey of	Burhou Seabird Monitoring	Burhou Seabird Monitoring Rat survey of rock islet	Burhou Seabird Monitoring Seabird Census Survey

		Coque Lihou Rat survey of Burhou			2013-16
Invasive species	Control of hottentot fig within the Ramsar site Monitor the distribution of Slipper Limpet & Japweed	Control of hottentot fig within the Ramsar site	Invasive Species (Marine & Terrestrial) Review Report Point Control of hottentot fig within the Ramsar site Monitor the distribution of Slipper Limpet & Japweed	Control of hottentot fig within the Ramsar site	Invasive Species Final Review Report Control of hottentot fig within the Ramsar site Monitor the distribution of Slipper Limpet & Japweed
Education & Publicity	Events/programmes for the public and schools	Events/programmes for the public and schools	Events/programmes for the public and schools PhD MSc	Events/programmes for the public and schools PhD	Events/programmes for the public and schools PhD MSc
Advisory & Legislative	Oil Spill Action Plan Production of Ramsar Stakeholder List and Ramsar Stakeholder Group Develop and utilise links with the French Normand-Breton Marine Natural Park Investigate co-operative CI Ramsar Network	Production of Ramsar Stakeholder List and Ramsar Stakeholder Group Production of Conventions list Investigate co-operative CI Ramsar Network	Alderney Environmental Conservation Act	Alderney Environmental Conservation Act	Alderney Environmental Conservation Act
Ramsar	Update Ramsar Information Sheet	Update Ramsar Information Sheet	Update Ramsar Information Sheet	Update Ramsar Information Sheet	Update Ramsar Information Sheet

Table 4, showing a guideline for work to be carried out over the five years of the Alderney Ramsar Strategy

5. Cost Requirements

Table 4 is an initial estimate at the costs required, set out per year for the five years of the ARS2. The work will be funded through payments from the States of Alderney for undertaking the work on their behalf and by funding provided by AWT itself.

PROPOSED RAMSAR WORK COSTINGS 2012-2016	2012	2013	2014	2015	2016
Existing work continuance	£6,000.00	£6,000.00	£6,000.00	£6,000.00	£6,000.00
Burhou surveyor living cost increase	£600.00	£600.00	£600.00	£600.00	£600.00
Marine					
Benthic & Pelagic surveys					
- side scan / bottom profilig / pelagic mapping		£5,600.00			£5,600.00
- camera survey		£5,300.00			£2,650.00
- surveyor cost of living (£110 p/week)		£880.00			£730.00
Intertidal (whole Ramsar site)					
- Phase 1 (boat time/cost)	£2,400.00			£2,400.00	
- Phase 2 - dependent on results of Phase 1 and available resources					
- surveyor cost of living (£110 p/week)	£495.00			£495.00	
Marine Mammals (Cetaceans)					
- Co-ordination of existing information and oversee new work					
- cost of literature and website	£800.00				
- surveyor cost of living (£110 p/week)	£357.50	£357.50	£357.50	£357.50	£357.50
Terrestrial					
- Phase 1	£0.00				
- Phase 2 - dependent on results of Phase 1 and available resources					
- surveyor cost of living (£110 p/week)	£110.00				
Research					
- MSc (annual)	£710.00	£710.00	£710.00	£710.00	£710.00
- Phd (Case) - 3 yearrs			£1,000.00	£1,000.00	£1,000.00
Additional Seabird work - surveys of Coque Lihou & Casquests	£720.00				
- surveyor cost of living (£110 p/week)	£63.00				
	£12,255.50	£19,447.50	£8,667.50	£11,562.50	£17,647.50
TOTAL	£69,580.50				
averaged over 5 years	£13,916.10				

Table 5, showing the initial estimate costs for the five year period of this Alderney Ramsar Strategy 2012 -16

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6. Appendix

Appendix 1 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 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 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 2 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 windblown 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 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 clifftops 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 peregine Falco peregrinus, and clifftop vegetation may provide important feeding grounds for chough Pyrrhocorax pyrrhocorax.

Hard cliffs are widely distributed around the more exposed coasts of the UK, occurring principally in south-west and southeast 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 ignificance. 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 craccae 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 he 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 asmuch 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 nestingseabirds, 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 impacton 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 flora 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 in to 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, 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-madeassets, 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 extend 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 agrienvironment 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 3 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 cuspate 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 s ea 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 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 cuspate 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 albimacula, 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.

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 Wale s. 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 for a 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.