NPWS (2011)

Roaringwater Bay and Islands SAC (site code: 101)

Conservation objectives supporting document-marine habitats

Version 1

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Introduction

Roaringwater Bay and Islands SAC is designated for *inter alia* the Annex I qualifying interests of Submerged or partly submerged sea caves, Reefs and Large shallow inlet and bay, and the Annex II species *Halichoerus grypus* (grey seal) and *Phocoena phocoena* (harbour porpoise).

Habitat surveys of Roaringwater Bay and Islands SAC were undertaken in 2002, 2009 and 2010 to investigate the physical and biological structure of this bay, in addition to the BioMar survey that was carried out in 2004. A comprehensive survey of the grey seal breeding population was carried out in 2005 and a follow-up moult season survey conducted in 2007 in order to investigate pup production, habitat use and population composition within the site. A considerable number of records of harbour porpoise have been gathered in the bay since 1979. In addition, targeted surveys of the harbour porpoise community were conducted in 2005 and 2008 in order to investigate species occurrence, abundance, distribution and community composition within the site. Aspects of the biology and ecology of Annex I habitats and Annex II species are provided in Section 1. The corresponding site-specific conservation objectives will facilitate Ireland delivering on its surveillance and reporting obligations under the EU Habitats Directive (92/43/EC).

Ireland also has an obligation to ensure that consent decisions concerning operations/activities planned for Natura 2000 sites are informed by an appropriate assessment where the likelihood of such operations or activities having a significant effect on the site cannot be excluded. Further ancillary information concerning the practical application of the site-specific objectives and targets in the completion of such assessments is provided in Section 2.

Section 1

HALICHOERUS GRYPUS (GREY SEAL)

This marine mammal species occurs in estuarine, coastal and offshore waters but also utilises a range of intertidal and terrestrial habitats for important life history functions such as breeding, moulting, resting and social activity. Its aquatic range for foraging and inter-site movement extends predominantly into continental shelf and slope waters. Grey seal occupies both aquatic and terrestrial habitats in Roaringwater Bay and Islands SAC, including intertidal shorelines that become exposed during the tidal cycle. It is present at the site throughout the year during all aspects of its annual life cycle which includes breeding (Aug-Dec approx.), moulting (Dec-April approx.) and non-breeding foraging and resting phases. In acknowledging the limited understanding of aquatic habitat use by the species within the site, it should be noted that all suitable aquatic habitat is considered relevant to the species' range and ecological requirements at the site and is therefore of potential use by grey seals.

Grey seals are vulnerable to disturbance during periods in which time is spent ashore by individuals or groups of animals. This occurs immediately prior to and during the annual breeding season, which takes place predominantly during the months of August-December. Pups are born on land, usually on remote beaches and uninhabited islands or in sheltered caves. While there may be outliers in any year, specific established sites are used annually for breeding-associated behaviour by adult females, adult males, newborn pups and weaned pups. Such habitats are critical to the maintenance of the species within any site since pups are nursed there for a period of several weeks by the mother prior to weaning and abandonment. During this period, adult females also mate with adult males at or adjacent to breeding sites. In addition to delivering information on breeding dynamics, pup production (i.e. the number of pups born each year) can be measured or estimated in order to deliver an assessment of population size. However the relationship between pup production and total population size is not well known. An estimated 33 pups were born in Roaringwater Bay and Islands SAC in 2005. The corresponding minimum population estimate for the site numbered 116-149 grey seals of all ages. Known and suitable habitats for the species in Roaringwater Bay and Islands SAC during the breeding season are indicated in figure 1. Current breeding sites in Roaringwater Bay and Islands SAC are broadly as follows: Clear Island, the Calf Islands, Carthy's Islands and Castle Island.

Grey seal also occurs at the site during the annual moult (i.e., hair shedding and replacement), a protracted period during which individual animals spend significant periods of days or weeks on the shore. Moulting is considered an intensive, energetically-demanding process that all seals must undergo, incurring further vulnerability for individuals during this period. Terrestrial or intertidal sites where seals can be found ashore are known as haul-out sites. Moult locations may be preferentially selected by the species. Those currently described in Ireland are remote from human habitation and interference, being on uninhabited islands or remote

beaches, with specific established sites used annually by moulting adult females, adult males and juveniles. In Ireland the moulting phase in the annual life cycle occurs predominantly during the months of December to April. A minimum estimate of 254 grey seals was recorded at the site during the moult season in 2007. Known moult haul-out locations at the site are indicated in figure 2 , broadly consisting of Calf Island West, Calf Island East, the Carthy's Islands, Toorane Rocks, Carrigviglash and Carrigviglash Rocks, Mannin Island, Illaunrahnee and adjacent skerries.

Grey seal is a successful aquatic predator that feeds on a wide variety of fish and cephalopod species. For individual grey seals of all ages, intervals between foraging trips in coastal or offshore waters are spent resting ashore at terrestrial or intertidal haul-out sites, or in the water. Resting locations selected by grey seals may be more variable and dispersed than those used during the breeding or moulting seasons. While outliers may occur for very small numbers of animals, there is nevertheless a tendency for recurrent selection by grey seal of particular habitats and sites for terrestrial/intertidal resting behaviour (e.g., low-lying rocks and skerries). Known and suitable habitats for resting by the species are indicated in Figure 3. Current sites described in Roaringwater Bay and Islands SAC are broadly as follows: Duharrig, Illaunricmonia and adjacent skerries, Clear Island, Calf Island West, Calf Island Middle, Carthy's Islands, Toorane Rocks, Carrigviglash and Carrigviglash Rocks, Mannin Island, Illaunrahnee and adjacent skerries, the Creeveens (outer Ballydehob bay), Inishleigh and an adjacent skerry.

PHOCOENA PHOCOENA (HARBOUR PORPOISE)

This small toothed cetacean species (from the mammal Order Cetacea - whales, dolphins and porpoises) occurs in estuarine, coastal and offshore waters in which it carries out breeding, foraging, resting, social activity and other life history functions. Its distribution extends predominantly throughout continental shelf waters and the species may range over many hundreds or thousands of kilometres. As air-breathing mammals, harbour porpoises must return to the water surface to breathe but they are otherwise wholly aquatic. Individual porpoises of all ages use sound as their primary sensory tool in order to navigate, communicate, avoid predators, or locate and facilitate the capture of prey under water, for example. Group sizes tend to be small (i.e., in single figures, more commonly 2-3 individuals) although larger aggregations may occasionally be recorded, particularly in the summer months.

Harbour porpoise breeds annually in Ireland, predominantly during the months of May-September. The principal calving period in Irish waters is thought to occur in the months of May and June although it may extend throughout the summer months and early autumn. Newborn calves are weaned before they are one year old. Mating commonly occurs several weeks after the calving season.

The occurrence of harbour porpoises within a prescribed marine area can be estimated using visual observation and passive acoustic methods in order to deliver an assessment of community or population size (i.e., relative abundance or absolute abundance), density and distribution. The size, community structure and distribution or habitat use of harbour porpoise inhabiting Roaringwater Bay and Islands SAC are not well understood. In acknowledging the limited understanding of aquatic habitat use by the species within the site, it should be noted that all suitable aquatic habitat (figure 4) is considered relevant to the species' range and ecological requirements at the site and is therefore of potential use by harbour porpoises.

Survey effort targeting the summer-autumn season has delivered initial 'snapshot' estimates in 2008 of 0.72-2.7 animals per km^2 within the outer half of the site (overall estimate across three surveys: 1.24 individuals per km^2, N=159±42 individuals, 95% Confidence Intervals: 95-689, Coefficient of Variation=0.27). The numbers of harbour porpoise encountered during any survey within the site are variable. There are sufficient data to confirm the species' presence at the site in all seasons, while important cohorts within the harbour porpoise community such as adults, juveniles and newborn calves have been recorded within the site including during the calving/breeding season.

Harbour porpoise is a successful aquatic predator that feeds on a wide variety of fish, cephalopod and crustacean species occurring in the water column or close to the seabed. Dive depths in excess of 200m have been recorded for the species. Foraging areas for harbour porpoise are often associated with areas of strong tidal current and associated eddies, therefore the occurrence of porpoises close to shore or adjacent to islands and prominent headlands is commonly reported. Little is currently known of the species' foraging ecology within Roaringwater Bay and Islands SAC and the data available may be biased toward particular locations due to the nature of survey effort and opportunistic reports from a range of sources. There is currently no detailed information available on individual or group movements by harbour porpoise within or into/out of the site, nor is it known whether individuals/groups of the species demonstrate any faithfulness to the site (i.e., site fidelity or residency). Nevertheless the consistent annual and seasonal occurrence of the species at the site, its occurrence during the calving/breeding period and density/population estimates available to date all indicate the importance of this coastal site for the species.

SUBMERGED OR PARTLY SUBMERGED SEA CAVES

The distribution and ecology of intertidal or subtidal sea caves has not previously been the subject of scientific investigation in Ireland and the extent of very few individual caves have been mapped in detail. The Department of Communications, Marine and Natural Resources previously commissioned a coastal oblique aerial survey for the purpose of coastal protection. Analysis of this imagery has yielded some information concerning the location of partly submerged sea caves in Roaringwater Bay and Islands SAC (figure 5). There is no additional information available concerning the likely distribution of permanently submerged sea caves

in the site at present. Whilst surveys undertaken in the UK indicate the structure and function of sea caves are largely influenced by hydrodynamic forces and water quality, no such information is yet available for Ireland.

REEFS

Throughout the bay, intertidal reef is largely present as a narrow band that consists of vertical walls including overhangs and ledges. Subtidally, the reef, although present in small areas in the inner reaches of the bay, is more common and extensive in the outer bay and around the islands. Its morphotype is largely that of flat or sloping bedrock, apart from the southern coast of Clear Island where it is present as vertical rock walls (figure 6).

The exposure regime of the reef is largely exposed to moderately exposed. More sheltered reef occurs within embayments on the coast and the islands and along the leeward side of Castle Island and Long Island.

In general, reef within Roaringwater Bay may be categorised in four distinct groups, Exposed to moderately exposed intertidal reef, Exposed to moderately exposed subtidal reef below 20m, Sheltered reef and *Laminaria* dominated communities (figure 7).

The development of a community complex target arises when an area possesses similar abiotic features but records a number of biological communities that are not regarded as being sufficiently stable and/or distinct temporally or spatially to become the focus of conservation efforts. In this case, examination of the available data from Roaringwater Bay identified a series of biological communities whose species composition overlapped significantly. Such biological communities are grouped together into what experts consider are sufficiently stable units (i.e. a complex) for conservation targets.

EXPOSED TO MODERATELY EXPOSED INTERTIDAL REEF COMMUNITY COMPLEX

Whilst the majority of the intertidal reef occurs as vertical walls, large areas of flat or sloping bedrock can be found on Castle Island and Skeam Island, with smaller areas on Clear Island and the Calf Islands. Some of the exposed rocks in the Gascanane Sound, Toorane Rocks and those at the north-western boundary of the SAC also have reef in the form of flat or sloping bedrock. An area of cobble/boulder field occurs on the northern shore of Ringarogy Island. The reef biota is comprised largely of combinations of fucoids and barnacles, and by a variety of lichen species on the upper shore (table 1).

Distinguishing species of Exposed to moderately exposed intertidal reef community complex	
Semiballanus balanoides	*Xanthoria parietina*
Patella vulgata	*Caloplaca marina*
Littorina littorea	*Caloplaca thallincola*
Verrucaria maura	*Ramalina sp*

Table 1 Distinguishing species of Exposed to moderately exposed intertidal reef community complex.

EXPOSED TO MODERATELY EXPOSED SUBTIDAL REEF BELOW 20M COMMUNITY COMPLEX

This reef community complex is present in the outer third of the bay where it reaches depths of approximately 65m. It is found south of Sherkin Island and Clear Island and through the Gascanane Sound; it occurs to the west of Calf Island, along the northwest boundary of the SAC and on the south shore of Long Island.

This reef type is very varied, consisting of bedrock, bedrock and boulders, and cobbles and pebbles. The fauna is dominated by echinoderms and sponges, hydroids and anemones. Beds of the brittlestar, *Ophiocomina nigra* occur in the deeper areas, while in the shallow parts sparse brown seaweeds (*Dictyota dichotoma* and *Dictyopteris membranacea*) may be found (table 2).

Distinguishing species of Exposed to moderately exposed subtidal reef below 20m community complex	
Encrusting sponges	*Antedon bifida*
Cliona celata	*Echinus esculentus*
Erect hydroids	*Luidia ciliaris*
Caryophyllia smithi	*Marthasterias glacialis*
Corynactis viridis	*Asterias rubens*
Alcyonium digitatum	*Holothuria forskali*
Metridium senile	*Aslia lefevrei*

Table 2 Distinguishing species of Exposed to moderately exposed subtidal reef below 20m community complex.

SHELTERED REEF COMMUNITY COMPLEX

There are limited areas of sheltered reef within Roaringwater Bay. It occurs within embayments on the coast and the islands, and along the leeward side of Castle Island and Long Island (figure 7). It is present intertidally and subtidally down to depths less than 10m and consists of bedrock, and bedrock and boulders. Sheltered intertidal reef is dominated by

fucoids, in particular *Ascophyllum nodosum*, and it is likely that this species extends subtidally in places. This reef type is dominated subtidally by *Laminaria* species (table 3).

Distinguishing species of Sheltered reef community complex	
Laminaria hyperborea	*Saccorhiza polyschides*
Laminaria sacchaarina	*Furcellaria lumbricalis*
Laminaria digitata	*Ulva sp.*
Chorda filum	*Ascophyllum nodosum*
Halydris siliquosa	

Table 3 Distinguishing species of Sheltered reef community complex

LAMINARIA DOMINATED COMMUNITIES

Kelps forests are known to be among the most ecologically dynamic and biologically diverse of habitats. Kelp species are the most common prominent constituents of the temperate lower intertidal and subtidal rocky shore. They are considered to be important species whose presence affects the survival and abundance of many other species in that ecosystem.

Within Roaringwater Bay, kelp occurs as kelp forests which are dense, and kelp parks which are less dense. Three species of *Laminaria* dominate the reef from a depth of 1m to approximately 20m. These communities occur in exposed to moderately exposed reef, but they also are present on sheltered reefs. The reef type is flat and sloping bedrock, with the exception of the south shore of Clear Island where it occurs as vertical rock walls.

Laminaria hyperborea is the most widespread species throughout the site, whilst *L. digitata* and *L. saccharina* occur more frequently above 15m. The associated floral and faunal species varies between the sheltered sites and the more exposed areas; a variety of algal species being more common in the sheltered areas, whilst brown algae species and faunal species such as cnidarians *Alcyonium digitatum* and *Caryophyllia smithii*, the sponge *Cliona celata* and the urchin *Echinus esculentus* are commonly found in the more exposed areas (table 4)

Distinguishing species of *Laminaria* dominated communities	
Laminaria hyperborea	*Alcyonium digitatum*
Laminaria digitata	*Caryophyllia smithii*
Laminaria sacchaarina	*Cliona celata*
Dictyota dichotoma	*Echinus esculentus*
Dicyopteris membranacea	*Furcellaria lumbricalis*
Chorda filum	*Ulva sp.*

Table 4 Distinguishing species of Kelp dominated communities.

LARGE SHALLOW INLETS AND BAYS

Roaringwater Bay and Islands SAC is a large, open, south westerly facing bay (figure 8). The Atlantic waters driven by prevailing south westerly winds meet the network of islands situated in the bay to create a complex hydrodynamic regime. This in turn results in a heterogeneous benthic structure that is highly varied spatially. This habitat encompasses Reefs, as well as the communities described below.

ZOSTERA DOMINATED COMMUNITIES

Within Roaringwater Bay, seagrass communities dominated by *Zostera marina* are widespread at depths of between 4-6m. The most extensive community occurs in the upper reaches of Roaringwater Bay, south west of Carrigviglash Rock (figure 9). In general, the seagrass communities occur on muddy sand with shell fragments and the infauna is that of the Shallow Sand/Mud community complex.

Distinguishing species of *Zostera* dominated communities	
Zostera marina	*Glycymeris glycymeris*
Asperococcus compressus	*Venus verruscosa*
Ceramium rubrum	*Carcinus maenas*
Dictyota dichotoma	*Liocarcinus depurator*
Ulva sp.	*Pagurus bernhardus*
Anthopleura balli	*Gibbula magus*
Anemonia viridis	*Branchioma bombyx*
Ascidiella aspersa	*Sabella pavonina*
Ensis sp.	*Asterias rubens*

Table 5 Distinguishing species of *Zostera* dominated communities.

MAËRL DOMINATED COMMUNITIES

Large communities dominated by maërl species are present in Roaringwater Bay (figure 9) and include the largest reported community in Ireland of the rare maërl species *Lithophyllum dentatum*. Also present in this community is the rare filamentous red alga *Spyridia filimentosa.* Within Roaringwater Bay, the communities occur at depths of 5-6m. In the sheltered areas, north of the Carrigviglash Rocks, the previously mentioned large *Lithophyllum dentatum* community occurs. South-west of these rocks a separate maërl community composed of the bed-forming species *Lithothamnion corallioides* and *Phymatolithon calcareum* is present. Here, maërl is mixed with kelp and/or diverse red algae; maërl may also co-occur with seagrass.

Maërl, whether alive or dead (maërl gravel), provides a variety of niches as a consequence of the presence of both mud and epibenthic biogenic structures resulting in a high diversity of associated species compared to the surrounding area (table 6).

Distinguishing species of Maërl dominated communities	
Lithophyllum dentatum	*Myxilla incrustans*
Lithothamnion corallioides	*Sabella pavonina*
Phymatolithon calcareum	*Branchioma bombyx*
Chondria capillaris	*Myxicola infundibulum*
Ceramium rubrum	*Chaetopterus variopedatus*
Ceramium sp.	*Terebellidae* indet.
Cystoclonium purpureum	*Carcinus maenas*
Boergeseniella fruticulosa	*Xantho pilipes*
Dictyota dichotoma	*Xantho incisus*
Ulva sp.	*Pagurus bernhardus*
Pachymastisma johnsonia	*Necora puber*
Suberites ficus	*Buccinum undatum*
Halichondria panacea	*Asterias rubens*
Esperiopsis fucorum	

Table 6 Distinguishing species of Maërl dominated communities.

The associated macrofauna is dominated by the epifaunal amphipods *Caprella acanthifera*, *Aora gracilis*, *Phtisica marina* and *Microdeutopus versiculatus*.

MUDDY SAND WITH BIVALVES AND POLYCHAETES COMMUNITY COMPLEX

This community complex occurs in the deep mud or muddy sand located at the southern and south-western extremities of the site and in the entrance channel to Schull Harbour (figure 9). It ranges in depth from 7m to 51m, with the majority of records occurring in the 40m to 50m zone.

The substrate composition is variable, but usually spans muddy fine sand to sandy mud; a significant fraction of medium sand (0.5-42%) may also be present.

This community complex is distinguished by the bivalves, *Mysella bidentata, Nucula turgida* and *Abra alba*, and the polychaetes *Spiophanes bombyx, Heteroclymene robusta,* and *Pholoe inornata*.

Distinguishing species of Muddy sand with bivalves and polychaetes community complex	
Mysella bidentata	*Harpinia antennaria*
Nucula turgida	*Cylichna cylindracea*
Abra alba	*Diastylis laevis*
Amphiura filiformis	*Scalibregma inflatum*
Spiophanes bombyx	*Callianassa* sp.
Heteroclymene robusta	*Nephtys hombergii*
Nucula turgida	*Lumbrineris latreilli*
Pholoe inornata	*Melinna palmate*
Thyasira flexuosa	*Caulleriella zetlandicus*
Abra nitida	*Edwarsia* sp.
Ampelisca brevicornis	*Magelona minuta*

Table 7 Distinguishing species of the Muddy sand with bivalves and polychaetes community complex.

In deeper water (>20m) the complex is dominated by the infaunal brittlestar *Amphiura filiformis*, the bivalve *Mysella bidentata* and the polychaete *Spiophanes bombyx*; which are all commonly recorded in high abundances. In shallow water (7-17m) the complex is commonly distinguished by the bivalve *Mysella bidentata*, *Abra alba*, *Thyasira flexuosa* and *Nucula turgida*, the amphipod *Ampelisca brevicornis* and the polychaetes *Heteroclymene robusta*, *Nephtys hombergii* and *Lumbrineris latreilli*, all of which achieve high abundances here.

MIXED SEDIMENT COMMUNITY COMPLEX

This sediment community complex is associated with a band of gravel and gravelly sands/muds extending in a north-south distribution across the central regions of the site, and arching to the north-west and south-west (figure 9). The associated biological communities represent a gradual bidirectional transition across the central gravel-dominated substrates through to the deep muddy sand to the west and the shallow sand and mud along the eastern extent of the site.

Within this community complex the sediment composition is highly variable; gravel and coarse sand range from 0-96% and 0.4-39% respectively, whilst the fines range from fine sand 0.1-58%, very fine sand 0.1-25% and silt-clay 0-25%. It occurs from depths of 6m to 70m, with the majority of the records occurring between 15m to 50m.

The variability present in the sediment results in a large number of distinguishing species for the community complex (table 8).

Distinguishing species of Mixed sediment community complex	
Spiophanes bombyx	*Moerella donacina*
Pisione remota	*Glycera lapidum*
Mysella bidentata	*Syllis sp.*
Pariambus typicus	*Pista cristata*
Diastylis bradyi	*Nephtys cirrosa*
Phaxas pellucidus	*Ampelisca typica*
Protodorvillea kefersteinia	*Sphaerosyllis bulbosa*
Mysella bidentata	*Goodallia triangularis*
Spio filicornis	*Dosinia exoleta*
Abra alba	*Goniada maculata*
Diastylis laevis	*Ampharete lindstroemi*
Polinices pulchellus	

Table 8 Distinguishing species of the Mixed sediment community complex.

In those areas where there is a higher fine fraction, the polychaete *Spiophanes bombyx* dominates and is usually accompanied by small numbers of the bivalve *Phaxas pellucidus*, the amphipod *Pariambus typicus* and the cumaceans *Diastylis bradyi* and *D. laevis*. The coarser areas are distinguished by the polychaete *Pisione remota* which is present in variable abundances; the polychaete *Protodorvillea kefersteini* is also commonly present here.

SHALLOW SAND/MUD COMMUNITY COMPLEX

This community complex is predominantly confined to the shallow subtidal in the north and east of the site and to the south of Sherkin Island. Small, isolated areas occur in the sheltered embayments and inlets of Clear Island and Sherkin Island (figure 9).

The substrate is predominantly fine material (fine sand 0.5-57%, silt-clay 1-94%), but fractions of medium sand (0-39%) or gravel (0-39%) may also be present. It is recorded from depths of 0m to 15m.

The list of distinguishing species reflects the gradation from a mud to a sand community with the bivalves *Abra nitida, A. alba, Thyasira flexuosa* and the polychaete *Melinna palmate* being indicative of sands whilst the bivalve *Fabulina fabula* reflects more gravelly sediments (Table 9). The epifaunal amphipods, *Caprella acanthifera, Aora gracilis, Phtiscia marina* and *Microdeutopus versiculatus* typify the areas where this sediment type co-occurs with maërl and to a lesser degree *Zostera* at this site.

Distinguishing species of the Shallow sand/mud community complex	
Abra nitida	*Spio filicornis*
Melinna palmata	*Ophelina acuminata*
Thyasira flexuosa	*Owenia fusiformis*
Scoloplos armiger	*Ampelisca brevicornis*
Caprella acanthifera	*Aricidea minuta*
Aora gracilis	*Chamelea gallina*
Phtisica marina	*Notomastus latericeus*
Microdeutopus versiculatus	*Leptocheirus pectinatus*
Fabulina fabula	*Nephtys hombergii*
Spiophanes bombyx	

Table 9 Distinguishing species of Shallow sand/mud community complex.

Section 2: Appropriate Assessment Notes

Many operations/activities of a particular nature and/or size require the preparation of an environmental impact statement of the likely effects of their planned development. While smaller operations/activities (i.e., sub threshold developments) are not required to prepare such statements, an appropriate assessment and Natura Impact Statement is required to inform the decision-making process in or adjacent to Natura 2000 sites. The purpose of such an assessment is to record in a transparent and reasoned manner the likely effects on a Natura 2000 site of a proposed development. The Department of the Environment, Heritage and Local Government has prepared general guidance on the completion of such assessments (www.npws.ie).

The following technical clarification is provided in relation to specific conservation objectives and targets for Annex II species to facilitate the appropriate assessment process:

Objective **To maintain the favourable conservation condition of grey seal in Roaringwater Bay, which is defined by the following list of attributes and targets**

Target 1	Species range within the site should not be restricted by artificial barriers to site use.

- This target may be considered relevant to proposed activities or operations that will result in the permanent exclusion of grey seal from part of its range within the site, or will permanently prevent access for the species to suitable habitat therein.
- It does not refer to short-term or temporary restriction of access or range.
- Early consultation or scoping with the Department in advance of formal application is advisable for proposals that are likely to result in permanent exclusion.

Target 2	The breeding sites should be conserved in a natural condition.

- Target 2 is relevant to proposed activities or operations that will result in significant interference with or disturbance of (a) breeding behaviour by grey seal within the site and/or (b) aquatic/terrestrial/intertidal habitat used during the annual breeding season.
- Operations or activities that cause displacement of individuals from a breeding site or alteration of natural breeding behaviour, and that may result in higher mortality or reduced reproductive success, would be regarded as significant and should therefore be avoided.

Target 3	The moult haul-out sites should be conserved in a natural condition.

- Target 3 is relevant to proposed activities or operations that will result in significant interference with or disturbance of (a) moulting behaviour by grey seal within the site and/or (b) aquatic/terrestrial/intertidal habitat used during the annual moult.
- Operations or activities that cause displacement of individuals from a moult haul-out site or alteration of natural moulting behaviour to an extent that may ultimately interfere with key ecological functions would be regarded as significant and should therefore be avoided.

Target 4	The resting haul-out sites should be conserved in a natural condition.

- Target 4 is relevant to proposed activities or operations that will result in significant interference with or disturbance of (a) resting behaviour by grey seal within the site and/or (b) aquatic/terrestrial/intertidal habitat used for resting.
- Operations or activities that cause displacement of individuals from a resting haul-out site to an extent that may ultimately interfere with key ecological functions would be regarded as significant and should therefore be avoided.

Target 5	The grey seal population occurring within this site should contain adult, juvenile and pup cohorts annually, subject to annual processes.

- Resting haul-out sites and the composition of haul-out groups may be different to those normally observed during breeding or moulting. There is some evidence of cohort-linked preferential selection by grey seals of terrestrial/intertidal sites elsewhere in Ireland.
- Whilst information is limited in Roaringwater Bay and Islands SAC at this time, disturbance at a specific location may have the effect of causing cohort-specific disturbance within the population. Population composition, whether in aquatic or terrestrial/intertidal habitats within the entire site or at individual locations, is likely to vary naturally within and between years.
- For the effective maintenance of the population, the above cohorts should be represented in the population occurring naturally within the site each year and any disturbance likely to cause such a cohort-specific effect should be carefully considered.

Target 6	Human activities should occur at levels that do not adversely affect the grey seal population at the site.

- Proposed activities or operations should not introduce man-made energy (e.g., aerial or underwater noise, light or thermal energy) at levels that could result in a significant negative impact on individuals and/or the population of grey seal within the site. This refers to both the aquatic and terrestrial/intertidal habitats used by the species in addition to important natural behaviours during the species' annual cycle.
- Target 6 also relates to proposed activities or operations that may result in the deterioration of key resources (e.g., water quality, feeding, etc) upon which grey seals depend. In the absence of complete knowledge on the species' ecological requirements in this site, such considerations should be assessed where appropriate on a case-by-case basis.

Objective **To maintain the favourable conservation condition of harbour porpoise in Roaringwater Bay, which is defined by the following list of attributes and targets**

Target 1	Species range within the site should not be restricted by artificial barriers to site use.

- Target 1 may be considered relevant to proposed activities or operations that will result in the permanent exclusion of harbour porpoise from part of its range within the site, or will permanently prevent access for the species to suitable habitat therein.
- It does not refer to short-term or temporary restriction of access or range.
- Early consultation or scoping with the Department in advance of formal application is advisable for proposals that are likely to result in permanent exclusion.

Target 2	Human activities should occur at levels that do not adversely affect the harbour porpoise community at the site.

- Proposed activities or operations should not introduce man-made energy (e.g., aerial or underwater noise, light or thermal energy) at levels that could result in a significant negative impact on individuals and/or the community of harbour porpoise within the site. This refers to the aquatic habitats used by the species in addition to important natural behaviours during the species' annual cycle.
- Target 2 also relates to proposed activities or operations that may result in the deterioration of key resources (e.g., water quality, feeding, etc) upon which harbour

porpoises depend. In the absence of complete knowledge on the species' ecological requirements in this site, such considerations should be assessed where appropriate on a case-by-case basis.

Annex I Habitats

It is worth considering at the outset that in relation to Annex I habitat structure and function, the extent and quality of all habitats varies considerably in space and time and marine habitats are particularly prone to such variation. Habitats which are varying naturally, i.e., biotic and/or abiotic variables are changing within an envelope of natural variation, must be considered to have favourable conservation condition. Anthropogenic disturbance may be considered significant when it causes a change in biotic and/or abiotic variables in excess of what could reasonably be envisaged under natural processes. The capacity of the habitat to recover from this change is obviously an important consideration (i.e., habitat resilience) thereafter.

This Department has adopted a prioritized approach to conservation of structure and function in marine Annex I habitats.

1. Those communities that are key contributors to overall biodiversity at a site by virtue of their structure and/or function (keystone communities) should be afforded the highest degree of protection and any significant anthropogenic disturbance should be avoided.
2. In relation to the remaining constituent communities that are structurally important (e.g., broad sedimentary communities) within an Annex I marine habitat, there are two considerations.
    2.1. Significant anthropogenic disturbance may occur with such intensity and/or frequency as to effectively represent a continuous or ongoing source of disturbance over time and space (e.g., effluent discharge within a given area). Drawing from the principle outlined in the European Commission's Article 17 reporting framework that disturbance of greater than 25% of the area of an Annex I habitat represents unfavourable conservation status, this Department takes the view that licensing of activities likely to cause continuous disturbance of each community type should not exceed an approximate area of 15%. Thereafter, an increasingly cautious approach is advocated. Prior to any further licensing of this category of activities, an inter-Departmental management review (considering *inter alia* robustness of available scientific knowledge, future site requirements, etc) of the site is recommended.
    2.2. Some activities may cause significant disturbance but may not necessarily represent a continuous or ongoing source of disturbance over time and space. This may arise for intermittent or episodic activities for which the receiving environment would have some resilience and may be expected to recover within a reasonable timeframe relative to the six-year reporting cycle (as required under Article 17 of the Directive). This Department is satisfied that such activities could be assessed in a context-

specific manner giving due consideration to the proposed nature and scale of activities during the reporting cycle and the particular resilience of the receiving habitat in combination with other activities within the designated site.

The following technical clarification is provided in relation to specific conservation objectives and targets for Annex I habitats to facilitate the appropriate assessment process:

Objective **To maintain the favourable conservation condition of submerged or partly submerged sea caves in Roaringwater Bay, which is defined by the following list of attributes and targets**

Target 1	The distribution of sea caves occurring in the site should remain stable, subject to natural processes

- The distribution of all sea caves in this SAC has not yet been fully evaluated.
- This target refers to activities or operations that propose to permanently remove sea cave habitat thus reducing the range over which this habitat occurs within the site. It does not refer to long or short term disturbance of the biology of sea cave habitats.
- Early consultation or scoping with the Department in advance of formal application is advisable for such proposals.

Target 2	Human activities should occur at levels that do not adversely affect the ecology of sea caves at the site.

- Target 2 relates to proposed activities or operations that may result in the deterioration of key resources (e.g., water quality) that are likely to drive or influence community structure of sea caves in the site. In the absence of complete knowledge on these elements in this site, such considerations should be assessed where appropriate on a case-by-case basis.

Objective	**To maintain the favourable conservation condition of Reefs in Roaringwater Bay, which is defined by the following list of attributes and targets**

Target 1	The distribution of reefs occurring in the site should remain stable, subject to natural processes

- The likely distribution of reef habitat in this SAC is indicated.
- This target refers to activities or operations that propose to permanently remove reef habitat, thus reducing the range over which this habitat occurs within the site. It does not refer to long or short term disturbance of the biology of reef habitats.
- Early consultation or scoping with the Department in advance of formal application is advisable for such proposals.

Target 2	The permanent area is stable, subject to natural processes

- The area of this habitat represents the minimum estimated area of reef at this site and underestimates the actual area due to the many areas of sheer and steeply sloping rock within the reef habitat.
- This target refers to activities or operations that propose to permanently remove habitat from the site, thereby reducing the permanent amount of habitat area. It does not refer to long or short term disturbance of the biology of a site.
- Early consultation or scoping with the Department in advance of formal application is advisable for such proposals.

Target 3	The community complexes associated with the following categories of reef should be maintained in a natural condition: Exposed to moderately exposed intertidal reef; Exposed to moderately exposed subtidal reef below 20m; Sheltered reef.

- A semi-quantitative description of the communities has been provided in Section 1.
- An interpolation of their likely distribution is provided in figure 7.
    - The estimated areas of the communities within the Reefs habitat given below are based on spatial interpolation and therefore should be used with a degree of caution. In addition, as this habitat contains significant areas of sheer and steeply sloping rock, the mapped community extents will be underestimated:
      - Exposed to moderately exposed intertidal reef- 327ha
      -Exposed to moderately exposed subtidal reef below 20m- 1286ha
      -Sheltered reef- 39ha

- This target relates to the structure and function of the reef and therefore it is of relevance to those activities that may cause disturbance to the ecology of the habitat.
- Significant continuous or ongoing disturbance of communities should not exceed an approximate area of 15% of the interpolated area of each community type, at which point an inter-Departmental management review is recommended prior to further licensing of such activities.
- Proposed activities or operations that cause significant disturbance to communities but may not necessarily represent a continuous or ongoing source of disturbance over time and space may be assessed in a context-specific manner giving due consideration to the proposed nature and scale of activities during the reporting cycle and the particular resilience of the receiving habitat in combination with other activities within the designated site.

Target 4	The extent of *Laminaria* dominated communities should be conserved, subject to natural processes.

- *Laminaria* dominated communities are considered to be keystone communities that are of considerable importance to the overall ecology and biodiversity of a habitat by virtue of their physical complexity.
- Any significant anthropogenic disturbance to the extent of *Laminaria* dominated communities should be avoided.
- An interpolation of the likely distribution of *Laminaria* dominated communities is provided in figure 7. The estimated area is 1846ha

Target 5	The biology of *Laminaria* dominated communities should be conserved, subject to natural processes.

- It is important to ensure the quality as well as the extent of *Laminaria*-dominated communities is protected.
- Any significant anthropogenic disturbance to the flora and fauna associated with *Laminaria* dominated communities should be avoided.

Objective	**To maintain the favourable conservation condition of large shallow inlet and bay in Roaringwater Bay, which is defined by the following list of attributes and targets**

Target 1	The permanent habitat area is stable or increasing, subject to natural processes

- This habitat also encompasses the Annex I habitats Sea caves, Reefs and Vegetated sea cliffs of the Atlantic and Baltic coasts. Targets for these habitats should be addressed in their own right.
- This target refers to activities or operations that propose to permanently remove habitat from the site, thereby reducing the permanent amount of habitat area. It does not refer to long or short term disturbance of the biology of a site.
- Early consultation or scoping with the Department in advance of formal application is advisable for such proposals.

Target 2	The extent of the *Zostera* dominated and maërl dominated communities are conserved, subject to natural processes.

- *Zostera* and maërl dominated communities are considered to be keystone communities that are of considerable importance to the overall ecology and biodiversity of a habitat by virtue of their physical complexity, e.g., they serve as important nursery grounds for commercial and non-commercial species.
- Any significant anthropogenic disturbance to the extent of these communities should be avoided.
- An interpolation of the likely distribution of these communities is provided in figure 9. The areas given below are based on spatial interpolation and therefore should be used with a degree of caution:
  -*Zostera* dominated community- 119ha
  -Maërl dominated community- 96ha

Target 3	The quality of *Zostera* dominated communities should be conserved, subject to natural processes.

- It is important to ensure the quality as well as the extent of *Zostera*-dominated communities is conserved. Shoot density provides an indication of the habitat quality as well as giving information on the habitat complexity and refuge capability; all important components in maintaining the structural and functional integrity of the habitat.
- Within Roaringwater Bay during a survey in 2007, the density of the *Zostera* dominated communities were variable ranging from Frequent to Occasional on the DAFOR scale (semi-quantitative abundance measure).
- Any significant anthropogenic disturbance to the quality (i.e., shoot density) of these communities should be avoided.

Target 4	The quality of maërl dominated communities should be conserved, subject to natural processes.

- Every effort should be made to avoid any death to living maërl.
- Any significant anthropogenic disturbance to the quality of maërl dominated communities (i.e., volume of live maërl) should be avoided.

Target 5	The following communities should be conserved in a natural condition: Muddy sand with bivalves and polychaetes community complex; Mixed sediment community complex; Shallow sand/mud community complex.

- A semi-quantitative description of the communities has been provided in Section 1.
- An interpolation of their likely distribution is provided in figure 9.
    - The estimated areas of the communities given below are based on spatial interpolation and therefore should be used with a degree of caution:
      - Muddy sand with bivalves and polychaetes community complex- 2407ha
      - Mixed sediment community complex- 3205ha
      - Mixed sediment community complex; Shallow sand/mud community complex- 3335ha
- Significant continuous or ongoing disturbance of communities should not exceed an approximate area of 15% of the interpolated area of each community type, at which point an inter-Departmental management review is recommended prior to further licensing of such activities.
- Proposed activities or operations that cause significant disturbance to communities but may not necessarily represent a continuous or ongoing source of disturbance over

time and space may be assessed in a context-specific manner giving due consideration to the proposed nature and scale of activities during the reporting cycle and the particular resilience of the receiving habitat in combination with other activities within the designated site.

Figure 1. *Halichoerus grypus* - Known breeding sites

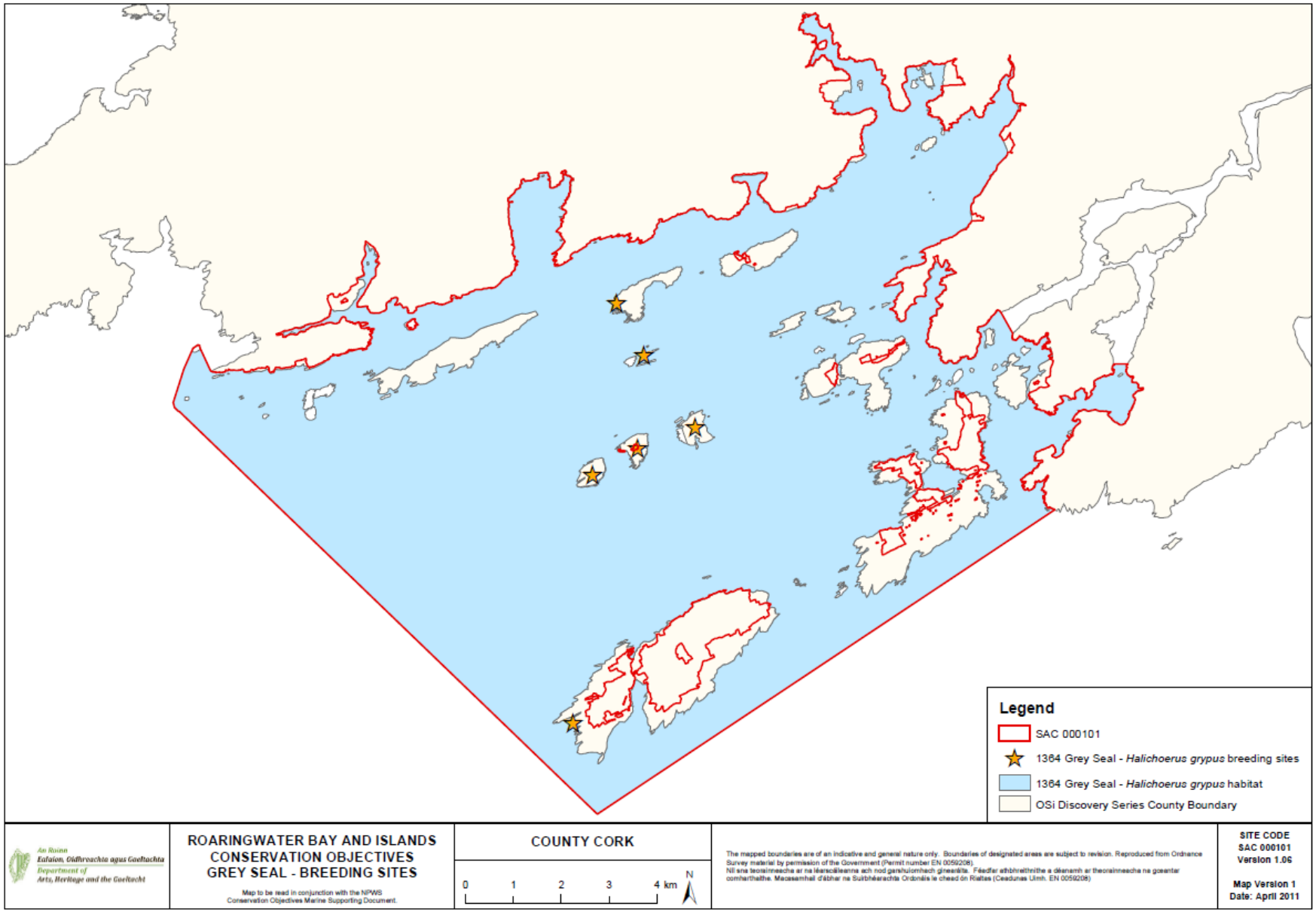

Figure 2. *Halichoerus grypus* - Known moult haul out sites

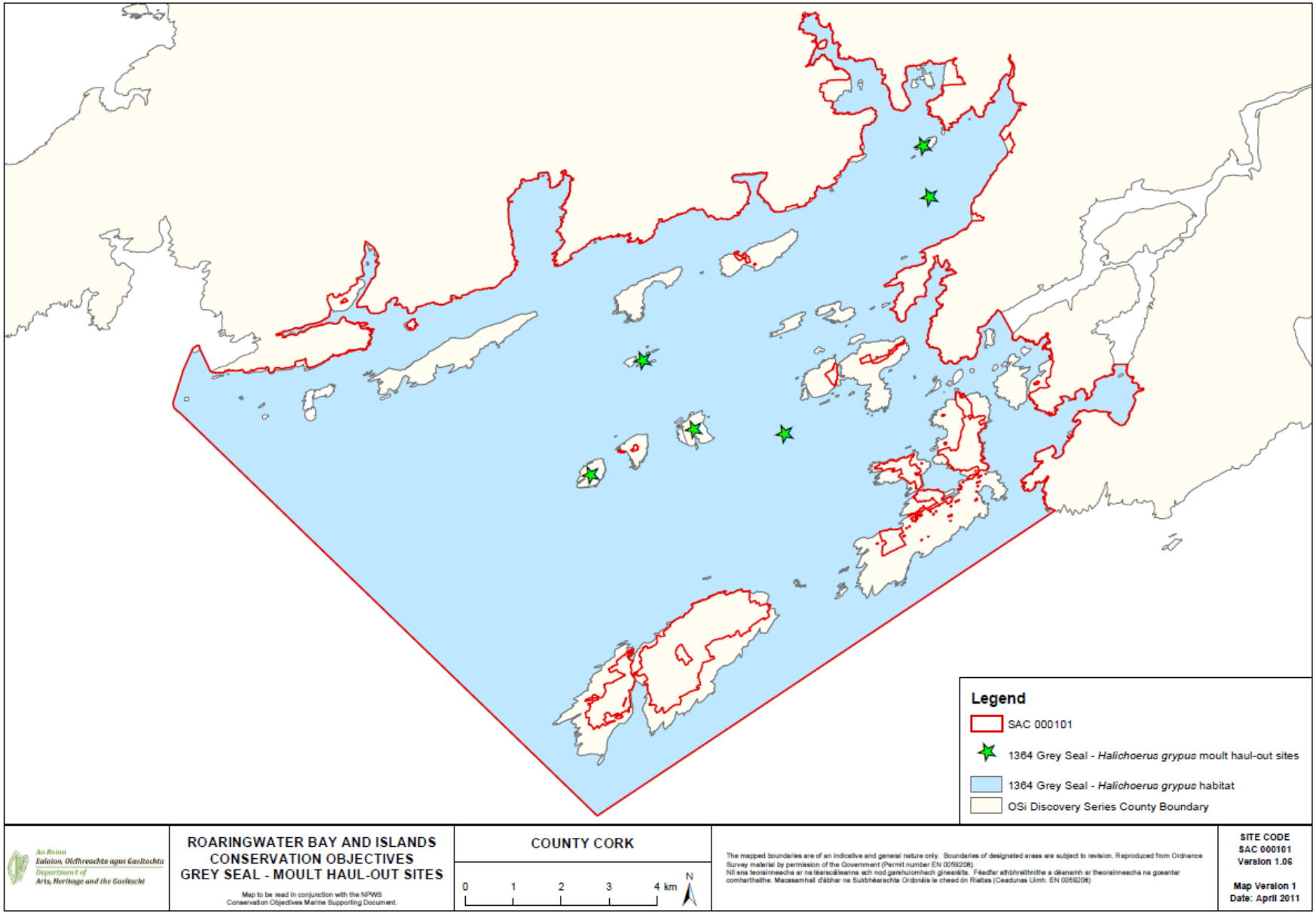

Figure 3. *Halichoerus grypus* - Known resting haul-out sites (non-breeding)

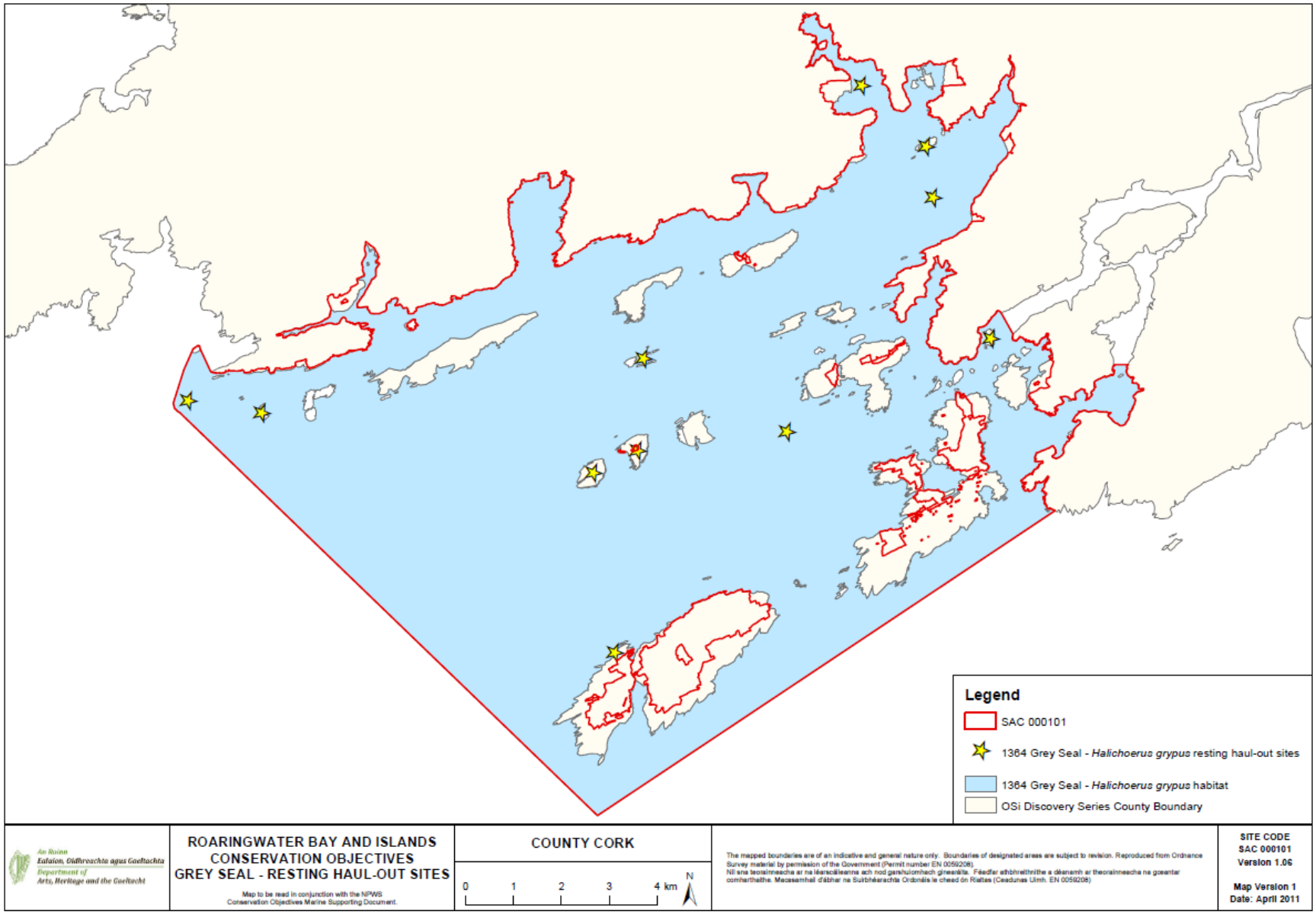

Figure 4. Harbour Porpoise - Suitable habitat

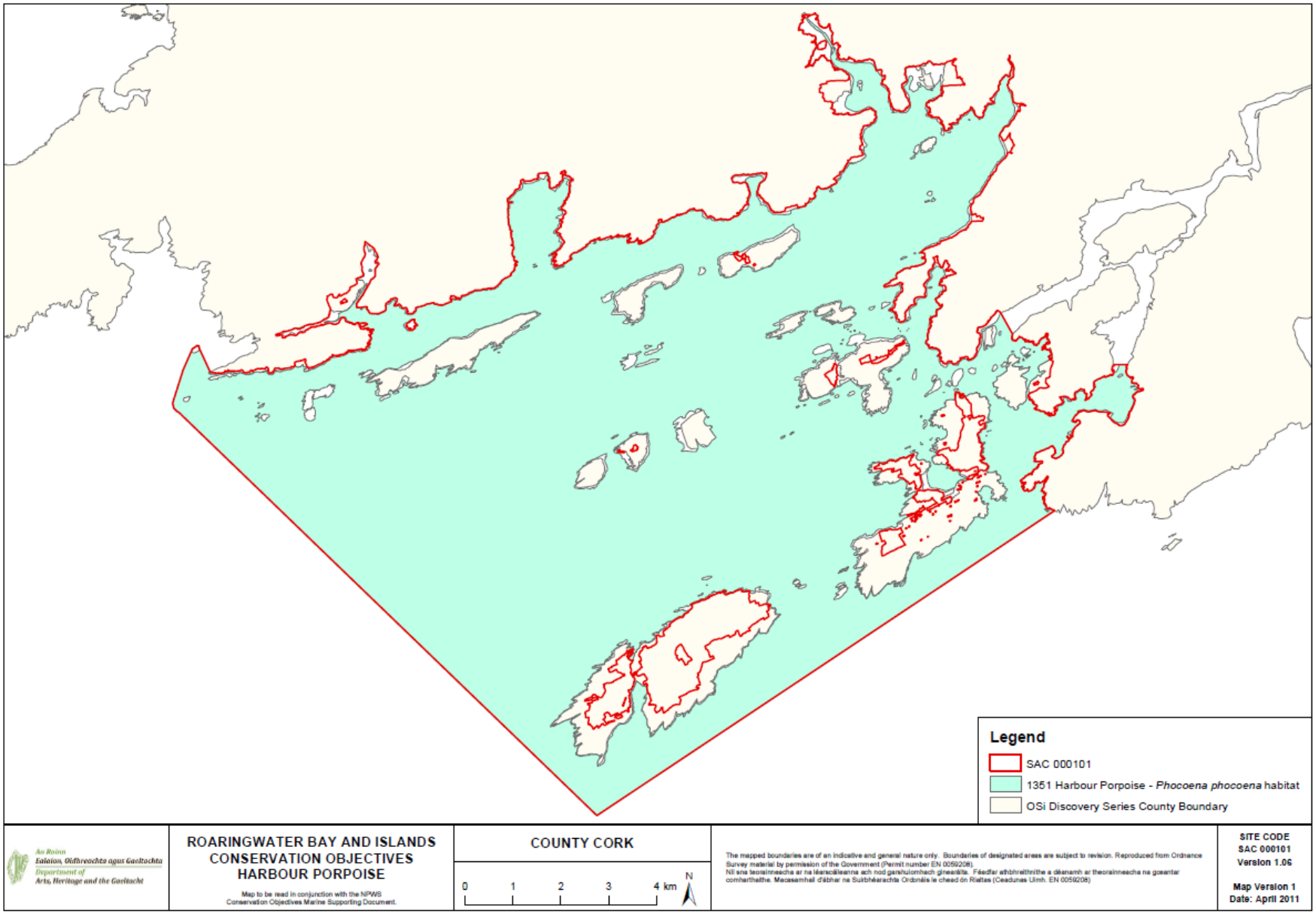

Figure 5. Known Sea cave distribution in Roaringwater Bay and Islands SAC

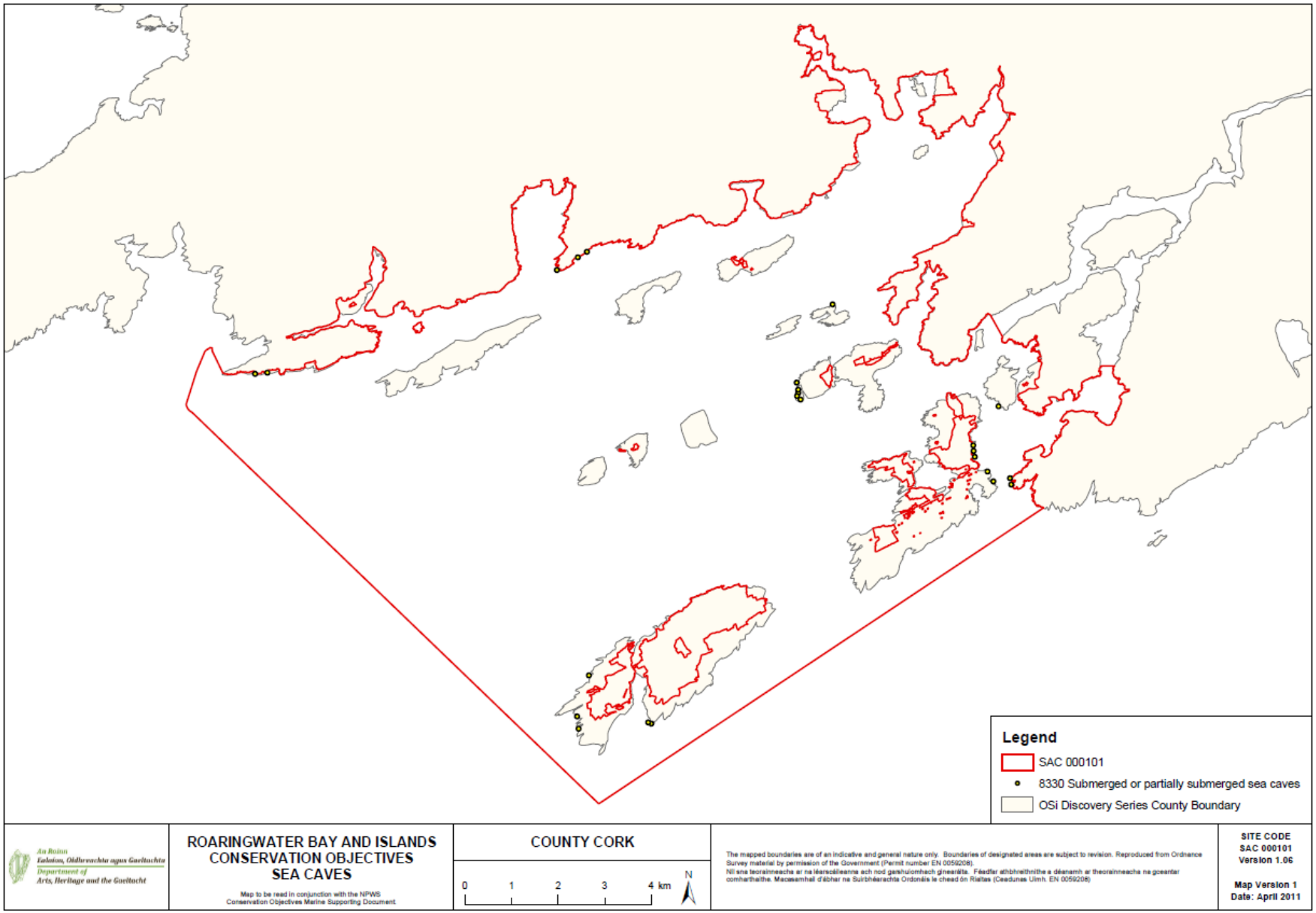

Figure 6. Extent of Reefs in Roaringwater Bay and Islands SAC

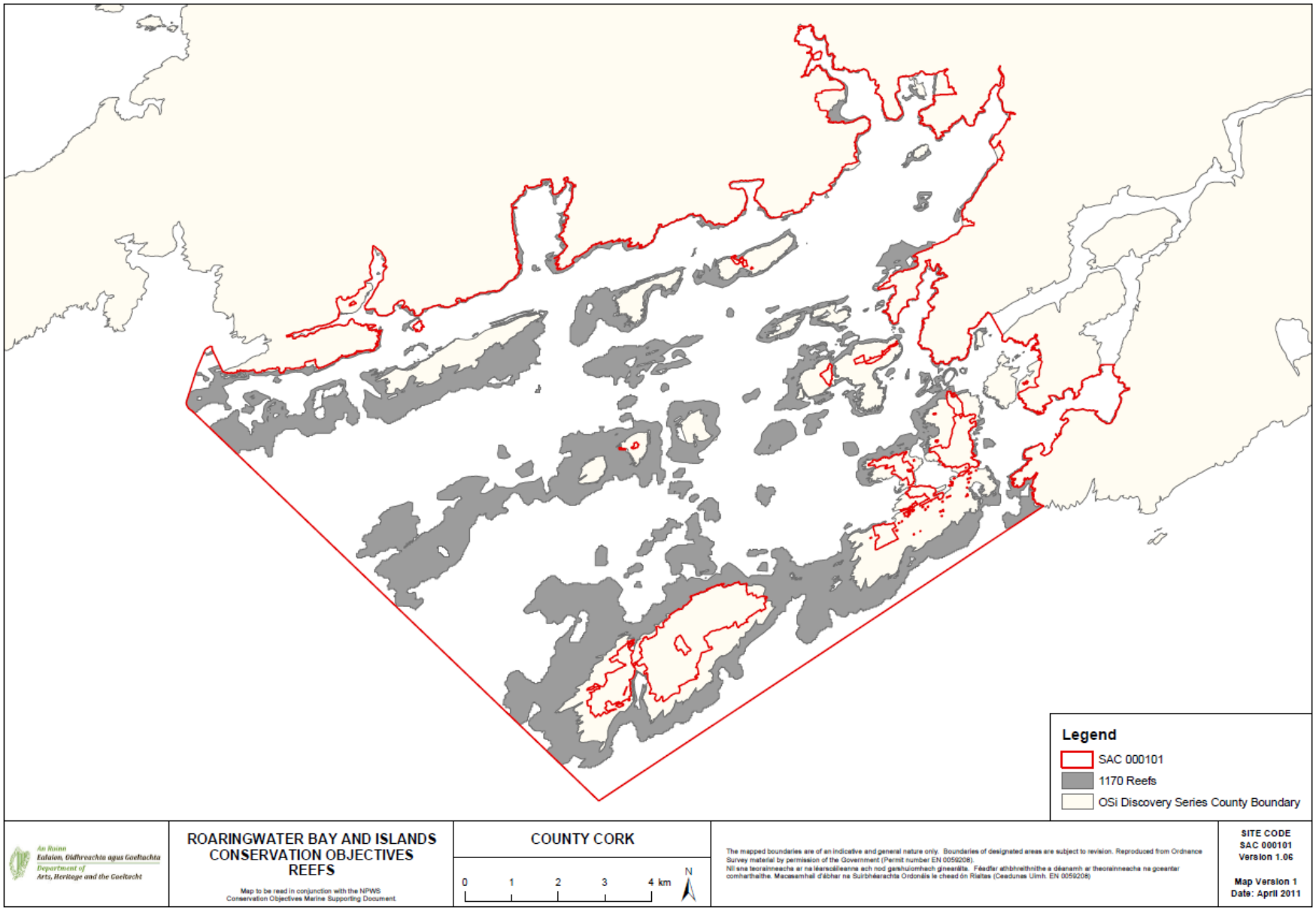

Figure 7. Distribution of Reef communities in Roaringwater Bay and Islands SAC

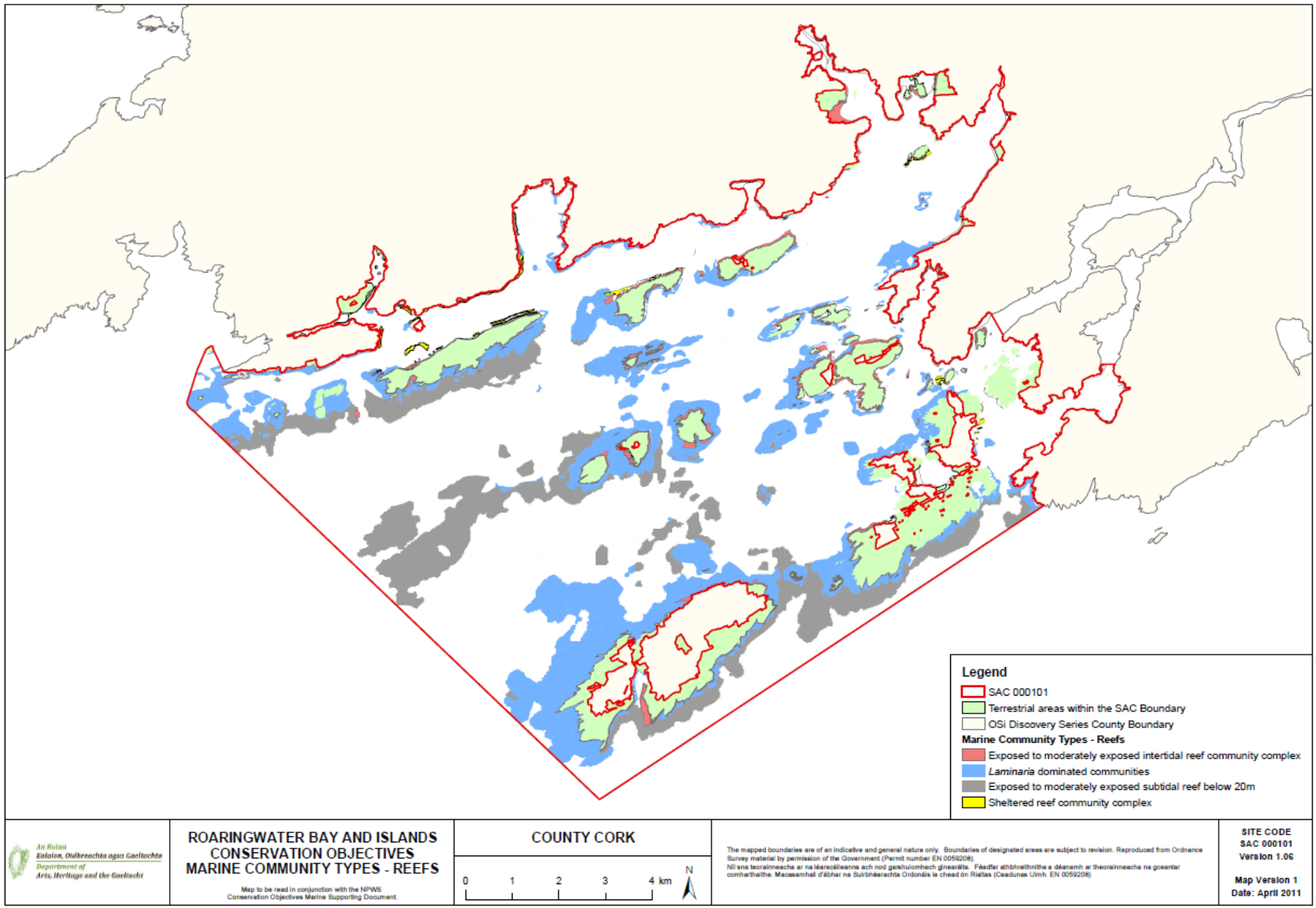

Figure 8. Extent of Shallow Inlet and Bay in Roaringwater Bay and Islands SAC

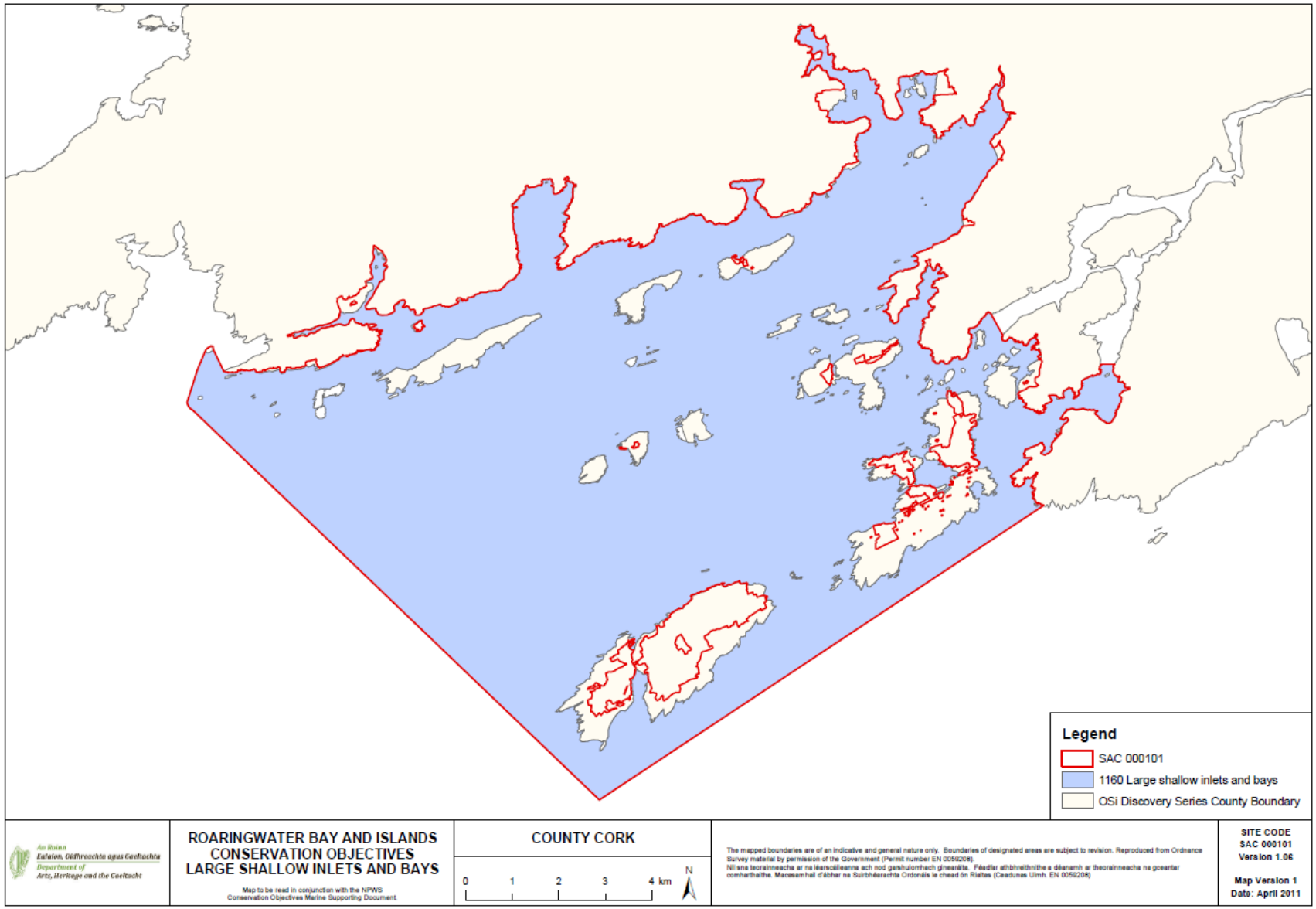

Figure 9. Distribution of sediment communities in Roaringwater Bay and Islands SAC