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9 Birds

9.1 Introduction

The islands of Guernsey, Sark and Herm and their off-lying islets host a range of seabirds throughout the year and up to thirteen species breed within the study area. Although only a relatively small number of individuals of some species, such as Puffin *Fratercula arctica* breed locally, others such as Shag *Phalacrocorax aristotelis* have a local population of international importance.

Seabirds, and to a lesser extent, other groups of birds use Guernsey waters in a number of ways and any tidal or wave power installations would be likely to impact some species and populations to a degree. In this chapter, a brief summary of local birdlife is given, followed by an analysis of possible impact and mitigation.

It is acknowledged that data on how birdlife uses local waters is extremely limited as most seabird activity occurs in areas which are not viewable from land. There are also variables such as tidal cycles, seasonal changes, the effects of wind and weather, and man's activity, specifically fishing to consider. In order to obtain a more accurate assessment, recommendations on future research and monitoring are also provided.

9.2 Baseline Environment

The Bailiwick of Guernsey hosts a wide variety of birdlife despite the restricted land mass. With its mosaic of habitats, around 60 species breed in a typical year and the full list of recorded breeding birds is c.100 species. Coastline habitats, in particular cliffs and small islets, are well represented locally and provide widespread opportunities for seabirds to breed. Local waters provide feeding areas for both breeding and non-breeding seabirds, with each species having unique foraging requirements.

Recording of local birdlife is generally adequate, with breeding species having been surveyed on several occasions in the past and casual recording contributing to provide a more comprehensive database.

<u>Breeding seabirds</u>

Three comprehensive surveys of local breeding populations have been undertaken in the last 40 years as follows –

Seafarer (1970)

Seabird Colony Register (1986-1992)

Seabird 2000 (1999-2001)

The fieldwork for the three projects was undertaken by volunteers and each involved numerous visits to survey the widespread colonies. The table on page 166 provides the population figures for each species. The areas identified as important breeding areas are outlined below.

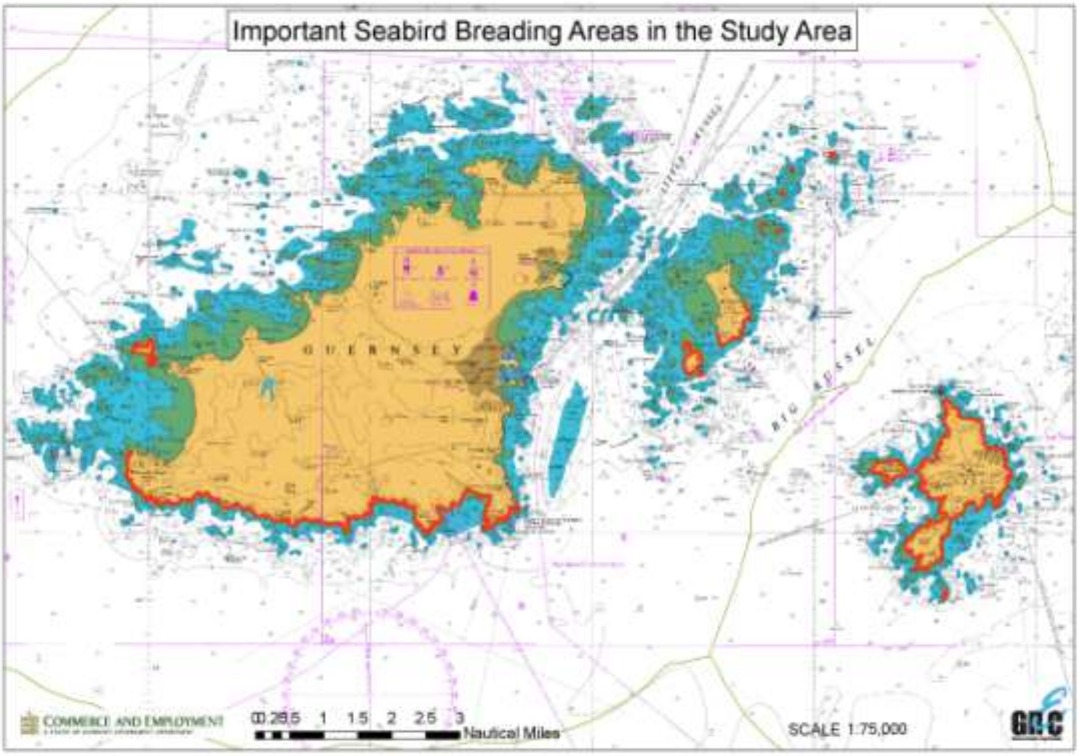

Figure 9.2.1: Identification of seabird breeding areas.

Photo 9.2.1. Fulmars (Fulmarus glacialis) colonised the Bailiwick in the 1980s and there is now a widespread stable population (Photo: Paul Hillion www.islandbirds.co.uk)

Photo 9.2.2. Guillemots (Uria aalge) dive to considerable depths in order to catch small fish (Photo: Paul Hillion www.islandbirds.co.uk)

Table 9.2.1 – Summary of bird surveys in the bailiwick over the last 40 years

Island Survey	Fulmar	Manx Shearwater	Storm Petrel	Gannet	Cormorant	Shag	Lesser Black-backed Gull	Herring Gull	Great Black-backed Gull	Kittiwake	Common Tern	Guillemot	Razorbill	Puffin
GUERNSEY														
Seafarer 1970	0	0	0	0	0	43	12	500	10	0	7	0	0	0
SCR 1986-92	35	0	0	0	0	130	80	855	60	0	30	0	0	0
Seabird 2000	23	0	0	0	0	120	115	1350	70	0	5	0	0	0
HERM														
Seafarer 1970	0	0	0	0	4	145	40	400	42	0	0	24	2	35
SCR 1986-92	40	15	0	0	30	350	140	290	90	0	80	75	35	95
Seabird 2000	15	0	0	0	13	365	160	375	73	0	23	80	20	45
SARK														
Seafarer 1970	0	0	0	0	0	45	135	1350	40	0	0	110	12	50
SCR 1986-92	60	40	0	0	2	180	685	440	30	0	20	190	30	100
Seabird 2000	45	0	0	0	0	160	855	495	28	0	5	305	28	55
ALDERNEY														
Seafarer 1970	0	0	13	3000	2	75	115	270	45	12	0	40	14	1028
SCR 1986-92	40	0	35	4850	1	180	330	500	45	80	30	170	80	330
Seabird 2000	55	0	130	5920	3	175	345	400	55	3	20	85	50	223
TOTALS														
Seafarer 1970	0	0	13	3000	6	308	302	2520	137	12	7	174	28	1113
SCR 1986-92	175	55	35	4850	33	840	1235	2085	225	80	160	435	145	525
Seabird 2000	138	0	130	5920	16	820	1475	2620	226	3	53	470	98	323

Despite species fluctuations between islands and between surveys, the bailiwick continues to support nationally and internationally important numbers of some species. Of the 13 local species, four (Shag, Gannet *Morus bassanus*, Lesser Black-backed Gull *Larus fuscus graellsii*, Herring Gull *Larus argentatus*) are significant, as shown in the table below:

Table 9.2.2 – Populations of bird species in the Bailiwick that are of internationally significance

Species	Bailiwick population (pairs)	British population (pairs)	Percentage in Bailiwick	European population (pairs)	Percentage in Bailiwick
Shag	820	28,580	2.9%	86,630	0.9%
Gannet	5,920	226,500	2.6%	229,660	2.6%
Lesser Black-backed Gull	1,470	142,940	1.3%	219,570	0.7%
Herring Gull	2,670	142,940	1.9%	789,940	0.3%

Some of Guernsey's seabirds are also important in terms of their location, with Fulmar *Fulmarus glacialis*, Gannet, Razorbill *Alca torda*, and Puffin on or very near to the southern limit of their breeding range. Outlying colonies such as these are often more vulnerable to environmental change.

Figure 9.2.1 illustrates islets and areas of coast which are important for local breeding seabirds. In addition to the areas highlighted, much of the coastline of Alderney, and all of its offshore islets are also of nature conservation importance.

Birds at Sea

Data on bird behaviour, specifically seabirds, at sea is sparse. Although there has been considerable effort in surveying birds at sea in European waters for the last 20 years, it is assumed that in terms of a local context, this database is of limited value. The precise information required to map the use of different areas of Bailiwick waters does not currently exist and only the most basic of anecdotal evidence is available. This gap in our current knowledge highlights the potential value of using techniques such as data loggers to track seabirds within the study area.

Non-seabird species

In the non-breeding season, variable numbers of divers, grebes and wildfowl overwinter in local waters. There has been a general decrease in overwintering marine birds in the last 20 years, probably due to milder temperatures although small numbers of several species are still recorded with reasonable frequency each year.

Observations of overwintering birds are mainly limited to viewable areas such as bays and harbours. Such locations also appear to be the most suitable for the species involved, as most dive to forage in benthic communities. Deeper water is therefore assumed to be a less productive habitat.

Land birds

Although the term 'land birds' is not a scientific one, it makes a convenient distinction from those species which live in the local marine environment for all or part of their life cycles.

Any renewable energy proposal would need to address the effects on two groups of land birds – migrating species, and birds which live – for all or part of the year - in locations where cables may come ashore.

1. Migrating species – Although the Bailiwick is not situated on a particularly busy or important migration route, or 'flyway', at certain times during the spring and autumn migrations, birds may arrive or depart the islands in considerable numbers.

   Research has shown that birds generally migrate at a height of 500m or less. Occasionally, possibly due to the weather, terrain or species involved, altitudes increase to 1000m or more. However, as birds approach land after a sea crossing, there is a tendency to lose height and migrants will often drop near to sea level. In adverse conditions, loss of height occurs at greater distances from land and some individuals may even ditch in the sea and die.

   Birds making a sea crossing will often veer towards land to make landfall at the earliest opportunity. In this respect, headlands, such as Pleinmont, Jerbourg, Icart and parts of L'Ancresse Common are important areas for migrants.

2. Birds in cable landing areas – Many coastal areas support various habitats, including beaches, shingle banks and sand dunes and are often in a relatively unspoilt state. The associated wildlife can be rich or locally valuable. For example, some beaches, such as Belle Greve, are important feeding areas for overwintering populations of wader species, or may be used as roost sites. A small number of bird species (Rock Pipit *Anthus petrosus*, Meadow Pipit *Anthus*

pratensis, Stonechat *Saxicola* torquata, Linnet *Carduelis cannabina*) breed in coastal locations, some exclusively so.

La Société Guernesiaise has carried out monthly 'Wader Counts' around much of Guernsey's coastline for more than 30 years. The study highlights the relative importance of the island's beaches for waders in general and for individual species.

<u>Protected Sites</u>

RAMSAR sites

There are currently three designated sites – Burhou and surrounds in Alderney, the Gouliot Caves in Sark, and Lihou Island and surrounds in Guernsey. There are also plans to designate parts of north Herm, including The Humps, as a fourth local site. RAMSAR status recognizes wetland or marine areas which are of international importance.

In terms of seabirds, the existing RAMSAR sites are only of equal importance to other nearby non-designated areas. The exception is the Alderney site which hosts internationally important Gannet colonies and the Bailiwick's largest Puffin colony. The proposed site in Herm would also be of importance in terms of marine birds due to The Humps supporting mixed seabird colonies.

Sites of Nature Conservation Importance (SNCIs)

The network of SNCI sites was introduced by the Board of Administration (now the Environment Department) following recommendations in a report submitted by Land Use Consultants (1989). This local designation only applies to terrestrial areas and although some sites include intertidal zones, they do not extend to the marine environment. They include a number of Guernsey's larger beaches and the entire length of the south coast cliffs. There are no designated areas in Herm or Sark although there are several sites, such as islets of The Humps to the north of Herm, Herm Common and Les Autlets in Sark, which would qualify as SNCIs . Some sites such as Belle Greve, Grande Havre or L'Ancresse Common may affect the site selection process for bringing cables ashore.

Important Bird Areas

There are several sites across the Bailiwick, which meet the criteria for designation as Important Bird Areas (IBAs) as recognized by the International Council for Bird Preservation (ICBP). There is considerable overlap between IBAs and SNCIs although Veron also lists the islands of Herm and Jethou, and Sark and Brecqhou, together with the numerous associated islets as having 'Channel Island Importance', based almost entirely on their breeding seabird populations.

G
arden Rocks (Les Etacs) near Alderney. One of two local Gannetries (Photo: Paul Hillion www.islandbirds.co.uk)

Foraging and feeding behaviour of seabirds

Some seabirds are largely migratory and only use local waters during the breeding season. At other times of year, these species either migrate south or resume a pelagic life in the Atlantic Ocean. Some members of the gull family, together with Shag and Cormorant are year-round residents of inshore waters.

In order to find food or catch prey, seabirds may use several sensory capabilities, including vision, sound and chemo-reception. Of these, only the petrels use chemo-reception (smell) to help locate food and for most species, vision is primarily used. Sound is not thought to be used to any degree.

In terms of feeding mechanisms, each species or family feeds in a different manner, as outlined in the table below.

Table 9.2.3 – Feeding mechanisms of seabirds in the Bailiwick

Group	Species	Diet	Feeding method	Diving depth	General range
Petrels	Fulmar, Manx Shearwater, Storm Petrel	Varied	Surface scavenging, shallow dive	Normally <20m Rarely up to 50m	Offshore, mostly beyond study area
Gannets	Northern Gannet	Pelagic fish	Dive from considerable heights	Normally <25m Rarely up to 50m	Widespread, often beyond study area
Cormorants	European Shag, Cormorant	Benthic fish	Dive from surface to seabed	Normally <20m Rarely up to 40m	Normally within 1-2km of coast
Gulls	Herring Gull, Great Black-backed Gull, Lesser Black-backed Gull, Black-headed Gull & other species	Varied	Foraging, scavenging	Surface feeders	Varies considerably depending on species and colony. Some species (Lesser Black-backed Gull) offshore
Terns	Common Tern, Sandwich Tern	Mainly sand-eels	Shallow plunge	Less than 0.5m	Predominantly within 1-2km of shore
Auks	Puffin, Razorbill, Guillemot	Small fish	Deep dive from surface	Normally <60m Rarely 100m+	Up to 50km from breeding colony

Photo 9.2.4. Lesser Black-backed Gull (Larus fuscus). This common species breeds throughout the area, often in small colonies. The Bailiwick supports internationally important populations. (Photo: Paul Hillion www.islandbirds.co.uk)

9.3 Potential Effects

The possible effects of the installation and operation of marine renewables will vary depending on the location and extent of the project, the type of device involved and the bird species affected. The potential issues involved are outlined below –

Disturbance

There are two main types of disturbance which may affect local birdlife – visual and noise. The main natural threats to birds are primarily recognised in a visual way i.e. a predator will be seen, not heard. Noise is therefore of less importance than visual disturbance although constant noise may eventually have a detrimental impact in some circumstances.

It is assumed that installed tidal or wave devices would be silent above water. It is not known how much underwater noise would be created by operating turbines. The severity of this impact on feeding birds would depend on the nature of the noise, in terms of volume and duration.

Visual disturbance is more closely linked with the installation or decommissioning stages. Seabirds are generally unaffected by marine traffic although visual disturbance in close proximity to seabird colonies, where seabirds are most vulnerable, would have a negative impact. Disturbance in the breeding season can lead to egg chilling, chick starvation, increased predation and colony desertion. These effects are more closely linked with cable installation.

Effect on feeding areas

At present, suitable nesting areas for several species, throughout the Bailiwick, remain unoccupied. For species such as Shag, the main factor limiting population growth is therefore believed to be the availability of food. Consequently, any loss of feeding areas for Shags and probably other species is likely to have an impact. It is also reasonable to assume that colonies situated closer to an array of devices would be impacted more severely.

There is a possibility that an array may have a positive effect on prey fish species, due to the reduction or cessation of fishing by man.

An array of devices may also alter sedimentation processes either in the immediate area or further along the current stream. This may lead to a change in the habitats present and the associated species. A change in the distribution of prey species of seabirds may result and have consequences for local populations.

Collision

There are two types of collision which may affect seabirds – collision during flight and collision underwater during feeding forays.

1. Collision during flight would be likely to occur in heavily used flyways such as narrow channels, approaches to major colonies or around important feeding areas. There are no such flyways in local waters. However, the approaches to the shore, and in particular, cliff areas with breeding colonies, become relatively busy. It is likely that cable installations and wave devices would present a higher risk than the installation and operation of tidal devices.

2. Research on the risk of collision underwater is not currently available, although it has been carried out for other animal groups such as marine mammals and fish. Seabirds which feed underwater are fast, agile swimmers and it is reasonable to assume that the risk is minor, but this remains unproven. The possible exception is the Gannet which dives, often from considerable height and enters the water at estimated speeds of up to 90mph. A collision with submerged structures, even at lower speeds would be fatal and devices would need to be designed accordingly.

Turbidity

As all seabirds feeding in the area mainly use sight to locate food, the level of turbidity in the water column has significant effects on the ability of birds to catch prey. In 2007 and 2008, high levels of suspended silt were recorded in the marine environment following several storm events. This subsequently led to near-complete breeding failure of Shags and reduced productivity in other species. The inability of local seabirds to feed was further demonstrated when dead and dying Shags washed up on Channel Island beaches.

The level of water turbidity around tidal or wave devices may be altered to some degree during installation of the array and cables and also during operation. Such affects are likely to be minor and localized.

Increased turbidity, even in a localized area, may lead to increased risk of underwater collision although compared to the widespread turbidity following storms, the risk is assumed to be low.

Pollution and contamination

Although the sources of contamination are numerous and varied, the risks are low and major incidences are very unlikely. Pollution could arise from accidental spillage of oil or similar substances during the installation phase, or from gradual leaching of toxic materials from the devices, such as anti-fouling paints, over time.

9.4 Sensitivity of receptors

Marine birds routinely face natural collision hazards, areas of increased turbidity and seasonal ‘loss’ of food sources on a regular basis. Generally, seabirds cope well with localized or short term ‘problems’. Behaviour patterns will often be modified to deal with a changing environment.

A tidal or wave energy operation should not present any hazards or risks which the various local species are not able to withstand. For example, the risk of collision, either above or below the surface would not be greater than the risk of collision with boats or rocks, although moving rotor blades present a new and unknown danger.

Any problems of turbidity are assumed to be localized and of much less importance than that experienced after severe storms. Such natural events can occur annually.

Photo 9.4.1. European Shag (Phalacrocorax aristotelis). Although this common species is often seen in near proximity to boats and marine infrastructure, the impacts of renewable energy are, as yet, unknown. (Photo: Paul Hillion www.islandbirds.co.uk)

9.5 Potential Significance of Effects

The Magnitude of the impact is considered in reference to the Value of the receptor (International, Regional or Local) to determine the Significance (see chapter 20).

Table 9.5.1 – Significance of effects

Potential impact	Project phase	Receptor species	Extent of impact	Significance (negative unless stated)
Visual disturbance	All, especially installation	All	Installation area	Minor (non-breeding birds), Moderate (breeding birds)
Noise disturbance	All, especially installation	All	Installation area (construction) Array area (operation)	Minor (non-breeding birds) Moderate (breeding birds)
Effect on feeding areas	All	All	Installation area (construction) Array area (operation)	Minor – may be positive
Collision above surface	All	All	Installation area	None
Collision below surface	Mainly operation	Diving species	Array area	Moderate
Increased turbidity	Mainly operation	Diving species	Array area	Minor
Pollution	All	All	Array area	Minor

Photo 9.5.1. Common Tern (Sterna hirundo). Of all the local seabirds, terns are the most at risk from disturbance. Entire colonies are frequently abandoned, often due to man's activity during the breeding season. (Photo: Paul Hillion www.islandbirds.co.uk)

9.6 Likelihood of Occurrence

The likelihood of marine birds being affected by the potential impacts is shown in the table below. Although a range of issues has been identified, the likelihood of them occurring and causing changes in the local marine avifauna is generally low.

Table 9.6.1 – Likelihood of effect occurrence

Potential impact	Possible effect	Extent	Likelihood
Visual disturbance (construction/decommissioning)	Disruption to feeding Disruption to breeding	Construction area and surrounds Construction area and surrounds	Possible Probable
Visual disturbance (operation)	Disruption to feeding	Array	Unlikely
Noise disturbance (construction/decommissioning)	Disruption to feeding Disruption to breeding	Construction area and surrounds Construction area and surrounds	Possible Probable
Noise disturbance (operation)	Disruption to feeding	Array and surrounds	Unlikely
Loss of feeding areas	Disruption to feeding	Array	Possible
Increased prey species	Improved feeding area	Array	Possible

Collision above surface (construction/decommissioning)	Injury or death	Construction area	Unlikely
Collision above surface (operation)	Injury or death	Array	Unlikely
Collision below surface (construction)	Injury or death	Construction area	Unlikely
Collision below surface (operation)	Injury or death	Array	Possible
Increased turbidity (construction)	Disruption to feeding	Construction area and surrounds	Unlikely
Increased turbidity (operation)	Disruption to feeding	Array and surrounds	Possible
Pollution (construction)	Poisoning, oiling, loss of prey	Construction area and surrounds	Possible
Pollution (operation)	Poisoning, loss of prey	Array and surrounds	Unlikely

9.7 Mitigation Measures

Although there are no predicted impacts of major importance, disturbance, particularly to breeding birds, is of moderate importance. In order to mitigate this impact, construction (or decommissioning) work should be undertaken outside of the breeding season. The four-month period, April – July covers most of the nesting season and all work in close proximity to coasts should be avoided during this time. Ideally, March would also be off limits as most seabirds establish territories and determine nesting sites throughout this month.

Any impacts on breeding birds are particularly important due to the effects on both the present and future populations of a species.

All other impacts are considered to be of a minor or even negligible nature, based on the current available information. However, the mitigation of many of these is still possible through appropriate design and installation and decommissioning methods. Materials used, such as coatings and paints, should also be environmentally benign and of a non-toxic nature.

It is acknowledged that in a wider context, the benefits of renewable energy sources have obvious far-reaching benefits on a national or international scale. However, such advantages do not negate the need for considered, effective design, siting and mitigation measures.

Table 9.7.1 – Mitigation measures

Effect	Phase	Mitigation measures
Visual disturbance	Construction/ Decommission	Avoid sensitive seasons (esp.breeding) Avoid locally important feeding areas Use appropriate construction methods
	Operation	Avoid locally important feeding areas Install minimum infrastructure on surface
Noise disturbance	Construction/ Decommission	Avoid sensitive seasons (esp. breeding) Avoid locally important feeding areas Use appropriate construction methods
	Operation	Install devices with low noise emission
Collision risk	Construction/ Decommission	No mitigation necessary
	Operation	Avoid sensitive sites Locate devices at depths beyond reach of marine birds Design devices to reduce collision risk Use coatings and colourations which are visible underwater Use protective grids, mesh or netting as appropriate
Increased turbidity	Installation/Decommission	Use construction methods which do not disturb marine sediments unnecessary Carry out minimum piling
	Operation	Design devices to minimize sediment disturbance
Accidental contamination	Installation/Decommission	Design techniques to minimize risk Develop contingency plans Use non-toxic alternatives
	Operation	Use non-toxic alternatives

Photo 9.7.1. Oystercatcher (Haematopus ostralegus). Guernsey's only breeding wader species. Although resilient at the nest site, Oystercatchers often lose fail to produce fledged chicks due to disturbance and predation. (Photo: Paul Hillion www.islandbirds.co.uk)

9.8 Confidence and Knowledge Gaps

Through the three comprehensive breeding surveys and an intensive annual programme of monitoring visits (mostly to undertake ringing of seabird chicks), the status of each of the dozen or so breeding Bailiwick seabird species is generally understood. In addition, the effects of stormy weather, oiling, disturbance and fishing on seabirds are largely known and this knowledge can be applied to the potential impacts of marine energy devices. For example, seabirds have shown that they can survive short-lived periods of high water turbidity, which are often associated with 'normal' storm events. However, it has recently been proved that if local waters remain turbid for prolonged periods of several weeks, starvation or death of marine birds can occur.

Marine energy devices are likely to be installed within an extremely small area of the available marine environment. It is reasonable to assume therefore that any future array(s) will generally only have an impact on a small number of local seabirds. However, there is currently little information on how seabirds move within the Bailiwick. It is possible that several species move freely within the study area and beyond, and if so, marine energy devices may affect a larger proportion of the local populations than anticipated. For example, a low risk of collision which affects an entire population is of more significance that a similar risk affecting only a small number of individuals. Further research is therefore required to determine seabird movements.

At this stage in the development of marine energy, there is, understandably, no specific information on potential projects or device design. Predictions on how installations may affect birds have been made by studying the most appropriate comparison, natural or unnatural, and by using pioneering research carried out elsewhere. There are three important points to consider in this respect:

1. Some impacts are unique to marine energy installations and at this stage, their effects can only be estimated, with generally low confidence.

2. The environmental impact will vary between devices and so each specific proposal should be analysed in detail.

3. It is highly likely that this new technology will have some impacts which were not foreseen, which highlights the need for ongoing monitoring following installation.

Some of the limitations of current data are outlined below in relation to specific impacts:

Table 9.8.1 – Current data limitations

Data Gap	Relates to	Unknown information	Requirement
Seabird distribution	Site selection	Fine –scale distribution	Field survey or data-logging project of several species
Bird activity in water column	Site selection Device design	Local dive depths	Data logging project Analysis of available research
Capacity of key senses	Collision risk Device design Visual disturbance Noise disturbance	Mainly relating to the capabilities of seabirds underwater	Analysis of available research Monitoring of demonstration devices - e.g. Installation of cameras
Ecological changes	Device design Feeding areas Habitat changes	Level of reliance on certain habitats, relating to sediments	Analysis of available research Monitoring of demonstration devices - e.g. Installation of cameras
Bird activity around devices	Collision risk	How the birds will interact with the devices below water level if they become fish aggregation areas	Analysis of available research Monitoring of demonstration devices - e.g. Installation of cameras

9.9 Residual Effects

All marine energy devices, irrespective of location, design and mitigation measures, will impact the local environment to some degree and in most cases, these will be of a negative nature. Some of these issues, especially those associated with construction and/or decommissioning work, will be temporary, whereas operational effects will generally be long term.

Table 9.9.1 – Confidence of residual effects after mitigation

Effect	Phase	Receptor	Significance (with good practice & mitigation)	Magnitude of Residual effects	Confidence
Visual disturbance	Construction/Decommission	All species	Minor	Negligible	Moderate
	Operation	All species	None	Negligible	Moderate
Noise disturbance	Construction/Decommission	All species	Minor	Negligible	Low
	Operation	Diving species	Minor	Minor	Low
Collision risk	Construction/Decommission	All species	Minor	Negligible	Moderate
	Operation	Diving species	Minor	Minor	Low
Increased turbidity	Construction/Decommission	Diving species	Minor	Negligible	Moderate
	Operation	Diving species	Minor	Minor	Low
Accidental contamination	Construction/Decommission	All species	None	Negligible	Low
	Operation	All species	None	Negligible	Moderate
Feeding disruption	Construction/Decommission	All species	Minor	Negligible	Low
	Operation	Diving species	Minor	Minor	Low
Habitat changes	Operation	All species	Minor	Minor	Low

Although the table indicates that the significance and the residual effect of each issue are either minor or negligible, these predictions are given with low, or at best, moderate confidence. These levels reflect the considerable level of uncertainty associated with marine energy devices at present.

9.10 Recommendations for Survey and Monitoring

The main gap in current knowledge is the lack of information on which specific marine areas are regularly used by birds for activities such as fishing or loafing. It is known that certain marine features, such as sand banks and reefs, are attractive to feeding seabirds but on a local scale, there is no available data, apart from sparse anecdotal evidence. Daily, tidal, seasonal or annual variations in feeding activity represent the most significant areas in need of research. This data is required to predict some of the impacts on marine birds with more confidence.

Survey work, including the use of data-loggers should provide some indication of important areas for birds and facilitate the creation of a general map of seabird activity in local waters. Some preliminarily site surveys should be undertaken before potential locations for marine energy devices are finalised. It is recommended that local ornithologists be consulted in order to develop a programme of field survey work and data-logging. This general baseline information is essential for the site selection process and consequent environmental monitoring.

As the development of marine energy progresses, there will be a need to monitor the effects on local seabirds at all stages. Although some monitoring will be possible through continuation of annual visits to seabird colonies, it is possible that additional information, not currently obtained in a scientific or systematic manner, would need to be collected. In addition, project developers should be required to undertake appropriate site-specific surveys and subsequent monitoring in order to assess the associated impacts.

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