NPWS

Mulroy Bay SAC

(site code: 002159)

Conservation objectives supporting document -

Marine habitats

Version 2

IMPORTANT: This 'Version 2' document includes 1 additional QI (EU habitat code 1140) and updated maps to reflect a boundary change. The text relating to the pre-existing QIs has generally not been updated except in relation to the boundary change.

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Introduction

Mulroy Bay SAC (site code 002159) is designated for the marine Annex I qualifying interests of Mudflats and sandflats not covered by seawater at low tide (EU habitat code 1140), Large shallow inlets and bays (EU habitat code 1160), and Reefs (EU habitat code 1170) (**Figures 1, 2 and 3**). The Annex I habitat Large shallow inlets and bays is a large physiographic feature that may wholly or partly incorporate other Annex I habitats within its area.

In addition to a BioMar survey undertaken in Mulroy Bay in 1993 (Picton and Costello, 1997), subtidal surveys of Mulroy Bay SAC were undertaken in 2010 (Aquafact, 2011a, b). During the BioMar survey, beds of the bivalve *Limaria hians* were recorded in Moross Channel and Rosnakill Strait. Minchin (1995) also recorded these beds within Moross Channel. In 2008, a dive survey was undertaken at this site to map sensitive communities, including *L. hians* (MERC, 2008a). These data were used to determine the physical and biological nature of the SAC.

The first recording of the invasive ascidian *Styela clava* in Mulroy Bay was made in early summer 2008, in Lagmore Bay. This species is believed to be native to the southern hemisphere, with the earliest records coming from Australia and New Zealand. It is thought that the species spread to Europe through ballast water in shipping or ship fouling. A dive survey was commissioned in 2008 to report on the occurrence of this species in Mulroy Bay (MERC, 2008b).

Aspects of the biology and ecology of Annex I habitats 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 (also known as European 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
Principal Benthic Communities

Within Mulroy Bay SAC, 11 community types were recorded. The Annex I habitats in which they occur is presented in **Table 1** and a description of each community type is given below.

Table 1 The community types recorded in Mulroy Bay SAC and their occurrence in the Annex I habitats.

	SAC Annex I Habitats		
	Mudflats and sandflats not covered by seawater at low tide (1140)	Large shallow inlets and bays (1160)	Reefs (1170)
Gravel to mixed sediment with nematodes community complex		✓	
Gravelly sand with bivalves, polychaetes and nemerteans community complex		✓	
Intertidal sand community complex	✓	✓	
Laminaria-dominated community complex		✓	✓
Limaria hians associated community		✓	
Maërl-dominated community		✓	
Reef community complex		✓	✓
Sand dominated by *Nephtys cirrosa* and *Bathyporeia* sp. community complex		✓	
Sand to coarse sediment with *Pygospio elegans* community complex	✓	✓	
Zostera-dominated community complex		✓	
Sand with *Angulus tenuis* community	✓	✓	

Estimated areas of each community type per Annex I habitat, based on interpolation, are given in the objective targets in **Section 2**.

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. Examination of the available data from Mulroy Bay SAC identified a number of biological communities whose species composition overlapped significantly. Such biological communities are grouped together into what experts consider to be sufficiently stable units (*i.e*. a complex) for conservation targets.

Intertidal sand community complex

This community is composed mainly of sand on exposed shores. These communities may contain fractions of coarse to fine sand, depending on exposure. With exposure the sand may be heaped into ripples by wave action. Due to the exposure and coarse nature of these communities, there can often be low numbers of infauna, particularly at higher gradients. Grading to the low water mark polychaetes, isopods and amphipods become more frequent. The distinguishing species of this community are listed in **Table 2**.

Table 2 Distinguishing species of the Intertidal sand community complex.

Distinguishing species of the Intertidal sand community complex	
Scolelepis squamata	*Bathyporeia pelagica*
Bathyporeia pilosa	*Haustorius arenarius*
Eurydice pulchra	*Pontocrates arenarius*

Sand to coarse sediment with *Pygospio elegans*

This community contains a range of sediment sizes, from elements of mud, to coarse sand in more exposed locations. This community, when sheltered, is quite stable and can hold enough interstitial water to sustain infauna. Due to exposure and tidal flow there is a significant depth of superficial sediment above the anoxic substrate. This allows significant numbers of errant polychaetes and infaunal amphipods. This community can be a significant feeding resource for wading bird species. The distinguishing species of this community are listed in **Table 3**.

Table 3 Distinguishing species of the Sand to coarse sediment with *Pygospio elegans.*

Distinguishing species of the Sand to coarse sediment with *Pygospio elegans*	
Pygospio elegans	*Paraonis fulgens*
Nephtys cirrosa	*Spio* spp.
Ophelia rathkei	*Scoloplos armiger*

Sand dominated by *Nephtys cirrosa* and *Bathyporeia* sp. community complex

This community complex occurs in the outer northern reaches of the site from Melmore Head and Ballyhoorisky Point, south to Gortnalughoge Bay, from the intertidal to a depth of

approximately 22m. It is also recorded in the middle section of Mulroy Bay at Tirloughan Bay in depths of between 5m and 10m (**Figure 4**).

The sediment here is that of sand, with medium and fine sand ranging from 5.5% to 80.4%, and coarse sand from 1.4% to 30.6%. Silt-clay and gravel are negligible, less than 1% and less than 3%, respectively.

The polychaete *Nephtys cirrosa* and the amphipod *Bathyporeia* sp. dominate the fauna of this complex. The crustaceans *Pontocrates arenarius, Crangon crangon*, *Pagurus bernhardus* and *Liocarcinus marmoreus* and the echinoderm *Echinocardium cordatum* are also recorded from this complex (**Table 4**).

Table 4 Distinguishing species of the Sand dominated by *Nephtys cirrosa* and *Bathyporeia* sp. community complex.

Distinguishing species of the Sand dominated by *Nephtys cirrosa* and *Bathyporeia* sp. community complex	
Nephtys cirrosa	*Pagurus bernhardus*
Bathyporeia sp.	*Liocarcinus marmoreus*
Pontocrates arenarius	*Echinocardium cordatum*
Crangon crangon	

Gravel to mixed sediment with nematodes community complex

This community complex occurs extensively through the middle section of Mulroy Bay from the First Narrows in the north to Third Narrows in the east, in Broad Water at Pan Bay and in the Moross Channel at Rosnakill Bay (**Figure 4**). It is recorded from the intertidal to a depth of approximately 12m.

Some areas of this community complex are subject to strong currents and this is reflected in the variability in the sediment components. The fine fraction (silt-clay and very fine sand) ranges from 0% to 28%, medium and fine sand from 4.2% to 29.5% and 21% to 66.7% respectively. Gravel ranges from 0.1% to 32.3%. At the First Narrows, west of Glinsk, both living and dead maërl occur as a thin veneer on a coarse sand and gravel sediment.

This community complex is distinguished by the presence of unidentified nematodes, the polychaete *Platynereis dumerilii*, the crustaceans Aoridae sp. and *Dexamine spinosa*, unidentified nemerteans and the bivalve *Kurtiella bidentata*. The mixed nature of the sediment within this complex results in a species rich community, which is of particular note

between Island Roy and Rawson Point. Here the bivalve *Musculus discors* occurs in high abundance and the polychaete *P. dumerilii* and the unidentified nematodes were recorded in their highest abundances for the complex. The conspicuous fauna recorded within this complex include the crustaceans *Galathea squamifera*, *Pagurus bernhardus*, *Cancer pagurus*, *Inachus dorsettensis*, *Liocarcinus corrugatus* and *L. puber*, the sponges *Alcyonidium diaphanum*, *A. digitatum* and *A. hirsutum* and the echinoderms *Crossaster papposus*, *Henricia oculata*, *Asterias rubens*, *Marthasterias glacialis*. The ascidian *Clavelina lepadiformis* was also frequently recorded here. The decapod *Pagurus bernhardus*, the anthozoans *Anthopleura ballii and Anemonia viridis* and the serpulid polychaete *Pomatoceros lamarcki* were recorded where maërl occurs (**Table 5**). It should be noted that *A. ballii* is at the northern limit of its distribution here.

Table 5 Distinguishing species of the Gravel to mixed sediment with nematodes community complex.

Distinguishing species of the Gravel to mixed sediment with nematodes community complex	
Nematoda	*Cancer pagurus*
Platynereis dumerilii	*Inachus dorsettensis*
Aoridae sp.	*Liocarcinus corrugatus*
Dexamine spinosa	*Musculus discors*
Nemertea	*Liocarcinus puber*
Kurtiella bidentata	*Echinus esculentus*
Galathea squamifera	*Crossaster papposus*
Pagurus bernhardus	*Alcyonidium digitatum*
Alcyonidium diaphanum	*Alcyonidium hirsutum*
Asterias rubens	*Henricia oculata*
Marthasterias glacialis	*Clavelina lepadiformis*

Gravelly sand with bivalves, polychaetes and nemerteans community complex

This community complex occurs extensively in the inner reaches of Mulroy Bay; it is recorded throughout Broad Water, in the Moross Channel and in North Water from the intertidal to depths of approximately 32m (**Figure 4**).

The sand component accounts for 38% to 88.6% of the sediment within this community complex. Silt-clay ranges from 6% to 27.7% and gravel from 0.4% to 72% with the muddier areas occurring in the northeastern areas of Broad Water.

The distinguishing species of this community complex are the bivalves *Corbula gibba* and *Thyasira flexuosa,* unidentified nemerteans and the polychaetes *Jasmineira* sp., *Scalibregma inflatum* and *Prionospio* sp. A notable species recorded within this community complex is the rare bivalve *Limaria hians*; where it occurs, it is in low numbers. The conspicuous fauna recorded within the community complex include the echinoderms *Asterias rubens*, *Thyone fusus, Ophiocomina nigra, Ophiothrix fragilis, Henricia oculata* and *Crossaster papposus* and the bivalve Pecten maximus (Table 6).

Table 6 Distinguishing species of the Gravelly sand with bivalves, polychaetes and nemerteans community complex.

Distinguishing species of the Gravelly sand with bivalves, polychaetes and nemerteans community complex	
Corbula gibba	*Thyone fusus*
Nemertea	*Ophiocomina nigra*
Thyasira flexuosa	*Ophiothrix fragilis*
Jasmineira sp.	*Henricia oculata*
Scalibregma inflatum	*Crossaster papposus*
Prionospio sp.	*Pecten maximus*
Asterias rubens	

Within this community complex the highly invasive ascidian *Styela clava* was reported to occur at four locations in North Water. Twenty individuals were recorded in Lagmore Bay, five at Moross Point, with single individuals occurring at both Ross Point and Doocarrick Bay. It has been introduced through an unknown vector and its impact within the bay is a cause for concern.

Zostera-dominated community complex

This seagrass community is recorded in three areas within Mulroy Bay. Extensive beds occur in the inner reaches of the bay on both shores south of Carrowkeel, south of the First Narrows on Church Bank and Ottiergarve. Small beds are recorded in the northern areas of North Water and in the Ross Channel (**Figure 4**).

The sediment within this complex is largely that of mud. However, near the First Narrows it occurs on sand off Crannogue Point and on muddy sand with scattered living and dead maërl southwest of Glinsk.

Within this complex both *Zostera marina* and *Z. noltii* occur; the former species occurs in depths of approximately 3m to 5m while the latter species is largely confined to the intertidal. Within this community the density of both species ranged from frequent (6 to 11 individuals per m^2) to abundant (>12 individuals per m^2). Bloom-forming macro-algae Chaetomorpha linum can be a pressure on this community complex (Scally et al., 2020).

The associated species of the subtidal seagrass community complex include the brown alga *Ectocarpaceae*, the anthozoans *Anemonia viridis* and *Anthopleura ballii*, an asteroid *Asterias rubens* and the ascidians *Clavelina lepadiformis* and *Ciona intestinalis*. The polychaetes *Chaetopterus variopedatus* and *Sabella pavonina*, the gastropod *Haminoea navicula*, the nudibranch *Aplysia punctata* and the burrowing holothurian *Leptosynapta inhaerens* are also recorded here (**Table 7**).

Table 7 Distinguishing species of the *Zostera*-dominated community complex.

Species associated with the *Zostera*-dominated community complex	
Zostera marina	*Ciona intestinalis*
Zostera noltii	*Chaetopterus variopedatus*
Anemonia viridis	*Sabella pavonina*
Anthopleura ballii	*Haminoea navicula*
Ectocarpaceae	*Aplysia punctata*
Asterias rubens	*Leptosynapta inhaerens*
Clavelina lepadiformis	

Maërl-dominated community

This maërl community occurs extensively in Mulroy Bay from Church Bank in the west to the Third Narrows. Beds of deep live maërl were recorded, in particular, in the area north and east of Island Roy and on the Seedagh Bank (**Figure 4**). This community complex is recorded between depths of 4m and 6m.

The maërl species *Lithothamnion corallioides* dominates this community, with the associated species comprising of the polychaete *Eupolymnia nebulosa*, the decapod *Necora puber*, the echinoderm *Asterias rubens,* the nudibranch *Aplysia punctata* and the anthozoans *Anthopleura ballii* and *Anemonia viridis*. Other species which have a patchy occurrence within the complex are the echinoderms *Marthasterias glacialis* and *Ophiocomina nigra* and the polychaete *Megalomma vesiculosum*. Two notable species recorded often in large beds between the Second and the Third Narrows are the tube-dwelling anthozoan *Cerianthus lloydii* and the holothurian *Neopentadactyla mixta* (**Table 8**).

Table 8 Distinguishing species of the maërl-dominated community.

Species associated with the Maërl-dominated community	
Lithothamnion corallioides	*Anemonia viridis*
Eupolymnia nebulosa	*Marthasterias glacialis*
Necora puber	*Ophiocomina nigra*
Asterias rubens	*Megalomma vesiculosum*
Aplysia punctata	*Neopentadactyla mixta*
Anthopleura ballii	*Cerianthus lloydii*

Limaria hians associated community

The 1993 BioMar survey recorded the bivalve *Limaria hians* as the dominant species in the Rosnakill Strait and in the Moross Channel; from the latter site dense aggregations were also recorded in 1995. In the 2008 dive survey this species was recorded as rare, with individual specimens occasionally being located in small nests attached to the underside of small stones and rocks, most notably in the Moross Channel, around Moross Castle. The survey did observe a population of several hundred at the northern end of the Moross Channel southeast of Lambs Island; it also noted its occurrence in the narrows to Back Lough. This is the only known area in Ireland where *Limaria hians* has been recorded (**Figure 4**). There are indications of pressures on this species from recent surveys (Scally *et al*., 2020).

This species occurs in depths of between 4m and 9m and the associated fauna is generally that of the "Gravelly sand with bivalves, polychaetes and nemerteans community complex" (**see Table 6**); however, in the dense beds southeast of Lambs Island kelp species also occur. The ophiuroids *Ophiothrix fragilis* and *Ophiocomina nigra* are commonly recorded where dense aggregations occur.

Laminaria-dominated community complex

The most extensive occurrence of this community complex is in the narrows between Devlin Bay and Back Lough; it is also recorded in North Water, in Broad Water off Deegagh Point, and in the northwest of the site at Inverbeg Bay (**Figure 4**). It occurs in depths of between 3m and 18m on sheltered reef. The substrate is that of rugged bedrock to cobbles and boulders.

This community complex is distinguished by the kelp species *Laminaria digitata and L. hyperborea*. The most conspicuous biota recorded here includes the echinoderm *Asterias rubens*, the algae *Delesseria sanguinea*, *Dictyota dichotoma*, *Plocamium cartilagineum* and *Bonnemaisonia asparagoides*, the anthozoans *Clavelina lepadiformis* and *Caryophyllia smithii* (**Table 9**). The northern hydroid *Abietinaria filicula* occurs here; the foliose red alga *Drachiella spectabilis,* which is close to the northern limits of its distribution also occurs within this complex. In the North Water Channel where the kelp is less dense, individuals of the bivalve *Limaria hians* are recorded. South-east of Deegagh Point, in Broad Water, the sponges *Polymastia mamillaris* and *Stelligera rigida* commonly occur; the hydroid *Nemertesia ramosa*, the tunicates *Ascidiella aspera* and *Clavelina lepadiformis* and the echinoderms *Ophiothrix fragilis* and *Ophiura nigra* are recorded here as frequent to common. The rare fish *Gobius couchi* is recorded here and in the kelp at North Water; the only other known locations for this fish are Lough Hyne, Co. Cork and Cornwall, UK.

Table 9 Species associated with the *Laminaria*-dominated community complex.

Species associated with the *Laminaria*-dominated community complex	
Laminaria digitata	*Caryophyllia smithii*
Laminaria hyperborea	*Polymastia mamillaris*
Asterias rubens	*Stelligera rigida*
Delesseria sanguinea	*Nemertesia ramosa*
Dictyota dichotoma	*Ascidiella aspera*
Plocamium cartilagineum	*Clavelina lepadiformis*
Bonnemaisonia asparagoides	*Ophiothrix fragilis*
Clavelina lepadiformis	*Ophiura nigra*

Reef community complex

This community complex is recorded most extensively in the northern extreme of the site from Melmore Head and Ballyhoorisky Point to Gortnalughoge Bay. It also occurs to the south of the First Narrows and in Broad Water and North Water in the inner reaches of the site (**Figure 4**). Although largely subtidal, occurring at depths of between 8m and 24m, it does extend into the intertidal on small islands or on rocks throughout the site, and on the shore in Gortnalughoge Bay.

An extensive area of flat and sloping bedrock occurs from south of Melmore Head to Gortnalughoge Bay; vertical walls recorded south of the First Narrows and north off Lamb's Island in the North Water.

The exposure regime is that of exposed to moderately exposed reef in the northern reaches of the site but inside the First Narrows it is regarded as sheltered reef. Within the inner reaches of the site, extremely sheltered reef occurs in areas of weak currents. This reef type is rare within Irish waters.

In the intertidal and shallow subtidal brown algal species predominate, including *Fucus vesiculosus, Fucus serratus, Fucus spiralis, Pelvetia canaliculata* and *Ascophyllum nodosum*. The crustacean *Chthamalus stellatus* and the bivalve *Mytilus edulis* are abundant, while the crustacean *Balanus balanus* and *Nemalion helminthoides* are frequently recorded here. The asteroid *Asterina gibbosa* and the anthozoans *Aulactinia verrucosa*, *Actinia equina*, *Sagartia elegans* are recorded from *Corallina officinalis* rock pools.

In deeper areas, the red algal species replace the brown algae; species such as *Corallina officinalis*, *Nemalion helminthoides*, *Porphyra umbilicalis, Porphyra* sp., *Laurencia pinnatifida*, *Lomentaria articulata* and *Palmaria palmata* are recorded here. The fauna is distinguished by the asteroids *Asterias rubens* and *Henricia oculata*, the sponges *Esperiopsis fucorum*, *Raspailia ramosa* and *Polymastia boletiformis*, the anthozoans *Clavelina lepadiformis* and *Metridium senile*, the ascidian *Ciona intestinalis* and the phoronid *Phoronis hippocrepia*.

On exposed very steep bedrock at depths of between 8m and 24m faunal-dominated communities occur. In areas subject to strong tidal streams such as the First Narrows, the bryozoan *Flustra foliacea* and unidentified hydroids and sponges dominate, with the rare northern hydroid *Halecium muricatum* being recorded here. The sheltered reef within the site is generally very diverse. Within North Water and in Broad Water the uncommon sponges *Dercitus bucklandi* and *Stelletta grubii* occur in abundance on such reef. An undescribed *Polymastia* species of sponge is also recorded here, as is a population of the anthozoan *Parerythropodium coralloides*. The latter species has only been recorded in four locations in Ireland and is also rare in Britain (**Table 10**).

Table 10 Species associated with the Reef community complex.

Species associated with the Reef community complex	
Fucus vesiculosus	*Henricia oculata*
Fucus spiralis	*Esperiopsis fucorum*
Fucus serratus	*Raspailia ramosa*
Corallina officinalis	*Polymastia boletiformis*
Nemalion helminthoides	*Clavelina lepadiformis*
Porphyra umbilicalis	*Metridium senile*
Porphyra sp.	*Ciona intestinalis*
Laurencia pinnatifida	*Phoronis hippocrepia*
Lomentaria articulata	*Flustra foliacea*
Pelvetia canaliculata	Bryozoa
Ascophyllum nodosum	Porifera
Chthamalus stellatus	*Dercitus bucklandi*
Mytilus edulis	*Stelletta grubii*
Palmaria palmata	*Parerythropodium coralloides*
Asterias rubens	

Sand with *Angulus tenuis* community

This community is recorded at the causeway to Island Roy.

The sediment of this community is largely that of mobile medium to fine sand (ranging from 9.9% to 68.2% and 20.6% to 83.0%, respectively). Coarse sand ranges from 0.1% to 7.0% and very fine sand from 0.7% to 10.8%, respectively. The proportion of gravel (<2.1%), very coarse sand (<1.6%) and silt-clay (<2.3%) are generally negligible.

The distinguishing fauna of this community are the bivalve *Angulus tenuis*, the crustaceans *Eurydice pulchra* and *Haustorius arenarius* and the polychaete *Nephtys cirrosa* (Table11). These species are not uniformly distributed throughout the community, but where they occur, abundances are low. The polychaete *Scolelepis squamata* occurs in low abundances at the causeway in Mulroy Bay.

Table 11 Distinguishing species of Sand with *Angulus tenuis* community complex.

Distinguishing species of the Sand with *Angulus tenuis* community complex	
Angulus tenuis	*Nephtys cirrosa*
Eurydice pulchra	*Haustorius arenarius*

Section 2

Appropriate Assessment Notes

Many operations/activities of a particular nature and/or size require the preparation of an environmental impact statement (EIA) of the likely effects of their planned development. While smaller operations/activities (*i.e*. sub-EIA-threshold developments) may not require an EIA, an appropriate assessment is required of any project that may significantly affect the integrity of a Natura 2000 site. The appropriate assessment is to be used as part of the decision-making process, as to whether the project proceeds or not. The assessment should be recorded in a transparent manner, and should assess, in a reasoned manner, the likely effects on a Natura 2000 site of a proposed plan or project. General guidance on the completion of such assessments has been prepared and is available at www.npws.ie and at https://ec.europa.eu/environment/nature/natura2000/management/guidance_en.htm.

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 vary 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 prioritised 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) and their low resilience, 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 interdepartmental 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 Large shallow inlets and bays (EU habitat code 1160) in Mulroy Bay SAC, 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 two Annex I habitats Reefs [1170] and Mudflats and sandflats not covered by seawater at low tide [1140]. 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	Maintain the extent of the *Zostera*-dominated community complex, the maërl-dominated community and the *Limaria hians* associated community, 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. The bivalve *Limaria hians* may also be considered as a keystone species for the reasons stated above. In addition, this site is the only known location of this species in Irish waters.
- 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 4**. The areas given below are based on spatial interpolation and therefore should be considered indicative:

  - *Zostera*-dominated community complex – 81.58ha
  - Maërl-dominated community – 182.43ha
  - *Limaria hians* associated community – 14.34ha

Target 3	Conserve the high quality of *Zostera*-dominated community complex, subject to natural processes

- It is important to ensure the quality as well as the extent of the *Zostera*-dominated community complex is conserved. For example, shoot density can provide 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 this SAC, the density of *Zostera* in 2008 was estimated to range from abundant to frequent on the AFOR scale (semi-quantitative abundance measure).
- Any significant anthropogenic disturbance to the quality (*i.e*. shoot density) of this community should be avoided.

Target 4	Conserve the high quality of the maërl-dominated community, subject to natural processes

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

Target 5	Conserve the high quality of the *Limaria hians* associated community subject to natural processes

- Every effort should be made to avoid any death to *Limaria hians*.
- Any significant anthropogenic disturbance to the quality of the community should be avoided.

Target 6	Conserve the following community types in a natural condition: Sand dominated by *Nephtys cirrosa* and *Bathyporeia* sp. community complex; Gravel to mixed sediment with nematodes community complex; Gravelly sand with bivalves, polychaetes and nemerteans community complex; Sand to coarse sediment with *Pygospia elegans* community complex; Intertidal sand community complex; Sand with *Angulus tenuis* community complex; *Laminari*a-dominated community complex and Reef 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 4**.
- The estimated areas of these communities given below are based on spatial interpolation and therefore should be considered indicative:

  -Sand dominated by *Nephtys cirrosa* and *Bathyporeia* sp. community complex – 571.76ha

  -Gravel to mixed sediment with nematodes community complex – 657.53ha

  -Gravelly sand with bivalves, polychaetes and nemerteans community complex – 1610.41ha

  - Sand to coarse sediment with *Pygospia elegans* community complex – 170.14ha

  - Intertidal sand community complex – 0.22ha

  - Sand with *Angulus tenuis* community complex – 5.65ha

  -*Laminaria*-dominated community complex – 13.21ha

  -Reef community complex – 54.14ha

- 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 interdepartmental 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.

Objective **To maintain the Favourable conservation condition of Reefs (EU habitat code 1170) in Mulroy Bay SAC, which is defined by the following list of attributes and targets**

Target 1	The distribution of Reefs is stable or increasing, subject to natural processes

- The likely distribution of Reefs habitat in this SAC is indicated in **Figures 2 and 4**.
- 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 or increasing, 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 occurrence of vertical walls within the Reefs 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	Conserve the following community types in a natural condition: *Laminaria*-dominated community complex and Reef community complex

- A semi-quantitative description of the communities has been provided in **Section 1**.
- An interpolation of their likely distribution is provided in **Figures 2 and 4**.
- The estimated areas of the communities within the Reefs habitat given below are based on spatial interpolation and therefore should be considered indicative. In addition, as this habitat contains significant areas of vertical walls, the mapped community extents will be underestimated:
    - *Laminaria*-dominated community complex – 13.21ha
    - Reef community complex – 54.14ha
- 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 interdepartmental 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.

Objective **To maintain the Favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide (EU habitat code 1140) in Mulroy Bay SAC, 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 is also contained within the Annex I habitat, Large shallow inlets and bays. Targets for this habitat should be addressed in its 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 distribution of Mudflats and sandflats is stable or increasing, subject to natural processes

- The likely distribution of Mudflats and sandflats not covered by seawater at low tide habitat in this SAC is indicated in **Figure 3**. NB: some fragments of the habitat are not visible in Figure 3 due to their small size.
- This target refers to activities or operations that propose to permanently remove mudflat/sandflat 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 mudflat/sandflat habitats.
- Early consultation or scoping with the Department in advance of formal application is advisable for such proposals.

Target 3	Conserve the following community types in a natural condition: Intertidal sand community complex; Sand to coarse sediment with *Pygospio elegans* community complex and Sand with *Angulus tenuis* 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 4**
- The estimated areas of these communities given below are based on spatial interpolation and therefore should be considered indicative:
    - Intertidal sand community complex – 0.03ha
    - Sand to coarse sediment with *Pygospio elegans* community complex – 80.02ha
    - Sand with *Angulus tenuis* community complex – 4.75ha
- 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 interdepartmental 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.

Bibliography

Aquafact (2011a). Subtidal Benthic Investigations in Mulroy Bay cSAC (cSAC Site Code: IE002159) Co. Donegal. Produced by Aquafact on behalf of Marine Institute in partnership with National Parks & Wildlife Service Aquafact.

Aquafact (2011b). Reef Investigations in Mulroy Bay cSAC (cSAC Site Code: IE002159) Co. Donegal. Produced by Aquafact on behalf of Marine Institute in partnership with National Parks & Wildlife Service.

MERC (2008a). Survey of sensitive subtidal benthic marine communities. Carried out by MERC on behalf of National Parks and Wildlife Service, Department of Environment, Heritage and Local Government.

MERC (2008b). Survey of Mulroy Bay SAC for the Stalked Sea squirt *Styela clava*. Carried out by MERC on behalf of National Parks and Wildlife Service, Department of Environment, Heritage and Local Government.

Minchin, D. (1995). Recovery of a population of the Flame shell *Limaria hians*, in an Irish bay previously contaminated with TBT. Environmental Pollution, Vol. 90, No. 2, pp. 259-262, 1995.

Picton, B.E. and Costello M.J. (1997). The BioMar biotope viewer: a guide to marine habitats, fauna and flora in Britain and Ireland, Environmental Sciences Unit, Trinity College, Dublin.

Scally, L., Pfeiffer, N. and Hewitt, E. (2020). The monitoring and assessment of six EU Habitats Directive Annex I Marine Habitats. Irish Wildlife Manuals, No. 118. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

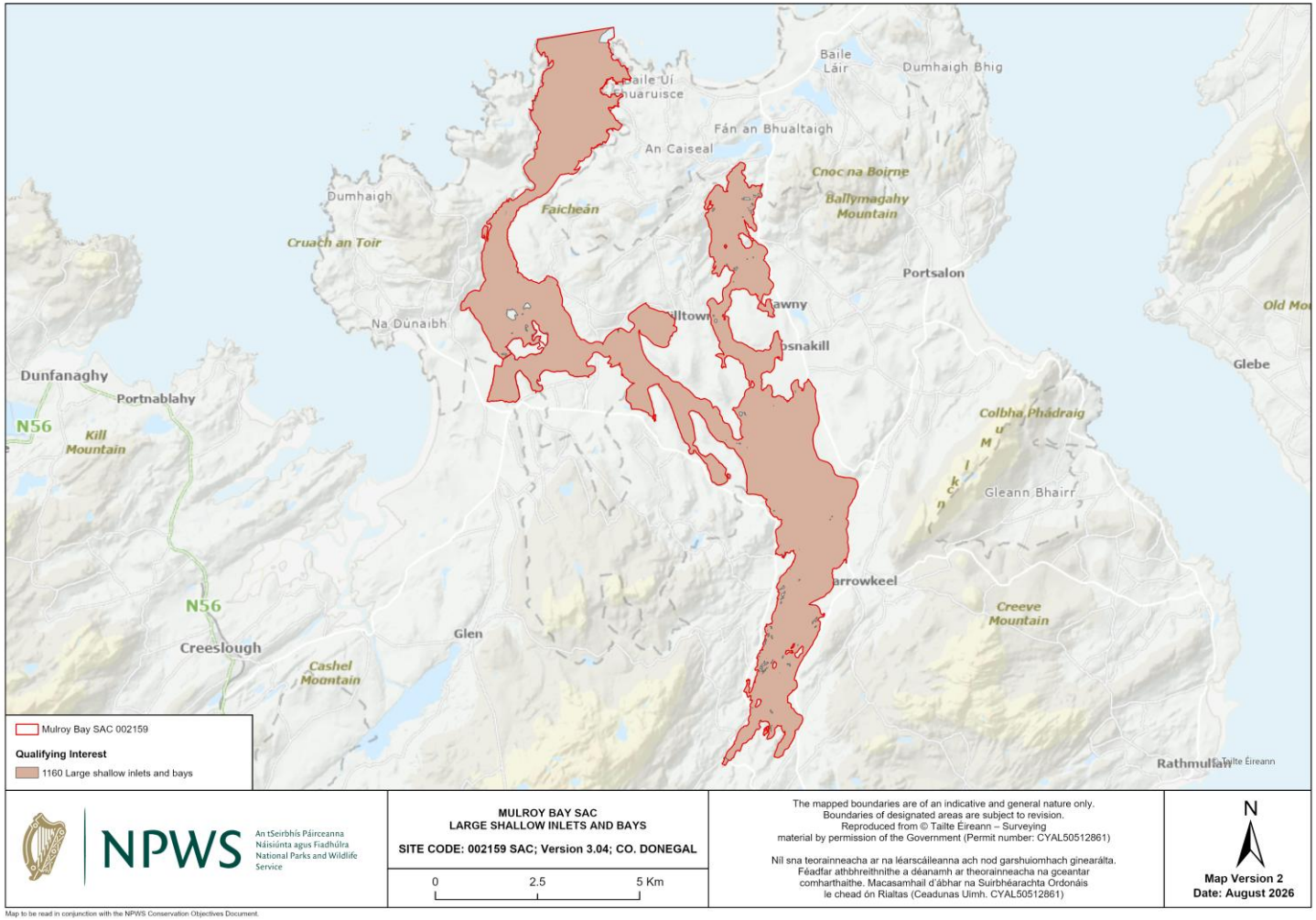


Figure 1 Extent of Large shallow inlets and bays in Mulroy Bay SAC.

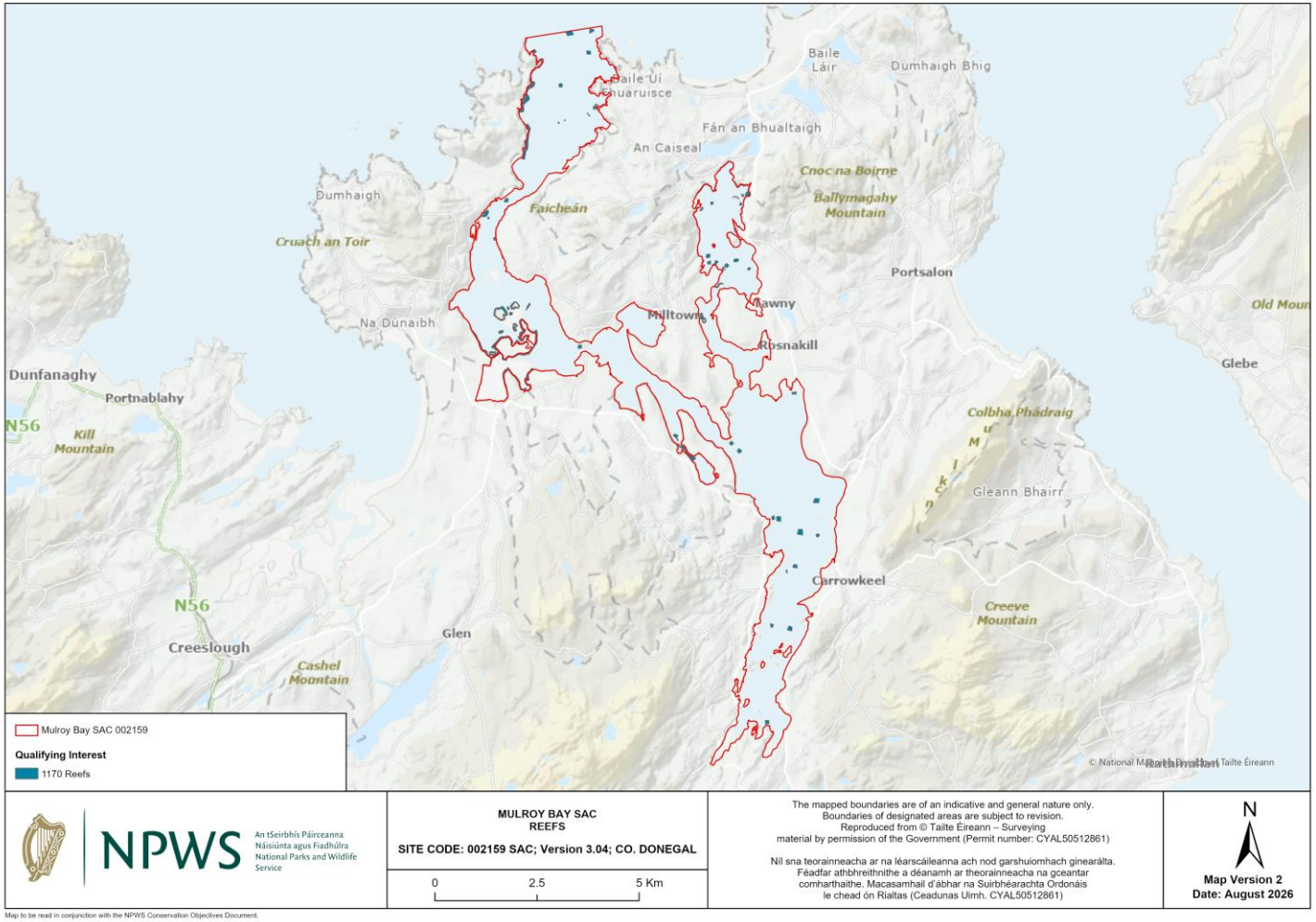


Figure 2 Extent of Reefs in Mulroy Bay SAC.

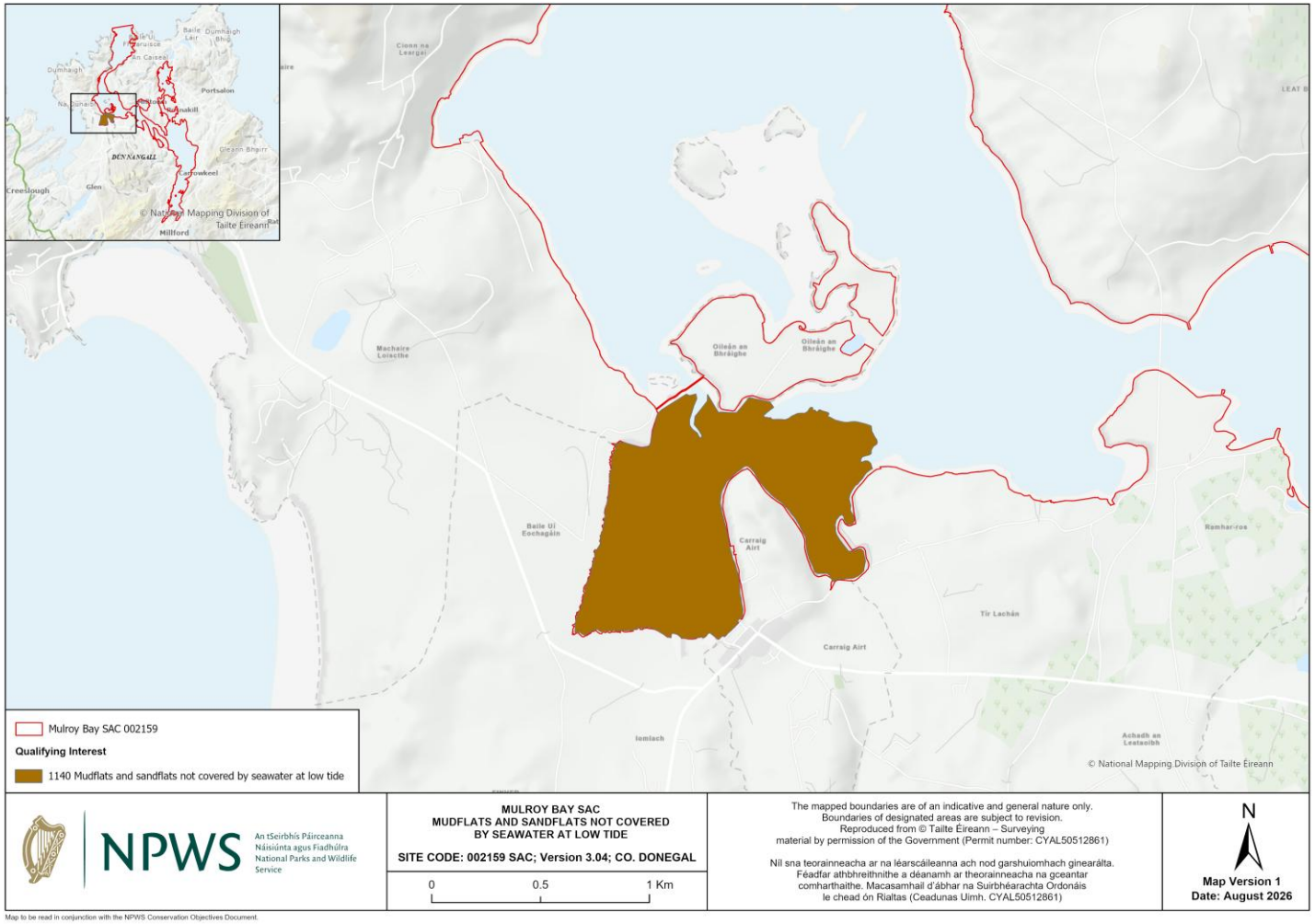


Figure 3 Extent of Mudflats and sandflats not covered by seawater at low tide in Mulroy Bay SAC.

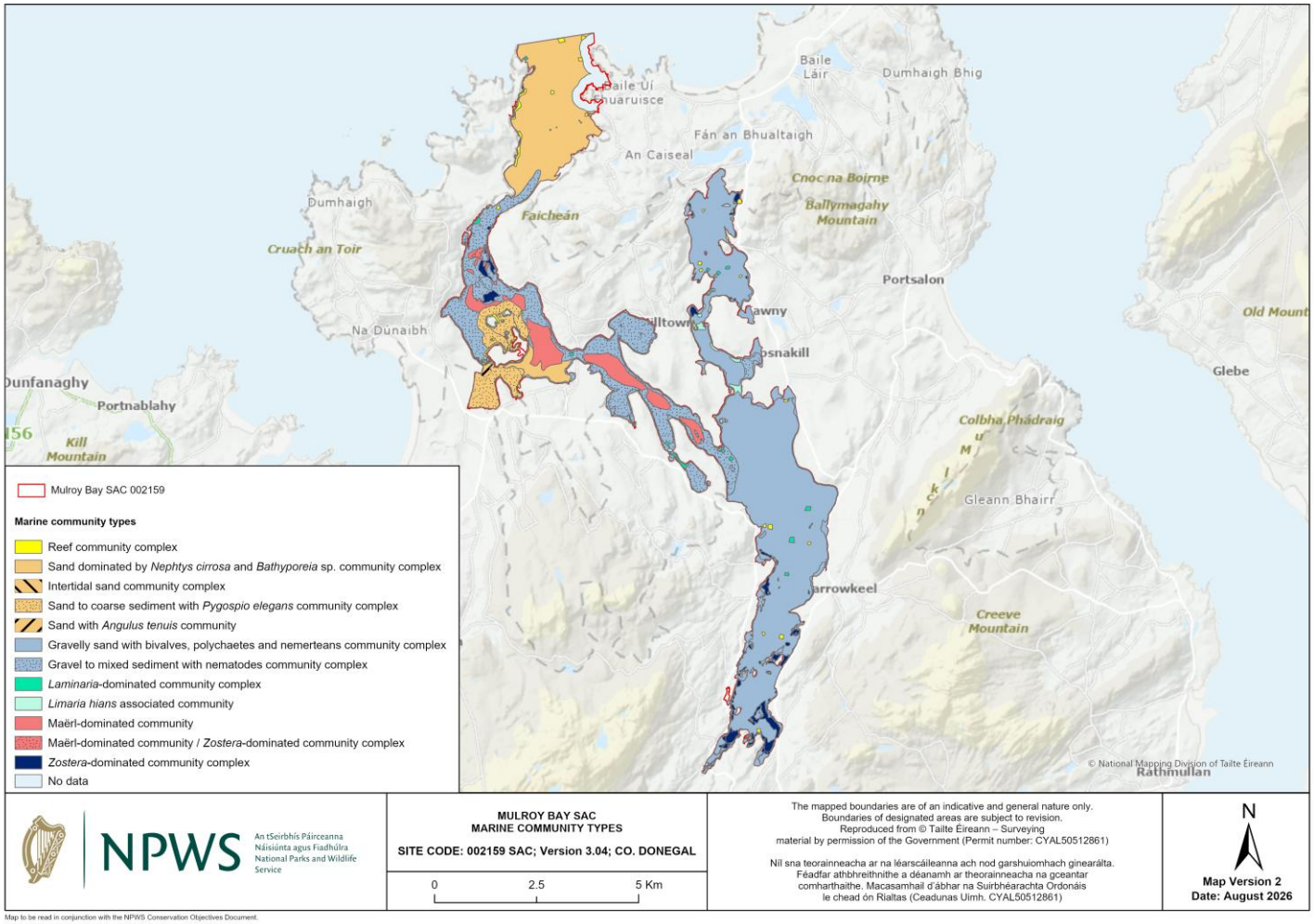


Figure 4 Distribution of Marine community types in Mulroy Bay SAC.