



Marine Nature Conservation Review

Sector 5

South-east Scotland and north-east England

Area summaries

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1998

Series editor: David Connor

Coasts and seas of the United Kingdom - MNCR series

Location

Position (centre)	NZ 530 260	
County/District	Cleveland	Hartlepool, Stockton-on-Tees, Langbaugh, Middlesbrough
Conservation agency/area	English Nature	Northumbria

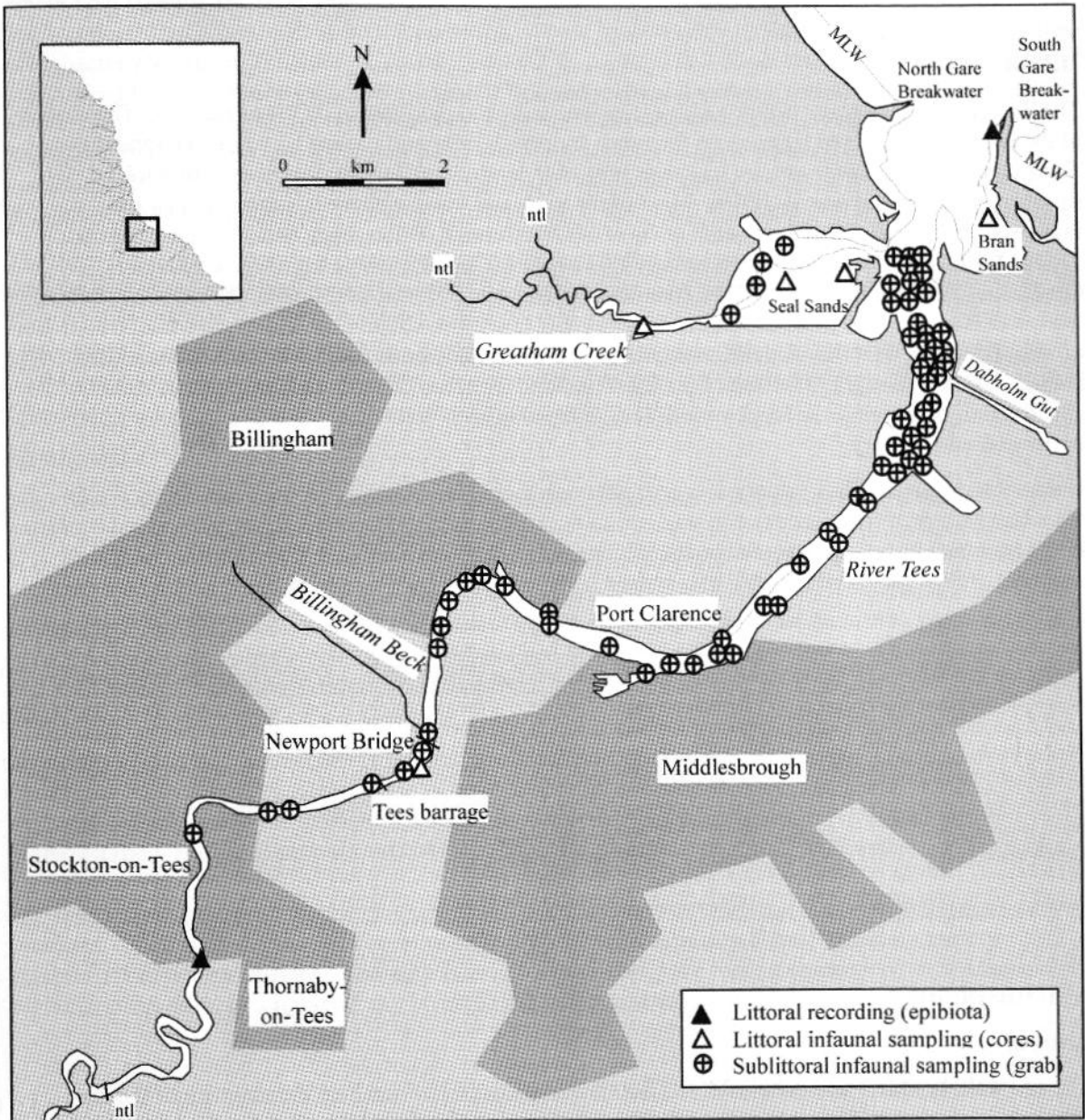


Figure 21.1 Location of area showing sites surveyed and main bathymetric features.

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Marine biological surveys				
	Survey methods	No. of sites	Date(s) of survey	Source
<i>Littoral</i>	Recording (epibiota)	2	September 1992	Brazier & Murray (1994)
	Infaunal cores and granulometry	5	September 1992	Brazier & Murray (1994)
<i>Sublittoral</i>	Infaunal grab samples (0.1 m ² Day grab) and granulometry	76	October 1991	Tapp <i>et al.</i> (1992)
	Infaunal grab samples (0.1 m ² Day grab) and granulometry	7	June 1992	NRA unpublished data
	Infaunal grab samples (0.1 m ² Day grab) and granulometry	3	September 1990	Shillabeer (1991)

Introduction

The Tees is a long, narrow estuary with extensive sand- and mudflats in its lower reaches. The mouth of the estuary is sheltered by piers on the north and south sides and backed by extensive sand dunes. The majority of the lower estuary has been subject to land-claim, largely for the construction of riverside industry and port facilities. Most of the mid- and lower estuary is surrounded by the industrial, commercial and residential areas of Middlesbrough, Billingham, Stockton-on-Tees and Thornaby-on-Tees, while the upper estuary flows past the small town of Yarm and farmland. Greatham Creek and Seaton-on-Tees channel flow east and north of Seal Sands, the sediment flats in the lower estuary. The wetlands associated with Greatham Creek and Seal Sands are considered to be of importance for seabirds (Davidson *et al.* 1991). Three kilometres upstream on the Tees estuary, Dabholm Gut is thought to be one of the most polluted stretches of water in Europe. The recent construction of a barrage at Stockton-on-Tees, opened in 1994 will change the hydrography of the upper and mid-estuary.

Hard substrata in the Tees estuary is scarce although there is a cobble shore and sea wall on South Gare breakwater, piles of stones forming a training wall at Seaton-on-Tees Channel and silted cobbles in the mid- and upper estuary. Sediment habitats, apart from the extensive tide-swept sand- and mudflats at Seal Sands, are limited and consist largely of fluid anoxic mud throughout the estuary.

Physical features

<i>Physiographic type</i>	Complex estuary
<i>Length of coast</i>	83 km
<i>Area of inlet</i>	1,350 ha
<i>Length of tidal channel</i>	17 km
<i>Bathymetry</i>	Over 5 km of lower estuary dredged to a minimum of 10.4 m
<i>Wave exposure range</i>	Moderately exposed to ultra sheltered
<i>Tidal stream range</i>	Moderately strong to negligible
<i>Tidal range</i>	4.6 m (springs), 2.3 m (neaps)
<i>Salinity range</i>	Fully marine to low

Marine biology

Littoral

The sea wall, boulders and cobbles of the South Gare Breakwater make up the majority of the hard substrata in the lower Tees estuary and these have the most diverse habitats in the estuary owing to their proximity to the open coast. The communities here exhibit vertical zonation that is not found further upstream due to the restricted littoral width. Below the sea wall, the boulders and cobbles are characterised by a furoid/barnacle mosaic of bladder wrack *Fucus vesiculosus* and barnacles *Semibalanus balanoides* and *Elminius modestus* (Fves; BPat.Sem). The lower eulittoral and sublittoral fringe boulders are covered by the red filamentous algae *Audouinella* spp. and sea lettuce *Ulva* spp. with no serrated wrack or kelp recorded (Rho). The underboulder community associated with this habitat increases the species richness and is characterised by the breadcrumb sponge *Halichondria*

panicea, tubeworms *Pomatoceros triqueter*, scale worms *Harmothoe* spp., gammarids, saddle oysters *Anomia ephippium* and butterflyfish *Pholis gunnellus*. The other hard substrata, the silted cobbles of the training wall on Seal Sands and cobbles in Greatham Creek, are colonised by bladder wrack *Fucus vesiculosus* and green algae *Enteromorpha* spp. with a particularly low species richness (FvesX). On the training wall, where the environment is less brackish and silty than Greatham Creek, common mussels *Mytilus edulis* and abundant common periwinkles *Littorina littorea* are also recorded.

Parts of Bran Sands and Seal Sands comprise clean medium fine sand on the mid-shore, characterised by polychaetes *Spio martinensis*, *Capitella capitata*, oligochaetes *Tubificoides pseudogaster* and bivalves *Cerastoderma edule* and *Fabulina fabula* (AP.P). Other areas of Bran Sands and Seal Sands, where tidal streams are decelerated in the centre of the flats and behind the training walls, have environments that are subject more to deposition. These more muddy habitats are characterised by the polychaetes *Hediste diversicolor*, *S. martinensis* and *C. capitata* and oligochaetes *Tubificoides benedii* and *T. pseudogaster*, species that are tolerant of fine sediment and variable salinity and are indicators of a nutrient-rich environment (HedMac.Pyg). The numbers of species and individuals are greater on Seal Sands and adjacent to the training walls where the additional polychaete species *Anaitides maculata* and *Polydora ciliata* are recorded (HedStr). However, in the centre of Bran Sands, the polychaete and bivalve richness is lower, possibly due to the intense bait-digging activities in this area.

The ultra sheltered sites at Greatham Creek and adjacent to the Newport Bridge comprise fluid anoxic mud typical of the mid- and upper estuaries. As a consequence of the anoxia the infauna has a low species diversity dominated by the polychaetes *Streblospio shrubsolei* and *H. diversicolor* and the oligochaete *T. pseudogaster* (HedOl). Rocky habitats in the upper reaches of the estuary towards the tidal limit consist of heavily silted cobble banks covered by green algae *Enteromorpha* spp. with very few other marine species present due to the variable salinity (EphX).

Sublittoral

Four main sublittoral sediment biotopes were identified within the Tees estuary prior to the construction of the barrage. At Stockton-on-Tees and downstream to just below Billingham Beck, the species composition was dominated by oligochaete species, particularly *Tubificoides benedii* and the polychaete *Capitella capitata* (Tub). The majority of the length of the estuary, from Billingham Beck to Seaton-on-Tees channel, including Greatham Creek, had a high mud fraction (80%) and was characterised by polychaete and oligochaete species. *Neanthes virens*, *Nephtys hombergii*, *C. capitata* and *T. benedii* were the most frequently recorded (CapTub).

Molluscan species were found in some sites; the mud snail *Hydrobia ulvae* in particular reaches a high abundance in the middle reaches of the estuary. At certain sites, the bivalve species *Modiolus modiolus*, *Fabulina fabula*, *Abra alba*, *Venerupis senegalensis* and *Mya arenaria* were found at high densities. In the vicinity of Dabholm Gut and also at two sites opposite Billingham Beck, no infauna were recorded from grab samples (MobMud). This probably reflects the chronic pollution that these stretches of the estuary have been exposed to in the past (Shillabeer & Tapp 1990). At the mouth of the Tees estuary, between the North Gare and South Gare Breakwaters, a less muddy habitat was recorded which is similar to open coast muddy sand habitats, typically characterised by a sparse infauna of polychaete species. The polychaetes *Nephtys* spp. were most frequently recorded here, with a greater proportion of amphipod and bivalve species present than further upstream (NhomTub).

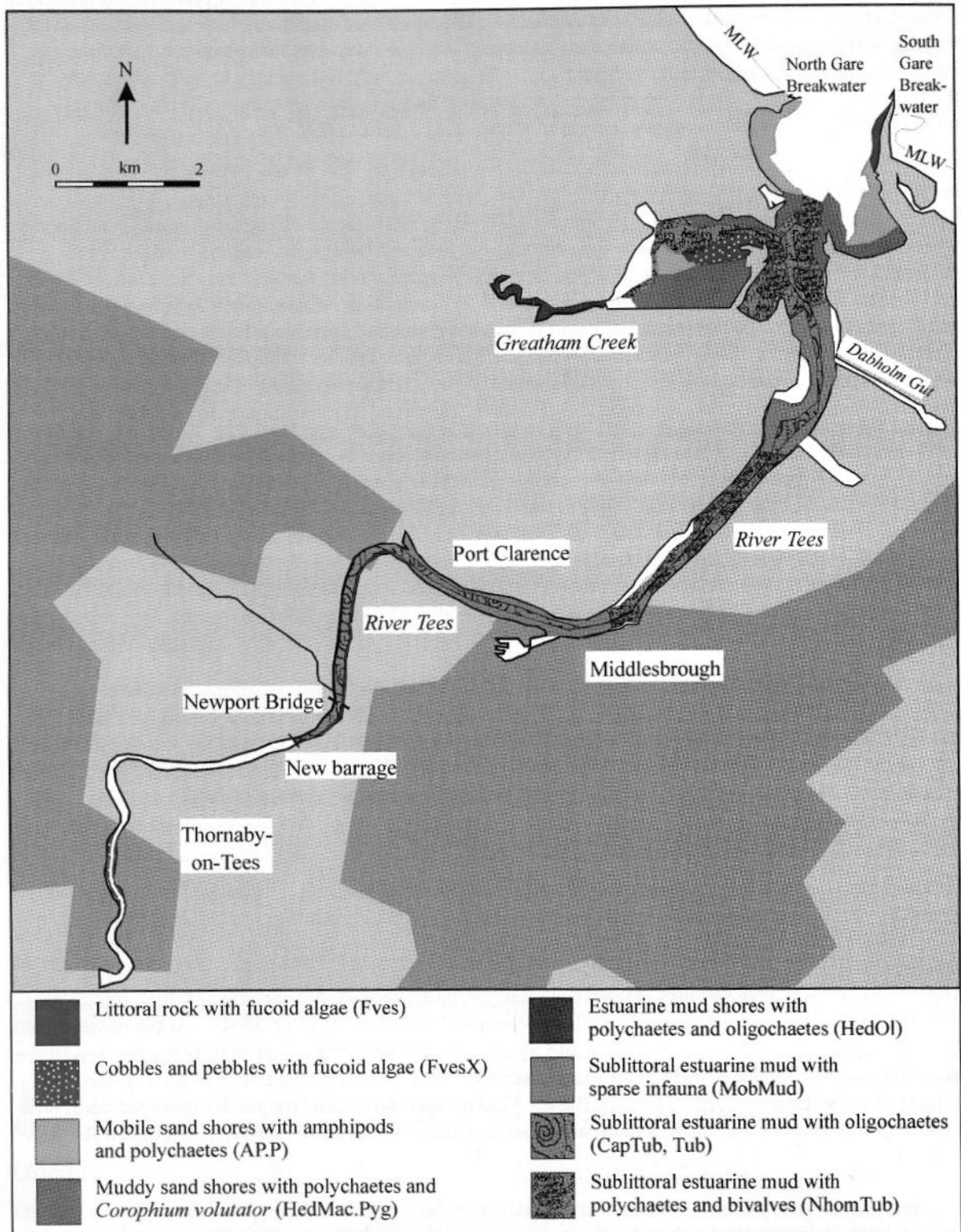


Figure 21.2 Indicative distribution of the main biotopes in the area (based on data from survey sites shown in Figure 21.1, and additional field observations and cited literature).
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Nature conservation

Conservation sites			
Site name	Designation	Centre grid ref.	Main features
South Gare and Coatham Sands	SSSI	NZ 547 262	Flora, invertebrates, ornithology
Cowpen Marsh	SSSI, WT	NZ 500 259	Ornithology
Seaton Dunes and Common	SSSI	NZ 535 285	Flora, invertebrates, ornithology
Teesmouth (North Gare and Seal Sands)	NNR	NZ 540 275 & NZ 530 260	Ornithology
Seal Sands	NNR, SSSI	NZ 529 260	Ornithology
Teesmouth & Cleveland Coast	Ramsar, SPA	NZ 535 265	Ornithology

Human influences

Coastal developments and uses

Large parts of the intertidal areas in the lower estuary have been subjected to land-claim for the development of port facilities and large-scale industrial sites. Industrial development canalised approximately 11.5 km of the middle reaches of the estuary to form Middlesbrough docks. Over 10 km of the lower estuary is dredged to a depth of at least 4.5 m, of which more than half this distance is dredged to a depth of 10.4 m.

The barrage at Stockton-on-Tees, completed in 1994, operates as a tidal exclusion structure and has shortened to limit of tidal influence to 17 km upstream of the estuary mouth.

Shipping

In 1990 there over 40 million tonnes of shipping used the estuary (Lloyds of London 1990). The shipping includes dry bulk, oil and containerised cargoes.

Pollution

The Tees estuary has for a long time suffered from pollution as a result of discharges from the chemical and engineering plants along its shores. However, much effort has been put in to reduce the impact of the local industry. Although much improved during the last ten years, Greenpeace still considers the Tees estuary as one of the most polluted in Europe (Greenpeace publicity material). Two hot-spots for chemical pollution are Billingham Beck and Dabholm Gut, where no infauna was recorded during sublittoral sampling. The river water upstream of Stockton-on-Tees, as well as that of the estuary, is likely to be nutrient-rich from the domestic outfalls and sewage discharges. The National Rivers Authority graded the Tees estuary as being of water quality grades B to D.

Recreation

There are few recreational activities on the estuary due to limited access and poor water quality. The wetland areas of Seal Sands and Greatham Creek are frequented by bird- and seal-watchers. Some sailing and windsurfing activity occurs at high tide over Bran Sands and between the piers but this is restricted by the shipping in this part of the estuary.

Fisheries

Prior to developments around the estuary in the 1940s, a flourishing fisheries industry existed for salmon, sea-trout, flounders and eels. The only fishing-related activity currently is the taking of lugworms from Bran Sands by anglers, since fish are scarce in the estuary.

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Survey sites

Surveys

- 314: MNCR littoral survey of the estuaries of south-east Scotland and north-east England, 1992 (Brazier & Murray 1994).
- 315: Grab sampling survey, ICI 1991 (Tapp *et al.* 1992).
- 316: Infaunal grab and core sampling of the estuaries of north-east England by the National Rivers Authority, 1992. Unpublished data.
- 319: Grab sampling survey, ICI 1990 (Shillabeer 1991).

Littoral sites

Survey Site	Site name	Grid reference	Latitude & longitude	Biotopes present	
314	50	South Gare Breakwater.	NZ 558 282	54°38.7'N 01°08.1'W	BPat.Sem; Fves; Rho; EphX
314	51	Bran Sands.	NZ 553 265	54°37.8'N 01°08.5'W	AP.P; HedMac.Pyg; HedOl
314	52	E Seaton-on-Tees Channel.	NZ 536 263	54°37.7'N 01°10.1'W	FvesX; MytX; HedStr; HedMac.Pyg; HedOl
314	53	W Seal Sands.	NZ 527 261	54°37.6'N 01°11.0'W	HedStr
314	54	Greatham Creek Bridge.	NZ 508 255	54°37.3'N 01°12.7'W	HedOl
314	55	Upstream Newport Bridge.	NZ 477 198	54°34.2'N 01°15.7'W	HedOl
314	56	Thornaby-on-Tees.	NZ 448 169	54°32.7'N 01°18.4'W	Ent

Sublittoral sites

Survey Site	Site name	Grid reference	Latitude & longitude	Biotopes present	
315	42	Tees estuary, site 4/2.	NZ 543 266	54°37.8'N 01°09.5'W	NhomTub
315	43	Tees estuary, site 4/3.	NZ 543 262	54°37.6'N 01°09.5'W	NhomTub
315	51	Tees estuary, site 5/1.	NZ 543 260	54°37.5'N 01°09.5'W	NhomTub
315	53	Tees estuary, site 5/3.	NZ 545 255	54°37.2'N 01°09.3'W	NhomTub
315	61	Tees estuary, site 6/1.	NZ 546 249	54°36.9'N 01°09.2'W	NhomTub
315	71	Tees estuary, site 7/1.	NZ 544 243	54°36.6'N 01°09.4'W	NhomTub
315	81	Tees estuary, site 8/1.	NZ 543 239	54°36.4'N 01°09.5'W	NhomTub
315	83	Tees estuary, site 8/3.	NZ 541 237	54°36.3'N 01°09.7'W	NhomTub
315	84	Tees estuary, site 8/4.	NZ 543 236	54°36.2'N 01°09.5'W	CapTub
315	91	Tees estuary, site 9/1.	NZ 537 234	54°36.1'N 01°10.1'W	AphTub
315	92	Tees estuary, site 9/2.	NZ 538 233	54°36.1'N 01°10.0'W	CapTub
315	101	Tees estuary, site 10/1.	NZ 534 228	54°35.8'N 01°10.4'W	NhomTub
315	102	Tees estuary, site 10/2.	NZ 535 227	54°35.7'N 01°10.3'W	AphTub
315	111	Tees estuary, site 11/1.	NZ 525 218	54°35.3'N 01°11.2'W	NhomTub
315	112	Tees estuary, site 11/2.	NZ 527 218	54°35.3'N 01°11.0'W	CapTub
315	113	Tees estuary, site 11/3.	NZ 519 213	54°35.0'N 01°11.8'W	PolVS
315	114	Tees estuary, site 11/4.	NZ 519 212	54°34.9'N 01°11.8'W	CapTub
315	121	Tees estuary, site 12/1.	NZ 515 210	54°34.8'N 01°12.1'W	CapTub
315	122	Tees estuary, site 12/2.	NZ 520 212	54°34.9'N 01°11.7'W	MobMud
315	131	Tees estuary, site 13/1.	NZ 511 210	54°34.8'N 01°12.5'W	CapTub
315	132	Tees estuary, site 13/2.	NZ 509 208	54°34.7'N 01°12.7'W	CapTub
315	141	Tees estuary, site 14/1.	NZ 504 213	54°35.0'N 01°13.2'W	CapTub
315	142	Tees estuary, site 14/2.	NZ 504 213	54°35.0'N 01°13.2'W	MobMud
315	151	Tees estuary, site 15/1.	NZ 495 216	54°35.2'N 01°14.0'W	MobMud
315	152	Tees estuary, site 15/2.	NZ 494 215	54°35.1'N 01°14.1'W	MobMud
315	161	Tees estuary, site 16/1.	NZ 489 221	54°35.4'N 01°14.5'W	MobMud
315	162	Tees estuary, site 16/2.	NZ 485 220	54°35.4'N 01°14.9'W	CapTub
315	171	Tees estuary, site 17/1.	NZ 481 215	54°35.1'N 01°15.3'W	MobMud
315	181	Tees estuary, site 18/1.	NZ 482 218	54°35.3'N 01°15.2'W	Tub
315	191	Tees estuary, site 19/1.	NZ 480 213	54°35.0'N 01°15.4'W	Tub
315	201	Tees estuary, site 20/1.	NZ 479 201	54°34.4'N 01°15.5'W	MobRS
315	211	Tees estuary, site 21/1.	NZ 478 199	54°34.3'N 01°15.6'W	MobRS
315	221	Tees estuary, site 22/1.	NZ 471 194	54°34.0'N 01°16.2'W	Tub
315	231	Tees estuary, site 23/1.	NZ 460 190	54°33.8'N 01°17.3'W	Tub
315	241	Tees estuary, site 24/1.	NZ 457 190	54°33.8'N 01°17.5'W	Tub
315	261	Tees estuary, site 26/1.	NZ 447 187	54°33.6'N 01°18.5'W	Tub
315	271	Tees estuary, site 27/1.	NZ 526 266	54°37.9'N 01°11.1'W	NhomTub

Sublittoral sites - continued

<i>Survey Site</i>	<i>Site name</i>	<i>Grid reference</i>	<i>Latitude & longitude</i>	<i>Biotopes present</i>
315	272 Tees estuary, site 27/2.	NZ 524 259	54°37.5'N 01°11.3'W	CapTub
315	273 Tees estuary, site 27/3.	NZ 523 264	54°37.7'N 01°11.3'W	Tub
315	274 Tees estuary, site 27/4.	NZ 521 256	54°37.3'N 01°11.5'W	HedOl
315	301 Tees estuary, site 30/1.	NZ 546 266	54°37.8'N 01°09.2'W	CapTub
315	302 Tees estuary, site 30/2.	NZ 545 266	54°37.8'N 01°09.3'W	NhomTub
315	311 Tees estuary, site 31/1.	NZ 546 265	54°37.8'N 01°09.2'W	NhomTub
315	312 Tees estuary, site 31/2.	NZ 545 265	54°37.8'N 01°09.3'W	NhomTub
315	321 Tees estuary, site 32/1.	NZ 546 264	54°37.7'N 01°09.2'W	CapTub
315	322 Tees estuary, site 32/2.	NZ 545 263	54°37.7'N 01°09.3'W	CapTub
315	331 Tees estuary, site 33/1.	NZ 547 261	54°37.6'N 01°09.1'W	CapTub
315	332 Tees estuary, site 33/2.	NZ 545 260	54°37.5'N 01°09.3'W	NhomTub
315	342 Tees estuary, site 34/2.	NZ 546 257	54°37.4'N 01°09.2'W	CapTub
315	351 Tees estuary, site 35/1.	NZ 548 255	54°37.2'N 01°09.0'W	MobMud
315	352 Tees estuary, site 35/2.	NZ 547 255	54°37.2'N 01°09.1'W	MobMud
315	361 Tees estuary, site 36/1.	NZ 548 254	54°37.2'N 01°09.0'W	MobMud
315	362 Tees estuary, site 36/2.	NZ 547 254	54°37.2'N 01°09.1'W	MobMud
315	371 Tees estuary, site 37/1.	NZ 548 253	54°37.1'N 01°09.0'W	MobMud
315	372 Tees estuary, site 37/2.	NZ 547 252	54°37.1'N 01°09.1'W	MobMud
315	381 Tees estuary, site 38/1.	NZ 549 251	54°37.0'N 01°08.9'W	Tub
315	382 Tees estuary, site 38/2.	NZ 547 250	54°37.0'N 01°09.1'W	MobMud
315	391 Tees estuary, site 39/1.	NZ 548 249	54°36.9'N 01°09.0'W	MobMud
315	392 Tees estuary, site 39/2.	NZ 547 249	54°36.9'N 01°09.1'W	MobMud
315	401 Tees estuary, site 40/1.	NZ 548 246	54°36.8'N 01°09.0'W	MobMud
315	402 Tees estuary, site 40/2.	NZ 547 245	54°36.7'N 01°09.1'W	MobMud
315	411 Tees estuary, site 41/1.	NZ 547 244	54°36.7'N 01°09.1'W	MobMud
315	412 Tees estuary, site 41/2.	NZ 546 244	54°36.7'N 01°09.2'W	PolVS
315	421 Tees estuary, site 42/1.	NZ 547 243	54°36.6'N 01°09.1'W	CapTub
315	422 Tees estuary, site 42/2.	NZ 546 243	54°36.6'N 01°09.2'W	CapTub
315	431 Tees estuary, site 43/1.	NZ 546 240	54°36.4'N 01°09.2'W	MobMud
315	432 Tees estuary, site 43/2.	NZ 545 242	54°36.5'N 01°09.3'W	CapTub
315	441 Tees estuary, site 44/1.	NZ 546 237	54°36.3'N 01°09.2'W	CapTub
315	442 Tees estuary, site 44/2.	NZ 545 238	54°36.3'N 01°09.3'W	NhomTub
316	13 Portrack.	NZ 476 195	54°34.1'N 01°15.8'W	MobMud
316	14 Bamlett's Bight.	NZ 485 221	54°35.5'N 01°14.9'W	CapTub
316	15 No. 23 Buoy.	NZ 529 224	54°35.6'N 01°10.8'W	VsenMtru
316	16 Opposite Tees Dock.	NZ 544 244	54°36.7'N 01°09.4'W	PolMtru
316	18 Phillips Petroleum, Tees estuary.	NZ 545 249	54°37.0'N 01°09.3'W	AphTub

Compiled by: Paul Brazier

Location

Position (centre/limits)	NZ 980 020	NZ 680 220 - TA 170 750
County/District	Cleveland, North Yorkshire	Langbaugh, Scarborough
Conservation agency/area	English Nature	Northumbria, North & East Yorkshire

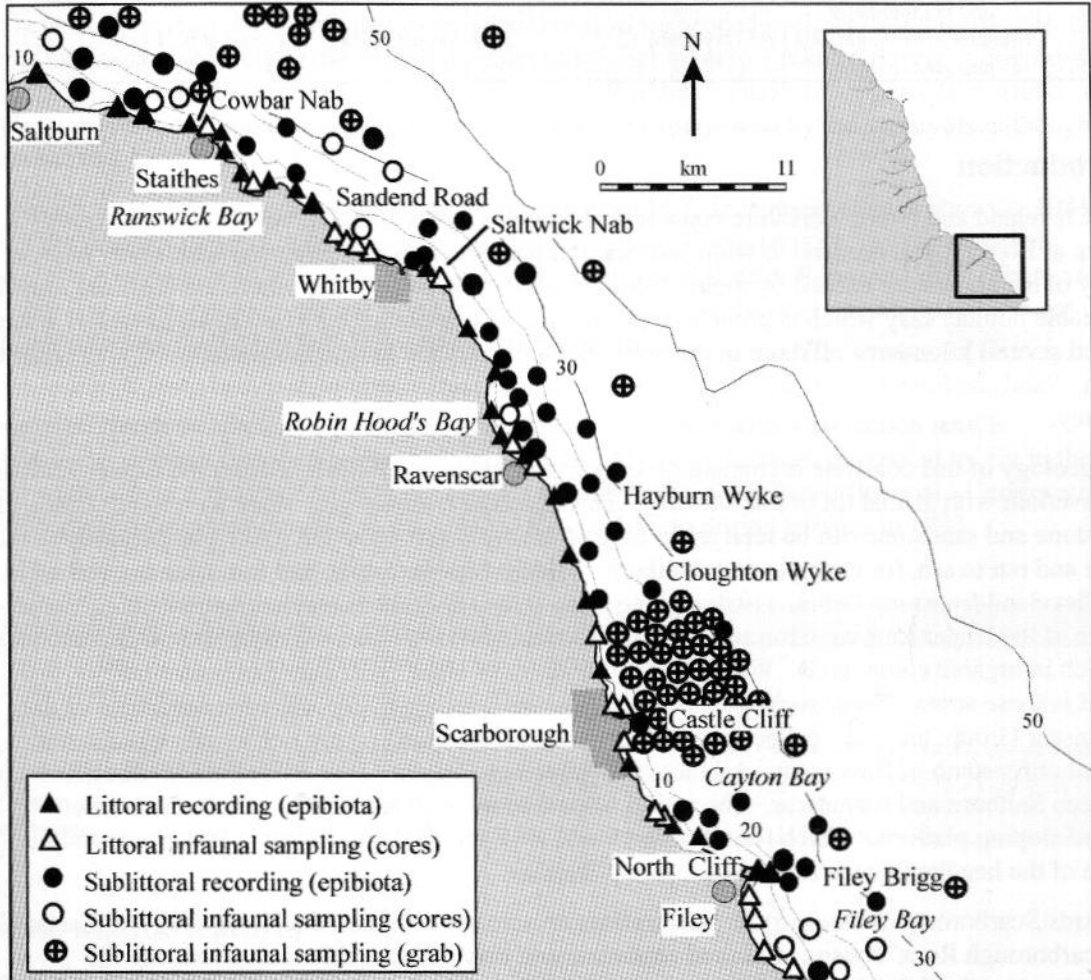


Figure 22.1 Location of area showing sites surveyed and main bathymetric features.

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Marine biological surveys				
	Survey methods	No. of sites	Date(s) of survey	Source
<i>Littoral</i>	Infaunal cores and granulometry	9	April-September 1992	Bird & Morris (1992)
	Infaunal cores and granulometry	8	August 1993	MNCR survey 399
	Recording (epibiota)	6	May-July 1991	Morris & Bird (1992)
	Recording (epibiota)	21	August 1993	MNCR survey 399
<i>Sublittoral</i>	Recording (epibiota)	42	June-July 1993	MNCR survey 400
	Infaunal cores and granulometry	14	June-July 1993	MNCR survey 400
	Infaunal grab samples (0.1 m ² Day grab) and granulometry	68	July 1991	Confidential data
	Infaunal grab samples (0.1 m ² Day grab) and granulometry	12	July-August 1993	Turner <i>et al.</i> 1993

Introduction

The Cleveland and North Yorkshire coast is characterised by spectacular, very high cliffs (reaching 200 m at Boulby) that descend to wide bedrock and boulder shores interspersed with sandy bays. Many of the shores are backed by mobile boulders and scree, particularly where the cliffs are topped by friable boulder clay which is prone to rapid erosion. Rock plains, under 30 to 40 metres of water extend several kilometres offshore in the north, but are restricted to nearshore shallower areas further south. Sandy sediment plains with scattered boulders are particularly widespread from Whitby south to Filey.

The geology of this coastline is characterised by friable shale and sandstone from the Lower Jurassic and overlain with glacial till or boulder clay. Thick beds of crumbly grey shale with minor bands of limestone and sandstone can be seen at the base of the cliffs and wave-cut rocky platforms along the shore and out to sea, for example near Saltburn. Middle Lias sandstone and ironstone is overlain by the Cleveland Ironstone Series, a rusty orange stone mined at Staithes for its iron content. The dark shales of the Upper Lias were formed by a steady 'rain' of dead planktonic organisms and consequently are rich in organic compounds. Whitby Jet and nodules of alum, both mined in recent history, are found in these strata. These rocks of the Upper Lias are overlain by the coloured sandstone of the Ravenscar Group; the rocks called the Dogger Formation are particularly rich in iron and form the rugged cliffs south of Ravenscar. All these formations can be seen in cross-section in the cliffs between Saltburn and Ravenscar. The results of structural uplift are clearly seen in the crescent-shaped sloping platforms which form Robin Hood's Bay, the geological fault at Ravenscar and the shape of the headlands such as Cowbar Ness at Staithes.

Towards Scarborough Jurassic rocks predominate around sea level and the North Cliff and Castle Cliff of 'Scarborough Rock' consist of faulted sandstone and clay. The boulder clay overlying the formations south of Scarborough are particularly thick and are prone to slippage after prolonged heavy rain. In summer 1993 there was a particularly dramatic landslide which carried the seaward side of a hotel into the sea. Boulder clay at shore level is constantly under attack by wave action which results in extensive plumes of discoloured water fringing the coast during rough weather.

The cliffs between Gristhorpe and Filey consist of Oxford Clay and Lower Cretaceous Grit; the latter forming the long spit of rock at Filey Brigg. The rocks on Filey Brigg dip approximately southwards with the steep north side of the Brigg taking the brunt of any heavy weather, whereas the gradually sloping south side is more sheltered and silted. The low vertical walls of sandstone at the base of the high boulder clay cliffs to the south of Filey Brigg are easily weathered and have produced the gently curving sandy bay at Filey.

The prevailing winds are from the south-west and are consequently offshore but high wind speeds occur onshore during winter gales. The long fetch across the North Sea can result in very high-energy wave action from the north and north-east although bouts of heavy weather from these directions are relatively short-lived. This section of coast is predominantly moderately exposed, i.e. the prevailing wind is offshore but onshore winds with a long fetch are frequent. The high headlands, such as south

of Whitby and at High Hawsker, are more exposed to wave action during northerly and easterly gales than are the large bays, for example at Runswick Bay and Robin Hood's Bay, and more localised shelter can be found in small coves such as Cloughton Wyke. Castle Cliffs, forming the prominent headland at Scarborough, protects the harbour, and similarly the exposed headland at Filey Brigg shelters Filey Bay.

Tidal streams are moderately strong around headlands, such as under High Hawsker, and along the linear stretches of coast, but are much reduced in the larger bays of Robin Hood's and Runswick Bays. Tidal streams follow the coastal outline, flowing southwards on the flood and are generally slower northwards on the ebb. There is a net flow of water southwards due to the combined forces of tide and wind action. This long-shore drift carries small amounts of suspended sediment southwards. Tidal stream flow rates, according to the Admiralty chart (134), run at up to 1.6 knots during spring tides where they are accelerated around the headland south of Whitby. In most other parts of this area, apart from in embayments, appreciable underwater currents were experienced by the surveyors, although of no more than 1 knot.

The surface water temperature ranges from 5°C in winter to 14°C in summer (Lee & Ramster 1981). During the summer of 1993, a surface water temperature of 12°C was recorded by the surveyors. Mean surface salinity is 34.5‰ in summer and 34.35‰ in winter (Lee & Ramster 1981). There are relatively few rivers entering the sea along this stretch of coast and the only one likely to have any localised influence on the benthos is the River Esk at Whitby.

Turbidity is influenced by the soft shales and boulder clay along the North Yorkshire coast and is at its highest after rough weather. The moderate tidal streams combined with wave action tend to continually re-suspend fine particulate material inshore. All rocky surfaces are coated by silt in the deeper water where turbulence from wave action and tidal streams was less influential. Underwater visibility ranged from less than 0.5 m (inshore) to 8 m (offshore) during surveys in 1993.

Physical features

<i>Physiographic type</i>	Open coast
<i>Length of coast</i>	90 km
<i>Bathymetry</i>	50 m within 3 mile limit
<i>Wave exposure range</i>	Exposed to sheltered
<i>Tidal stream range</i>	Moderately strong to negligible
<i>Tidal range</i>	4.8 m (springs), 2.3 m (neaps)
<i>Salinity range</i>	Fully marine

Marine wildlife features

Littoral

The wave-cut platforms and boulder beaches under the cliffs between Saltburn and Filey Bay support much the same assemblages of species along the whole stretch of coast. Most sites are moderately exposed to wave action and the physical composition of the relatively soft and friable rocks varies little over the majority of the area, although the relative proportion of boulders to bedrock varies.

As on most rocky shores throughout north-east England, the general layout of species on the shores follows a sequence of zones distinguished primarily by the dominant fucoids and/or the presence of abundant barnacles. The littoral fringe and upper eulittoral are often present at the base of the steep cliffs, where the substratum consists of freshly-fallen shale scree or mobile boulders and shingle (for example near Boulby and under Beast Cliff). Freshwater seepage from the cliffs also affects this zone. Consequently species diversity on the upper shore is low with a band of the green alga *Enteromorpha* sp. (Ent), or variable amounts of spiral wrack *Fucus spiralis* and the periwinkle *Littorina saxatilis* in crevices and amongst boulders (Fspi). Lichens (YG) and channelled wrack *Pelvetia canaliculata* (Pel) are infrequently recorded, the latter only amongst the localised shelter on large boulders at the base of

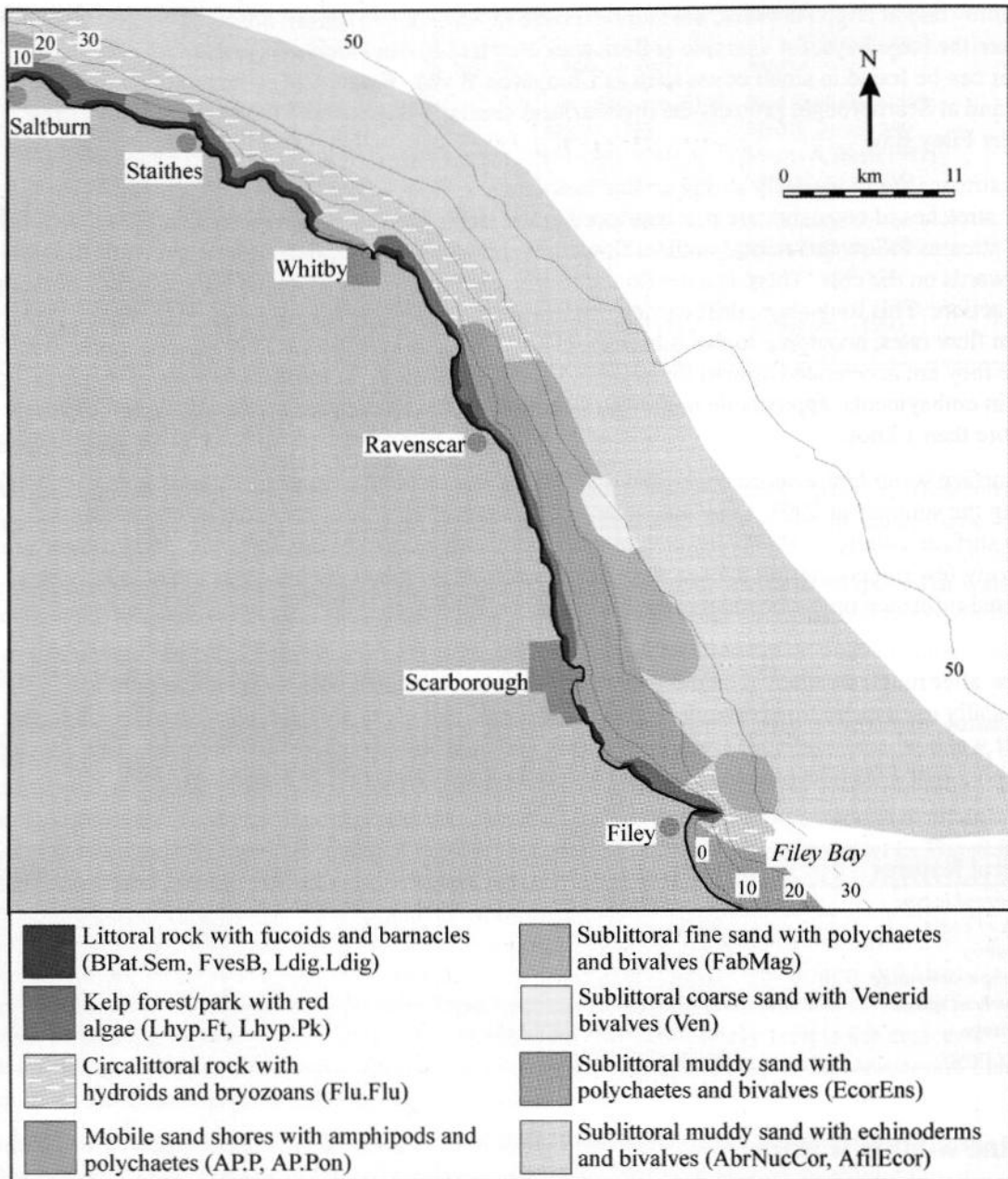


Figure 22.2 Indicative distribuion of the main biotopes within the area (based on data from survey sites shown in Figure 22.1 and additional field observations).

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the cliffs in Robin Hood's Bay and at Filey Brigg. Below these zones there is often an area of scoured bare rock, with very little growth other than a few barnacles *Semibalanus balanoides* (BPat.Sem). Barnacles are found in greater numbers a little further down the shore with limpets *Patella vulgata* and small mussels *Mytilus edulis* (MytB).

Wracks *Fucus vesiculosus* and *F. serratus* often dominate the mid- and lower eulittoral respectively (Fves; Fser.Fser). The proportions of furoid to barnacle-limpet-mussel covered rock varies slightly depending on local wave exposure, with an inverse relationship between increasing wave exposure and the amount of furoid algae on the shore. Shallow water-filled depressions on the flatter bedrock platforms are lined with coralline algae and contain large numbers of common periwinkles *Littorina*

littorea (Cor). Red algae *Mastocarpus stellatus* and *Osmundea pinnatifida* are also more common in the lower eulittoral (XR), particularly around boulders and on the less friable bedrock, and spongy mats of sediment bound to the rocks by the red algae *Audouinella* spp. occur in the lower eulittoral and sublittoral fringe (Rho). Overhangs and the undersides of boulders in the lower eulittoral often support a variety of the encrusting sponges *Halichondria panicea*, *Grantia compressa* and *Scypha ciliata*, tubeworms *Pomatoceros triqueter* and encrusting bryozoans; the beadlet anemone *Actinia equina* and the shore crab *Carcinus maenas* are also common where there are damp cracks and crevices. Pools at this level on the shore, for example adjacent to Cayton Bay, are often large, filling the troughs formed between tilted bedrock plains (FK). Species found in the sublittoral fringe such as the kelps *Laminaria hyperborea* and *L. saccharina* and brittlestars *Ophiothrix fragilis* and *Amphipholis squamata* are common in these pools, which occasionally also hold clumps of the brown alga sea oak *Halidrys siliquosa* where the pool's floor is covered with sand (SwSed).

Sublittoral fringe communities on rock generally consist of dense kelp *Laminaria digitata* and the upper limits of the *L. hyperborea* forest (Ldig.Ldig; Lhyp.Ft). Red algae such as *Ceramium* spp., *Chondrus crispus*, *Palmaria palmata* and *Plocamium cartilagineum* and dense mats of the bryozoan *Electra pilosa* are found on the kelp stipes and amongst the holdfasts on the rock, although in some places urchins *Echinus esculentus* have reduced the amount of algae through grazing. At most sites the gradually sloping bedrock supports extensive kelp forests exposed in the sublittoral fringe at low water, for example at Saltburn Scar. Small vertical faces, overhangs and underboulder communities in the sublittoral fringe are animal-dominated, often with encrusting sponges *Myxilla incrustans*, *Halichondria panicea* and *Halisarca dujardini* (Ldig.Ldig.Bo).

Localised variations in the layout of the shore occur where wave action is either reduced, for example in the larger bays such as Runswick and Robin Hood's Bays, in areas partially protected by headlands and shallow reefs just offshore, or where exposure is increased such as on the north side of Filey Brigg. The more sheltered sites support a particularly dense cover of fucoids. In Robin Hood's Bay the cover of wracks *Fucus vesiculosus* and *F. serratus* is almost complete and areas of the mid eulittoral are also covered in occasional clumps of the knotted wrack *Ascophyllum nodosum*. Barnacles and limpets are less abundant than on the more exposed coast although several ridges in the upper mid eulittoral support mosaics of barnacles and small clumps of fucoids (FvesB). The lower shore is generally more silted at these sheltered sites. Red algae *Audouinella* spp. is abundant in patches (Rho) and pools hold sediment-tolerant algae such as *Polyides rotundus* and sea oak *Halidrys siliquosa* (SwSed).

In contrast, the north side of Filey Brigg is exposed. Barnacles and limpets with lines of small mussels in crevices cover both vertical and horizontal faces throughout the eulittoral zone and dogwhelks *Nucella lapillus* are common. Fucoids are sparse although patches of the red alga *Mastocarpus stellatus* occur in the mid and lower eulittoral, interspersed with thongweed *Himanthalia elongata* (Fser.R). Sublittoral fringe communities are characterised by small amounts of the kelps *Laminaria digitata*, *L. hyperborea* and occasional *Alaria esculenta*; silt-free crevices and overhangs contain luxuriant growths of the breadcrumb sponge *Halichondria panicea* on coralline algae. The sheltered south side of Filey Brigg makes an interesting comparison with the north side. Communities here bear a greater resemblance to those in Robin Hood's Bay, even though separated from the north side by no more than 200 metres.

Littoral sediment is confined to small pockets at Skinningrove, Runswick Bay and Robin Hood's Bay and to the few larger sandy beaches at Whitby Sands, Scarborough, Cayton and Filey Bay. The sediment is mostly medium clean sand with sparse crustacean-polychaete communities (AP.P), although some of the cores taken in slightly finer sand at Filey Bay and Whitby Sands contain large numbers of sand mason worms *Lanice conchilega* and a few bivalves such as thin tellin *Angulus tenuis* (AP.Pon; Lan).

Sublittoral

Onshore, adjacent to the high cliffs, infralittoral rocky habitats are almost continuous from one end of the survey area to the other but there is a discontinuity in the distribution of circalittoral rocky habitats which occur offshore between Runswick Bay and Sandsend near Whitby. Bedrock plains extend to over 4 km offshore off Saltburn, Skinningrove and Runswick Bay, but further south and east the rock dips below the sea bed and is covered by sediment plains with boulders and cobbles. Rippled sand and slightly muddy sand plains with boulders are found offshore from Sandsend, Whitby, Robin Hood's Bay, Scarborough and into Filey Bay.

The biotopes in the upper infralittoral are typical of those found throughout north-east England, i.e. associated with moderate wave exposure, relatively high turbidity and moderate scour. Poor light penetration through what is often very turbid water limits the depth range at which kelp forests flourish and also restricts the number of sites surveyed close to the shore. Kelp *Laminaria hyperborea* forms dense forests on the shallow rocky substrata (Lhyp.Ft) which comprise stepped bedrock terraces and large boulders. The depth at which kelp forests flourish ranges from around sea level to 1 m and kelp park (Lhyp.Pk) and solitary small plants are not found much deeper than 3 m. The most regularly recorded red algae include *Palmaria palmata*, *Plocamium cartilagineum*, *Delesseria sanguinea*, *Phycodrys rubens* and *Hypoglossum hypoglossoides*, often found attached high up the kelp stipes away from the substratum which is often *Echinus*-grazed and supports a layer of coralline algae. Silt-tolerant species are also abundant, particularly the red algae *Phyllophora crispa*, *P. pseudoceranoides* and *Chondrus crispus* which are often thickly encrusted with the bryozoan *Electra pilosa*.

The more tide-swept and wave-exposed kelp forests at Whitby Rock and Filey Brigg hold a slightly higher diversity of animals, with sponges such as *Halichondria panicea*, *Myxilla incrustans*, *Haliclona oculata* and *Scypha ciliata*, hydroids *Tubularia indivisa*, *Abietinaria abietina* and *Sertularia argentea* and the anemone *Sagartia elegans*. The hornwrack bryozoan *Flustra foliacea* - a species tolerant of silt and scour - is also common in the kelp forests at Filey Brigg and amongst the other kelp forests in the area. Short vertical faces in the infralittoral (AlcByH.Hia; AlcByH) are bare of kelp but support filamentous and foliose red algae, coralline crusts and a variety of sessile animals. Ascidians are relatively common here, with light-bulb sea squirt *Clavelina lepadiformis* and occasionally *Perophora listeri*, the latter not occurring further north. The brown alga *Taonia atomaria*, here at the northern limit of its distribution in GB, is found on flat bedrock in the lower infralittoral just off Beast Cliff, south of Robin Hood's Bay. The tube-forming polychaete *Sabellaria spinosa* is found amongst kelp holdfasts and on infralittoral rock at many of the sites in this area but at one location near Saltwick Nab dense aggregations of tubes form a distinct reef-like structure covering the entire area surveyed (Sspi).

Circalittoral hard substrata in the north of this area are characterised by extensive plains of gently sloping terraced bedrock with short vertical faces, in some areas appearing similar to the tilted platforms visible at low water in Robin Hood's Bay. The assemblages of animals present at these sites are characteristic of the silt-scoured and moderately tide-swept conditions found elsewhere on the north-east England coast (Flu.Flu). Dead-man's fingers *Alcyonium digitatum*, tubeworms *Pomatoceros triquetus* and hornwrack *Flustra foliacea* are the most obvious benthic species, interspersed with the bryozoan *Securiflustra securifrons* and hydroids including *Abietinaria abietina*, *Thuiaria thuja* and *Hydrallmania falcata*. Combined, these species often form a turf on the rock surfaces, particularly where the tidal flow is accelerated over ridges and on the tops of large, stable boulders. The featherstar *Antedon bifida* is recorded as common at the extreme north end of this area and in the south of Tees Bay. Although not a rare species in Britain, its nearest location in Sector 5 recorded by MNCR surveys is off Newbiggin in Northumberland. The calcareous tubeworm *Pomatoceros lamarcki* is recorded at a few sites although distribution of this species in Sector 5 is somewhat limited. An interesting variation in the most prevalent circalittoral communities is found in Robin Hood's Bay where spongy 'nests' made from the tubes of the amphipod *Jassa falcata* cover the bedrock. This has been recorded by other workers (Lincoln 1979) but has not been found elsewhere in Sector 5.

Sublittoral sediments comprise mainly moderately exposed fine and medium sand with polychaetes and bivalves, occasionally with the heart urchin *Echinocardium cordatum* (EcorEns). Ripples, waves

and dunes are frequently found at these sites which are often strongly tide-swept, for example off High Hawsker near Whitby and the southern end of Filey Bay. Characterising species comprise a suite of polychaetes including *Nephtys* spp., *Spio* spp., *Spiophanes bombyx*, *Magelona mirabilis* and *Chaetozone setosa*. Bivalves recorded regularly included *Nucula nitidosa*, *Spisula elliptica*, *Fabulina fabula*, *Gari fervensis*, *Abra alba* and *Chamelea gallina* (FabMag). Beyond the 20 m contour south of Ravenscar the habitat was more muddy with a community characterised by polychaetes *Nephtys* spp. and bivalves (AbrNucCor).

Nature conservation

Conservation sites			
Site name	Designation	Centre grid ref.	Main features
Boulby Quarries	SSSI	NZ 745 200	Geology
Staithe - Port Mulgrave	SSSI	NZ 784 189	Geology
Runswick Bay	SSSI	NZ 809 169	Geology
Whitby - Saltwick	SSSI	NZ 901 115	Geology
May Wyke - Miller's Nab	SSSI	NZ 941 082	Geology
Hawsker Bottoms	SSSI	NZ 942 082	Geology
Beast Cliff to Miller's Nab	SSSI	NZ 966 028	Geology, flora
Hayburn Wyke	SSSI, NT, WT	TA 012 968	Geology, flora
Iron Scar & Hundale Point to Scalby Ness	SSSI	TA 017 964	Geology
North Bay - South Toll House Cliff	SSSI	TA 048 893	Geology
Cayton and Cornelian Bays	SSSI, NT	TA 062 852	Geology, flora, invertebrates, ornithology
Gristhorpe Bay & Red Cliff	SSSI	TA 085 840	Geology
Filey Brigg	SSSI	TA 126 816	Geology, ornithology
Robin Hood's Bay and associated coast	SMA	TA 005 990 - NZ 939 085	Marine biology
North Yorkshire and Cleveland	HC	NZ 668 216 - TA 036 909	Landscape
North York Moors	NP	NZ 747 202 - TA 029 943	
Hunt Cliff & Warsett Hill	NT	NZ 692 215	Coastal habitats
Port Mulgrave	NT	NZ 796 175	Coastal habitats
Saltwick Nab	NT	NZ 914 112	Coastal habitats
Bay Ness Farm	NT	NZ 958 060	Coastal habitats
Rocket Post Field	NT	NZ 955 058	Coastal habitats
Boggle Hole	NT	NZ 955 040	Coastal habitats
Ravenscar	NT	NZ 980 025	Coastal habitats

Human influences

Sewage discharge

There are outfalls at Saltburn, Skinningrove, Staithe, Sandsend, Whitby, Runswick Bay, Robin Hood's Bay, Scalby Mills (Scarborough's new long sea outfall), Wheatcroft (Cornelian Bay) and Filey. Most of the sewage discharged from these areas is either raw or has undergone primary treatment only (i.e. screening to remove non-sewage debris and sewage solids). However, there are plans to construct a treatment plant at Whitby.

The National Rivers Authority (NRA 1991) reported an increase in numbers of polychaetes as a result of organic deposition from sewage on the beaches at Staithe and Scalby Ness.

The North York Moors National Park Committee has stated that there should be a change in the present legislation to secure an appropriate level of sewage treatment along the National Park

coastline. They have referred specifically to the outfall in Robin Hood's Bay where there are serious concerns regarding sewage pollution in an area where the National Park Plan has identified the possibility of establishing a voluntary marine conservation area for educational purposes.

Industrial effluent discharge

British Steel's Skinningrove Works discharges cooling water into a stream just above the village. The dry weather flow rate is estimated at 100 cubic metres per day and contains no reported toxic metals. However, orange oxides of iron are plainly visible on the stream bed and banks.

Cleveland Potash Ltd. at Boulby is Britain's only potash mine. Water is pumped underground at high pressure as part of the extraction process and the waste effluent is piped and discharged at high pressure approximately 2 km offshore. The effluent consists of a dilute slurry of sea water, dissolved chlorides and fine insoluble clays and calcium sulphate. Typical values of approximately 500,000 to 700,000 cubic metres of effluent per month are discharged (NRA data 1992).

Dredging and spoil dumping

Whitby Harbour entrance has been dredged for many years. Approximately 80,000 tonnes of dredge spoil per year are dumped on the spoil ground just over 2 km north of the harbour entrance (Capt. W. Estill, Whitby Harbour Master, pers. comm.).

Scarborough harbour is also dredged regularly (amount of spoil unknown). The dumping ground is situated 5 km north-east of Scarborough Rock.

Shipping

The Tees is the nearest main port for heavy shipping, although a small number of lighter vessels use the harbour facilities at Whitby and Scarborough. Approximately 80 cargo vessels per year use Whitby harbour with cargoes of steel, potash and grain weighing around 800 to 2,300 tonnes. No oil industry-related vessels use these harbours (Capt. W. Estill, Whitby Harbour Master, pers. comm.).

Garbage from shipping remains a problem despite regulations banning dumping of refuse at sea and regulations governing waste water treatment facilities (Coastwatch UK information).

Oil/mineral extraction

At present there is no oil extraction taking place within or near to this area, although exploration for oil is underway 9 km east of Scarborough.

Commercial fishery

A traditional fishery has operated in this area since the 12th century, with a peak in the late 19th century based mainly in Robin Hood's Bay and at Staithes. Today small boats, known as cobbles, tend to be based in the small fishing villages such as Staithes, Port Mulgrave, Runswick Bay, Sandsend and Robin Hood's Bay and fleets of trawlers are based in Whitby and Scarborough. Whitby has 48 regular trawlers and 29 cobbles in its fishing fleet and Scarborough has 25 trawlers and 28 cobbles (University of Hull Fisheries Institute, 1993 data). The cobbles tend to operate fleets of pots during the summer and long lines in the winter.

In 1992, 4,503 tonnes of fish were landed at Whitby and 4,165 tonnes at Scarborough. Figures for summer potting since 1985 to 1992 show a limited decline in number of boats and fishermen, and yet a considerable increase in the number of pots (15,146 - 22,140).

The NRA has a regulatory role in licensing the coastal salmon and sea trout fishery. Drift-nets are operated up to 8 km offshore but are prohibited within 1.6 km of the entrance to Whitby Harbour. Salmon poaching occurs in the entrance to Whitby Harbour.

Coastal protection

Robin Hood's Bay has sea defences protecting the cliffs and the village and these are being upgraded to stabilise the cliffs. In 1990 work was completed in Whitby to stabilise and regrade the sea defences around the cliffs and a new promenade was constructed protected by 'rock armour'. Sea walls support

the highway at Sandsend and there has been a study of the groynes on the beach at Sandsend which may lead to their reconstruction. The sea walls at Runswick Bay are cracking as the substrata is subsiding, and it is likely that the old walls will be demolished and replaced. At Staithes, substantial works were completed in 1992 to build a breakwater for the harbour; there are also proposals for further work. Extensive sea walls and harbour complex are present at Scarborough and there have been proposals to extend the harbour. Filey Bay has sea walls and there is a concrete pathway, currently in need of repair, that runs from the bay out onto Filey Brigg.

Recreation

Poor access from the cliffs onto many of the beaches in the area means that many of the rocky shores remain relatively undisturbed. The busiest beaches are at Saltburn, Skinningrove, Staithes, Runswick Bay, Sandsend, Robin Hood's Bay, Scarborough and Filey. Litter collections take place on most of these beaches. In Robin Hood's Bay, animals and plants are collected by students on field trips.

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Survey sites

Surveys

319: Grab sampling survey, ICI 1981 (Shillabeer 1991).

391: National Rivers Authority (NRA) Yorkshire region intertidal invertebrate survey of the EC designated bathing beaches, 1991 (Morris & Bird 1992).

395: NRA Yorkshire region summary report on the rocky shore surveys, 1991 (Bird & Morris 1992).

399: MNCR littoral survey from Saltburn to Flamborough Head, 1993.

400: MNCR sublittoral survey from Saltburn to Flamborough Head, 1993.

461: Grab sampling survey of north-east England, Analytical and Environmental Services 1993 (Turner *et al.* 1993).

Littoral sites

Survey Site	Site name	Grid reference	Latitude & longitude	Biotores present
391	1 Staithes, Whitby.	NZ 785 189	54°33.5'N 00°47.1'W	Tal; HedMac
391	2 Runswick Bay, Whitby.	NZ 811 156	54°31.7'N 00°44.8'W	AP.P; AP.Pon
391	3 Sandsend, Whitby.	NZ 864 125	54°30.0'N 00°39.9'W	Tal; AEur; AP.Pon
391	4 Whitby Sands, Whitby.	NZ 894 117	54°29.5'N 00°37.1'W	Tal; AEur; AP.P
391	5 Robin Hood's Bay, Whitby.	NZ 954 050	54°25.8'N 00°31.7'W	AP.P
391	6 Scarborough North Bay.	TA 037 897	54°17.5'N 00°24.3'W	AP.P; AP.Pon
391	7 Scarborough South Bay.	TA 047 886	54°16.9'N 00°23.5'W	AEur; AP.Pon; NcirBat
391	8 Cayton Bay, Scarborough.	TA 067 845	54°14.6'N 00°21.7'W	AEur; AP.P
391	10 Filey Sands.	TA 121 807	54°12.5'N 00°16.8'W	AEur; AP.Pon
395	1 Staithes, Whitby.	NZ 790 188	54°33.4'N 00°46.6'W	Ent; Fspi; BPat.Sem; XR; Osm
395	2 Saltwick Bay, Whitby.	NZ 921 107	54°28.9'N 00°34.6'W	Bli; Fspi; BPat.Sem; Fves; Fser.Fser; XR
395	3 Boggle Hole, Whitby.	NZ 957 042	54°25.4'N 00°31.4'W	Ent; Fspi; FvesB; Fves; Fser.R; Fser.Fser
395	4 Ravenscar, Whitby.	NZ 977 024	54°24.4'N 00°29.6'W	Pel; BPat.Cat; FvesB; Fves; FvesX; Asc.Asc; AscX; Fser.R; Fser.Fser
395	5 Crook Ness, Scarborough.	TA 028 933	54°19.4'N 00°25.1'W	Ent; FvesB; Fser.R; Fser.Fser; Rho; Ldig.Ldig
395	6 Filey Brigg, Scarborough.	TA 133 815	54°12.9'N 00°15.7'W	Fspi; BPat.Sem; MytB; FvesB; Fser.R; Ldig.Ldig
399	1 N of Hunt Cliff, Saltburn.	NZ 683 222	54°35.4'N 00°56.5'W	Pra; BPat.Sem; MytFves; Ldig.Ldig.Bo

Littoral sites- continued

Survey Site	Site name	Grid reference	Latitude & longitude	Biotopes present
399 2	Hummersea Scar, Saltburn.	NZ 728 203	54°34.3'N 00°52.4'W	Fspi; BPat.Sem; Fves; Fser.Fser; Fser
399 3	Lintycock Stone, Staithes.	NZ 740 203	54°34.3'N 00°51.3'W	Fspi; BPat.Sem; Rho; Cor
399 4	Cowbar Nab, Staithes.	NZ 780 191	54°33.6'N 00°47.6'W	Fspi; BPat.Sem; FvesB; Fser.Fser; BLlit
399 5	Penny Steel, Staithes.	NZ 787 191	54°33.6'N 00°46.9'W	BPat.Sem; Fser.R; MytFR; Cor
399 6	Cobble Dump, Staithes.	NZ 812 163	54°32.1'N 00°44.6'W	Fspi; BPat.Sem; Fves; Fser.Fser; XR; Cor; Ldig.Ldig
399 7	Runswick Sands, Staithes.	NZ 811 159	54°31.9'N 00°44.7'W	EntPor; AP.P; AP.Pon
399 8	Kettle Ness, Goldsborough.	NZ 837 161	54°31.9'N 00°42.3'W	Ent; MytB; MytFR; Coff; FK; Ldig.Ldig
399 9	N of Seaveybog Hill, Goldsborough.	NZ 840 155	54°31.6'N 00°42.1'W	Ent; Fspi; BPat.Sem; Fves; Fser.R
399 10	Sandsend Sands, Whitby.	NZ 867 123	54°29.9'N 00°39.6'W	AP.P; AP.Pon
399 11	North of Whitby Sands.	NZ 885 120	54°29.7'N 00°38.0'W	AP.P; AP.Pon
399 12	Saltwick Nab, Whitby.	NZ 916 113	54°29.3'N 00°35.1'W	Ver.B; Fspi; MytFves; Fves; Cor; SByAs; Lhyp.Ft; XKScrR
399 13	Maw Wyke Hole, Whitby.	NZ 942 083	54°27.6'N 00°32.8'W	Ent; Ver.Ver; Fspi; BPat.Sem; Rho; Lhyp.Ft
399 14	North Cheek, Fylingthorpe.	NZ 958 058	54°26.3'N 00°31.3'W	Fspi; BPat.Sem; Fves; FK; Lhyp.Ft
399 15	West Scar, Fylingthorpe.	NZ 955 052	54°25.9'N 00°31.6'W	Fves; Fser.Fser
399 16	North of South Cheek, Fylingthorpe.	NZ 976 024	54°24.4'N 00°29.7'W	MytFR; FvesB; Fves; Fser.Fser; MytX; Cor; Ldig.Ldig
399 17	Beast Cliff, Fylingthorpe.	TA 002 997	54°22.9'N 00°27.4'W	Fspi; BPat.Sem; FK; Ldig.Ldig.Bo
399 18	Hayburn Wyke, Fylingthorpe.	TA 010 972	54°21.6'N 00°26.7'W	Ver.Ver; Fspi; Ent; FvesB; Ldig.Ldig.Bo
399 19	Cloughton Wyke, Scarborough.	TA 021 951	54°20.4'N 00°25.7'W	Fspi; FvesB; Fser.Fser; FK; Ldig.Ldig
399 20	South of Sailors' Grave, Scarborough.	TA 031 921	54°18.8'N 00°24.9'W	Fspi; Ent; BPat.Sem; Fser; Cor; Ldig.Ldig
399 21	North Sands, Scarborough.	TA 043 894	54°17.3'N 00°23.8'W	AP.P; AP.Pon
399 22	Black Rocks, Scarborough.	TA 052 871	54°16.1'N 00°23.0'W	Fspi; MytB; Fves; Cor; Ldig.Ldig
399 23	Cayton Sands, Scarborough.	TA 071 845	54°14.6'N 00°21.3'W	AP.P; AP.Pon
399 24	Below Leberston Cliff, Scarborough.	TA 083 843	54°14.5'N 00°20.2'W	Ent; Fspi; BPat.Sem; Fves; Fser.Fser.Bo; FK; Ldig.Ldig.Bo
399 25	North of The Wyke, Filey.	TA 100 832	54°13.9'N 00°18.7'W	Ent; BPat.Sem; Fves; Fser.Fser; Rho; Cor; FK; Lhyp.Ft
399 26	Filey Brigg.	TA 133 814	54°12.9'N 00°15.7'W	YG; Pel; Fspi; MytB; FvesB; Fser.R; Rho; SwSed; Ldig.Ldig
399 27	Filey Sands.	TA 124 810	54°12.7'N 00°16.5'W	AP.Pon; Lan
399 28	Hunmanby Sands, Filey.	TA 128 779	54°11.1'N 00°16.2'W	AP.Pon
399 29	Speeton Sands, Filey.	TA 156 756	54°09.7'N 00°13.7'W	AP.Pon

Sublittoral sites					
<i>Survey Site</i>	<i>Site name</i>	<i>Grid reference</i>	<i>Latitude & longitude</i>	<i>Biotores present</i>	
319	69	Boulby, Station 152.	NZ 815 251	54°36.9'N 00°44.1'W	FabMag
319	70	Boulby, Station 21.	NZ 809 255	54°37.1'N 00°44.8'W	FabMag
319	71	Boulby, Station 22.	NZ 809 255	54°37.1'N 00°44.8'W	FabMag
319	72	Boulby, Station 23.	NZ 809 255	54°37.1'N 00°44.8'W	FabMag
319	73	Boulby, Station 157.	NZ 760 252	54°37.0'N 00°49.3'W	AbrNucCor
319	74	Boulby, Station 31.	NZ 804 255	54°37.1'N 00°45.2'W	FabMag
319	75	Boulby, Station 33/1.	NZ 815 255	54°37.1'N 00°44.2'W	MobMud
319	76	Boulby, Station 33/2.	NZ 815 255	54°37.1'N 00°44.2'W	IMS
319	77	Boulby, Station 33/3.	NZ 815 255	54°37.1'N 00°44.2'W	FabMag
319	78	Boulby, Station 34.	NZ 815 255	54°37.1'N 00°44.2'W	MobMud
319	79	Boulby, Station 146.	NZ 815 255	54°37.1'N 00°44.2'W	FabMag
319	80	Boulby, Station 147.	NZ 815 255	54°37.1'N 00°44.2'W	MobMud
319	81	Boulby, Station 231.	NZ 815 255	54°37.1'N 00°44.2'W	IMS
319	82	Boulby, Station 42.	NZ 815 255	54°37.1'N 00°44.2'W	AbrNucCor
319	83	Boulby, Station 44.	NZ 815 255	54°37.1'N 00°44.2'W	MobMud
319	84	Boulby, Station 47.	NZ 815 255	54°37.1'N 00°44.2'W	FabMag
319	85	Boulby, Station 54.	NZ 815 251	54°36.9'N 00°44.1'W	AbrNucCor
319	86	Boulby, Station 56/1.	NZ 818 253	54°37.0'N 00°43.9'W	AbrNucCor
319	87	Boulby, Station 56/2.	NZ 837 255	54°37.1'N 00°42.2'W	AbrNucCor
319	88	Boulby, Station 56/3.	NZ 815 255	54°37.1'N 00°44.2'W	FabMag
319	89	Boulby, Station 83/1.	NZ 815 255	54°37.1'N 00°44.2'W	FabMag
319	90	Boulby, Station 83/2.	NZ 815 255	54°37.1'N 00°44.2'W	AbrNucCor
319	91	Boulby, Station 83/3.	NZ 815 255	54°37.1'N 00°44.2'W	FabMag
319	92	Runswick, Station 15/1.	NZ 948 182	54°33.0'N 00°31.9'W	FabMag
319	93	Runswick, Station 15/2.	NZ 948 182	54°33.0'N 00°31.9'W	FabMag
319	94	Runswick, Station 15/3.	NZ 948 182	54°33.0'N 00°31.9'W	FabMag
400	1	Off Saltburn Scar.	NZ 683 238	54°36.3'N 00°56.5'W	FabMag
400	2	Far offshore, Saltburn Scar.	NZ 693 253	54°37.0'N 00°55.6'W	AlcByH.Hia
400	3	Skinningrove Wick, Saltburn.	NZ 707 214	54°34.9'N 00°54.3'W	Lhyp.Ft
400	4	N of Skinningrove Wick, Saltburn.	NZ 711 229	54°35.8'N 00°53.9'W	Flu.Flu
400	5	NNE of Hunt Cliff, Saltburn.	NZ 715 260	54°37.4'N 00°53.5'W	Flu.Flu; IMS
400	6	N of Hummersea Scar, Staithes.	NZ 735 211	54°34.8'N 00°51.7'W	NcirBat
400	7	NW of Redcliff, Staithes.	NZ 738 207	54°34.6'N 00°51.4'W	FaAIC
400	8	N of Redcliff, Staithes.	NZ 748 235	54°36.0'N 00°50.4'W	AlcByH.Hia
400	9	N of Boulby, Staithes.	NZ 763 210	54°34.7'N 00°49.0'W	AbrNucCor
400	10	N of Boulby mine outfall, Staithes.	NZ 774 222	54°35.3'N 00°48.0'W	AlcByH.Hia
400	11	NE of Port Mulgrave, Staithes.	NZ 808 182	54°33.1'N 00°45.0'W	Flu.Flu
400	12	E of Kettle Ness, Goldsborough.	NZ 845 156	54°31.7'N 00°41.6'W	FaAIC
400	13	NE Runswick Bay, Staithes.	NZ 832 184	54°33.2'N 00°42.7'W	Flu.Flu
400	14	NE of Kettle Ness, Goldsborough.	NZ 856 167	54°32.2'N 00°40.5'W	AbrNucCor
400	15	Offshore Keldhowe Steel, Staithes.	NZ 869 176	54°32.7'N 00°39.3'W	Flu.Flu; Lcon
400	16	Sandsend Road, Whitby.	NZ 877 135	54°30.5'N 00°38.7'W	FabMag
400	17	E of Keldhowe Steel, Whitby.	NZ 892 149	54°31.2'N 00°37.2'W	AbrNucCor
400	18	E of Whitby Rock.	NZ 906 124	54°29.9'N 00°36.0'W	Lhyp.Tft; AlcByH.Hia; Flu.Flu
400	19	Whitby Rock.	NZ 903 122	54°29.8'N 00°36.2'W	LhypR.Ft
400	20	Offshore Whitby Rock.	NZ 905 132	54°30.3'N 00°36.1'W	Flu.Flu
400	21	E of Saltwick Nab, Whitby.	NZ 920 113	54°29.3'N 00°34.6'W	AlcByH.Hia; Sspi
400	22	NE of Whitby Bell Buoy.	NZ 919 131	54°30.3'N 00°34.8'W	Flu.Flu
400	23	Offshore, below Whitby High Lighthouse.	NZ 940 106	54°28.9'N 00°32.8'W	IMS
400	24	High Hawsker, Fylingthorpe.	NZ 947 081	54°27.5'N 00°32.3'W	Lhyp.Ft; AlcByH.Hia
400	25	Offshore High Hawsker, Fylingthorpe.	NZ 953 090	54°28.0'N 00°31.7'W	IGS
400	26	Inshore North Cheek, Fylingthorpe.	NZ 958 068	54°26.8'N 00°31.2'W	Lhyp.Ft; FaAIC
400	27	Offshore, E of North Cheek, Fylingthorpe.	NZ 975 061	54°26.4'N 00°29.7'W	Pol
400	28	Inshore Robin Hood's Bay, Fylingthorpe.	NZ 959 047	54°25.7'N 00°31.2'W	Lhyp.Pk
400	29	Offshore, SE of South Cheek, Fylingthorpe.	NZ 968 056	54°26.2'N 00°30.3'W	Flu.Flu; FabMag
400	30	N of Ravenscar, Fylingthorpe.	NZ 971 039	54°25.2'N 00°30.2'W	NcirBat
400	31	Offshore Robin Hood's Bay, Fylingthorpe.	NZ 982 047	54°25.7'N 00°29.1'W	EcorEns
400	32	N of South Cheek, Fylingthorpe.	NZ 978 030	54°24.8'N 00°29.5'W	Flu.Flu; EcorEns
400	33	NE of South Cheek, Fylingthorpe.	NZ 992 041	54°25.3'N 00°28.2'W	EcorEns
400	34	Inshore Beast Cliff, Fylingthorpe.	NZ 998 005	54°23.4'N 00°27.7'W	Lhyp.Ft; FoR; AlcByH.Hia

Sublittoral sites - continued

Survey Site	Site name	Grid reference	Latitude & longitude	Biotopes present
400 35	Beast Cliff, Fylingthorpe.	OV 002 006	54°23.4'N 00°27.3'W	Flu.Flu
400 36	1 mile offshore Beast Cliff, Fylingthorpe.	OV 007 015	54°23.9'N 00°26.9'W	FaAlC.Abi; IMS
400 37	N of Hayburn Wyke, Scarborough.	TA 013 976	54°21.8'N 00°26.4'W	FaAlC; NcirBat
400 38	NE of Hayburn Wyke, Scarborough.	TA 015 982	54°22.1'N 00°26.2'W	FaAlC; IMS
400 39	Inshore Cloughton Wyke, Scarborough.	TA 021 953	54°20.5'N 00°25.6'W	Lhyp.Ft
400 40	Offshore E of Cloughton Wyke, Scarborough.	TA 037 958	54°20.8'N 00°24.2'W	IGS
400 41	Offshore Scalby Ness, Scarborough.	TA 068 940	54°19.8'N 00°21.3'W	IMS
400 42	Scarborough Head.	TA 055 895	54°17.4'N 00°22.7'W	IGS
400 43	Offshore White Nab, Scarborough.	TA 084 878	54°16.4'N 00°20.0'W	AbrNucCor
400 44	Yons Nab, Scarborough.	TA 077 844	54°14.6'N 00°20.7'W	FaAlC
400 45	E of Yons Nab, Filey.	TA 100 846	54°14.7'N 00°18.6'W	AbrNucCor
400 46	Offshore Yons Nab, Scarborough.	TA 112 875	54°16.3'N 00°17.4'W	AbrNucCor
400 47	Old Horse Rocks, Filey.	TA 097 837	54°14.2'N 00°18.9'W	Lhyp.Ft; XKScrR; AlcByH; AlcByH.Hia
400 48	Offshore Cunstone Nab, Filey.	TA 131 838	54°14.2'N 00°15.8'W	FabMag
400 49	N of Filey Brigg ell.	TA 144 825	54°13.5'N 00°14.7'W	Flu.Flu
400 50	N of Filey Brigg.	TA 137 812	54°12.8'N 00°15.3'W	Lhyp.Tft
400 51	Filey Brigg Bell.	TA 146 812	54°12.8'N 00°14.4'W	AlcByH.Hia
400 52	S of Filey Brigg.	TA 139 812	54°12.8'N 00°15.1'W	Flu.Flu
400 53	NE of Reighton, Filey.	TA 141 776	54°10.8'N 00°15.0'W	Lcon
400 54	Central Filey Bay.	TA 153 788	54°11.5'N 00°13.9'W	Sell
400 55	2 miles NE of Speeton, Filey.	TA 184 789	54°11.5'N 00°11.0'W	Flu.Flu; IMS
400 57	NE of King and Queen Rocks, Filey.	TA 171 763	54°10.1'N 00°12.3'W	FabMag
461 10	Offshore Saltburn.	NZ 704 261	54°37.5'N 00°54.5'W	AbrNucCor
461 11	Offshore Boulby, Skinningrove.	NZ 764 211	54°34.7'N 00°49.0'W	AbrNucCor
461 12	Offshore Staithes, Skinningrove.	NZ 812 240	54°36.2'N 00°44.5'W	SspiMx; AbrNucCor
461 13	Offshore Runswick Bay, Whitby.	NZ 863 171	54°32.5'N 00°39.8'W	AbrNucCor
461 14	Offshore Whitby High.	NZ 943 113	54°29.3'N 00°32.5'W	SspiMx
461 15	Offshore Hawsker, Fylingthorpe.	NZ 991 121	54°29.7'N 00°28.1'W	SspiMx; ModMx
461 16	Offshore Robin Hood's Bay, Fylingthorpe.	OV 010 051	54°25.9'N 00°26.5'W	AfilEcor
461 17	Offshore Hayburn Wyke, Scarborough.	TA 030 982	54°22.1'N 00°24.8'W	AfilEcor
461 18	Offshore Scalby, Scarborough.	TA 090 942	54°19.9'N 00°19.3'W	AbrNucCor
461 19	Offshore Scarborough.	TA 103 889	54°17.0'N 00°18.3'W	FabMag
461 20	Offshore Gristhorpe, Filey.	TA 129 839	54°14.3'N 00°16.0'W	AfilEcor
461 21	Offshore Filey Brigg.	TA 195 823	54°13.3'N 00°09.9'W	FabMag

Compiled by:

Rohan Holt

Location

<i>Position (centre)</i>	NZ 900 100	
<i>County/District</i>	North Yorkshire	Scarborough
<i>Conservation agency/area</i>	English Nature	North & East Yorkshire

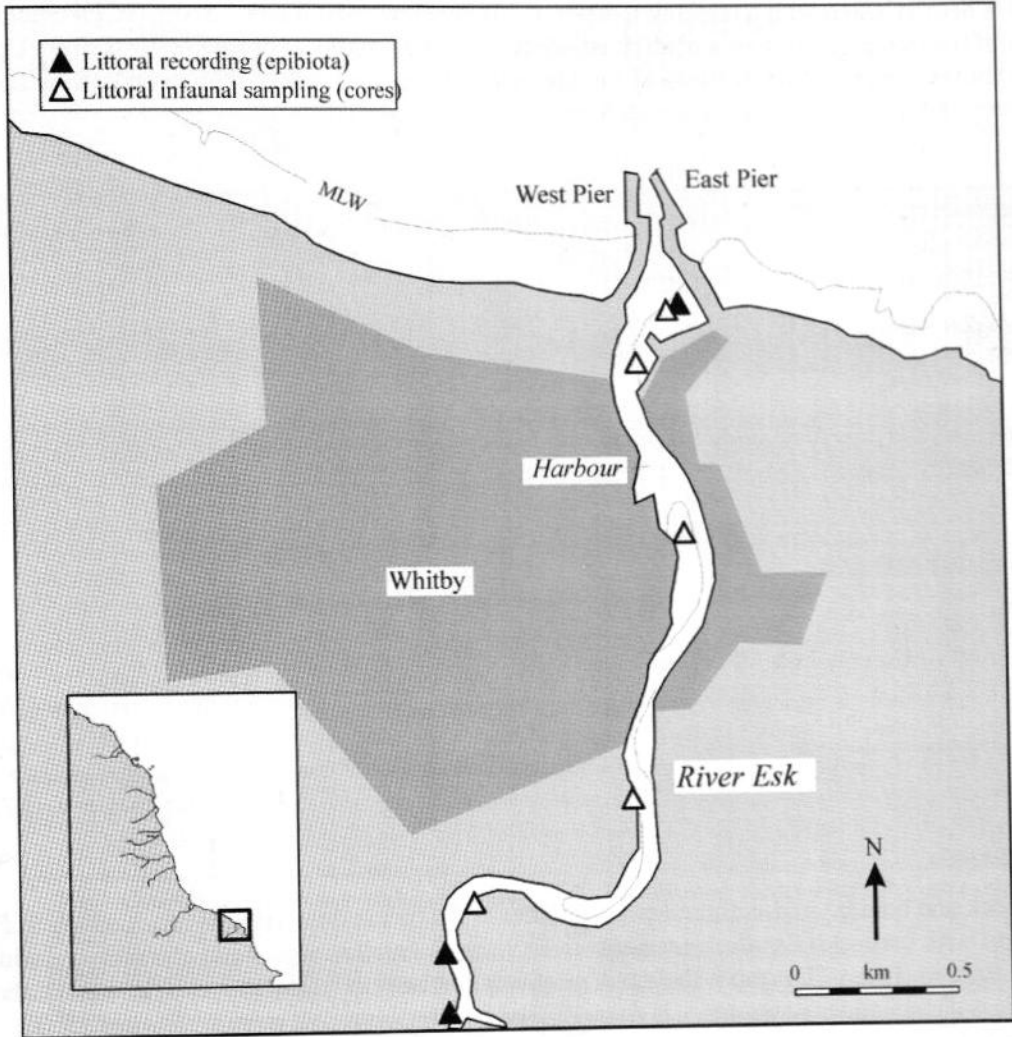


Figure 23.1 Location of area showing sites surveyed and main bathymetric features.

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Marine biological surveys

	<i>Survey methods</i>	<i>No. of sites</i>	<i>Date of survey</i>	<i>Source</i>
<i>Littoral</i>	Recording (epibiota)	2	September 1992	Brazier & Murray (1994)
	Infaunal cores and granulometry	5	September 1992	Brazier & Murray (1994)

Introduction

The Esk is a narrow estuary that enters the sea at the 12th century port of Whitby. The mouth of the estuary is protected by breakwaters to the east and west. The lower reaches of the estuary are canalised by sea walls and substantial piers that form Whitby harbour, home to a North Sea fishing fleet. In the upper reaches, the estuary flows past woodland and agricultural land.

The lower Esk estuary mainly consists of sediment sheltered behind the piers at the estuary mouth. An extensive bedrock and boulder shore behind the East Pier and a weir 1.2 km from the mouth of the estuary that dries at low tide make up the majority of the hard substrata. The channel in the lower estuary is heavily silted with a maximum depth of 1.0 m below chart datum. Shores in the middle reaches of the estuary consist of a mudflat adjacent to the weir and occasional silted cobbles. Upper estuary shores comprise narrow banks of muddy sand with areas of mixed cobbles and pebbles. A large weir 3.8 km from the estuary mouth forms the upper tidal limit.

Physical features

<i>Physiographic type</i>	Complex estuary
<i>Length of coast</i>	8 km
<i>Area of inlet</i>	30 ha
<i>Length of tidal channel</i>	3.8 km
<i>Bathymetry</i>	Shallow throughout with two weirs
<i>Wave exposure range</i>	Moderately exposed to sheltered
<i>Tidal stream range</i>	Moderately strong to weak
<i>Tidal range</i>	4.8 m (springs), 2.4 m (neaps)
<i>Salinity range</i>	Fully marine to variable

Marine biology

Littoral

The sandflats behind the East Pier show a gradation. At the seaward end the stable, clean well-sorted sand is characterised by the polychaetes *Nephtys hombergii*, *Scoloplos armiger* and *Lanice conchilega* (AP.P, Lan). Further upstream the sediment becomes muddy sand with a species-rich assemblage dominated by the polychaetes *Eteone longa*, *Hediste diversicolor*, *Pygospio elegans*, *Streblospio shrubsolii* and *Capitella capitata*, oligochaetes *Heterochaeta costatus*, *Tubificoides benedii* and *T. pseudogaster*, abundant amphipods *Corophium volutator* and Baltic tellin *Macoma balthica* (HedMac.Pyg).

The bedrock and boulder mid-eulittoral zone adjacent to the pier is dominated by bladder wrack *Fucus vesiculosus* with barnacles *Semibalanus balanoides*, limpets *Patella vulgata* and common periwinkles *Littorina littorea* (Fves). The more sheltered, relatively flat bedrock plain with cobbles behind the East Pier has less algae and the community is characterised by superabundant mussels *Mytilus edulis*, barnacles *S. balanoides* and *Elminius modestus*, limpets *P. vulgata* and common periwinkles *L. littorea* (MytX). In the middle reaches of the estuary, upstream of the harbour, cobbles and pebbles on mud are dominated by a community similar to that near the estuary mouth, with bladder wrack *F. vesiculosus*, barnacles *S. balanoides* and *E. modestus* and mussels *M. edulis*; however the species richness is reduced due to the more variable salinity and deposition of mud on the hard substrata (FvesX). This biotope is replaced further upstream by one dominated by the low salinity tolerant wrack *Fucus ceranoides* and green algae *Enteromorpha* spp. (FcerX). The soft anoxic mud adjacent to the weir in Whitby is characterised by a low species rich community dominated by the polychaete *Hediste diversicolor* and the amphipod *C. volutator* (HedOI).

The upper reaches of the estuary are predominantly muddy sand characterised by the polychaetes *H. diversicolor* and *S. shrubsolii*, oligochaetes *H. costatus*, *T. benedii* and enchytraeid oligochaetes and the amphipod *C. volutator* (HedOI). Towards the upper limit, cobbles and pebbles form a coarse matrix in sand with sparse wrack *F. ceranoides* and green algae *Enteromorpha* spp. attached to the

larger cobbles; the main faunal species recorded are gammarids. Habitats immediately downstream of the weir at the head of the estuary are not recorded in detail as they appear to be freshwater in character, with no marine or estuarine species.

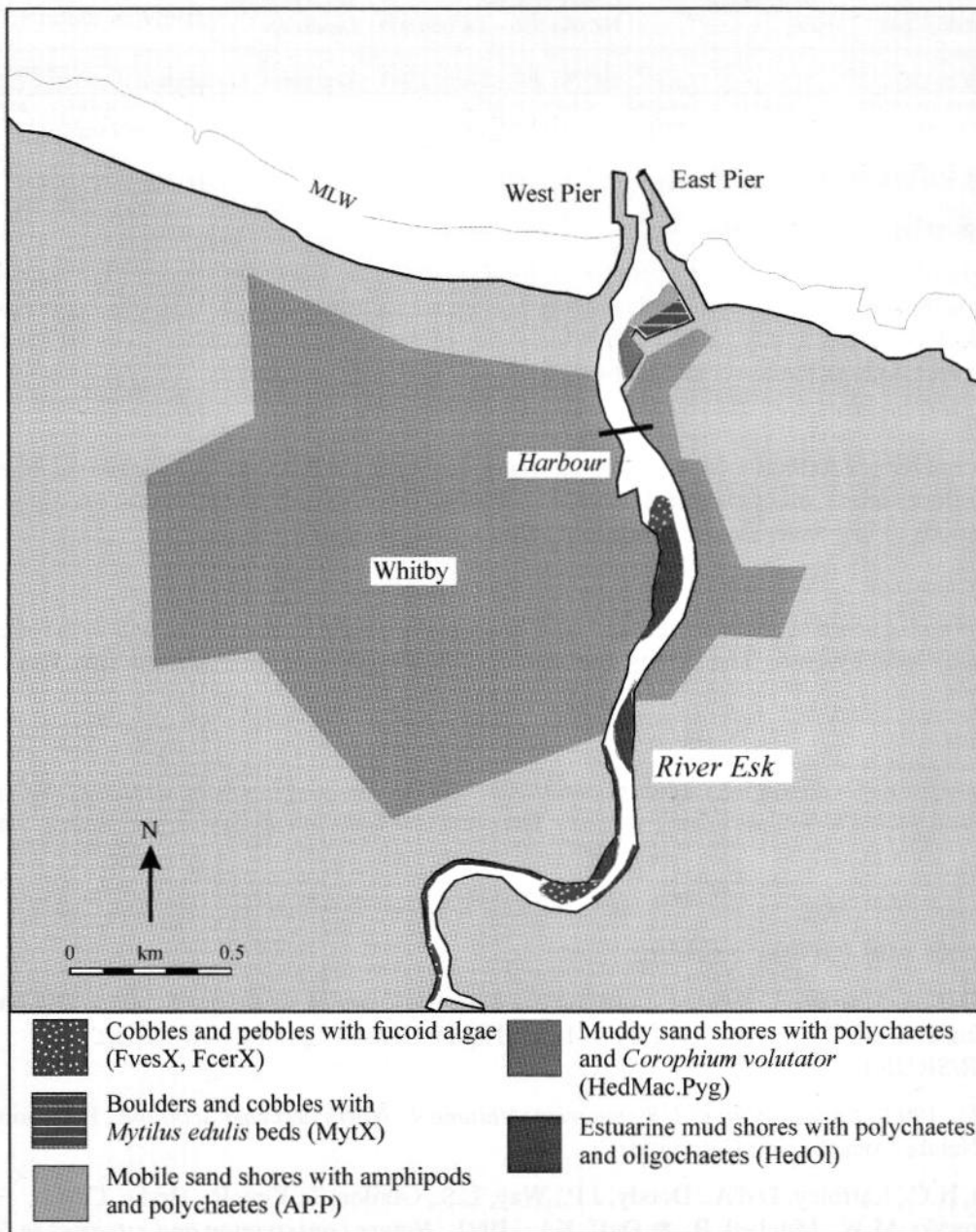


Figure 23.2 Indicative distribution of the main biotopes within the area (based on data from survey sites shown in Figure 23.1 and additional field observations).

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Nature conservation

Conservation sites			
Site name	Designation	Centre grid ref.	Main features
North Yorkshire and Cleveland	HC	NZ 668 216 - TA 036 909	Landscape
North York Moors	NP	NZ 747 202 - TA 029 943	Recreation, landscape

Human influences

Coastal developments and uses

Whitby Harbour and piers provide a safe haven for a small fishing fleet. Upstream of the Harbour there is a weir that stands at 1.2 m, while another, larger weir forms the upper tidal limit in the estuary. The town of Whitby is tightly packed within the valley of the Esk and encroaches up to the banks of the estuary throughout the lower and mid-estuary.

Pollution

The National Rivers Authority have graded the water quality of the Esk estuary as grade A. There is very little litter, debris, oil or chemical pollution, although there is likely to be nutrient enrichment during periods of low water flow as a result of sewage from upstream.

Fisheries

The Esk is well-known as a salmon and sea trout river, although the taking of fish within the estuary is forbidden by local by-laws. The fishing fleet, although now somewhat diminished in size, fish offshore.

Recreation

As a summer resort with marina moorings and berths, Whitby Harbour is a busy waterway with motor launches and yachts as well as fishing vessels. The piers and walls attract day anglers during the summer.

References and further reading

- Brazier, D.P., & Murray, E. 1994. Littoral survey of the estuaries of south-east Scotland and north-east England. *JNCC Report*, No. 159. (Marine Nature Conservation Review Report, No. MNCR/SR/26.)
- Buck, A.L. 1993. *An inventory of UK estuaries. Volume 4. North and east Scotland*. Peterborough, Joint Nature Conservation Committee.
- Davidson, N.C., Laffoley, D.d'A., Doody, J.P., Way, L.S., Gordon, J., Key, R., Drake, C.M., Pienkowski, M.W., Mitchell, R., & Duff, K.L. 1991. *Nature conservation and estuaries in Great Britain*. Peterborough, Nature Conservancy Council.

Survey sites

Surveys

314: MNCR littoral survey of the estuaries of south-east Scotland and north-east England, 1992 (Brazier & Murray 1994).

Littoral sites

<i>Survey Site</i>	<i>Site name</i>	<i>Grid reference</i>	<i>Latitude & longitude</i>	<i>Biotopes present</i>
314 57	East Pier.	NZ 901 115	54°29.4'N 00°36.5'W	Fves; MytX; AP.P; Lan
314 58	E Abbey House.	NZ 899 113	54°29.3'N 00°36.7'W	HedMac.Pyg
314 59	S of A171 Road Bridge.	NZ 898 098	54°28.5'N 00°36.8'W	FcerX; HedOl
314 60	Esk Lower Weir and Slipway.	NZ 899 104	54°28.8'N 00°36.7'W	FvesX; HedOl
314 61	SE Mayfield Nurseries.	NZ 893 097	54°28.4'N 00°37.3'W	HedOl
314 62	Crowdy Hall Farm.	NZ 894 094	54°28.3'N 00°37.2'W	FcerX
314 63	Downstream Ruswarp Road Bridge.	NZ 892 092	54°28.2'N 00°37.4'W	Est

Location

<i>Position (centre/limits)</i>	TA 177 720	TA 155 755 - TA 200 685
<i>County/District</i>	North Yorkshire, East Riding of Yorkshire	Scarborough
<i>Conservation agency/area</i>	English Nature	North & East Yorkshire

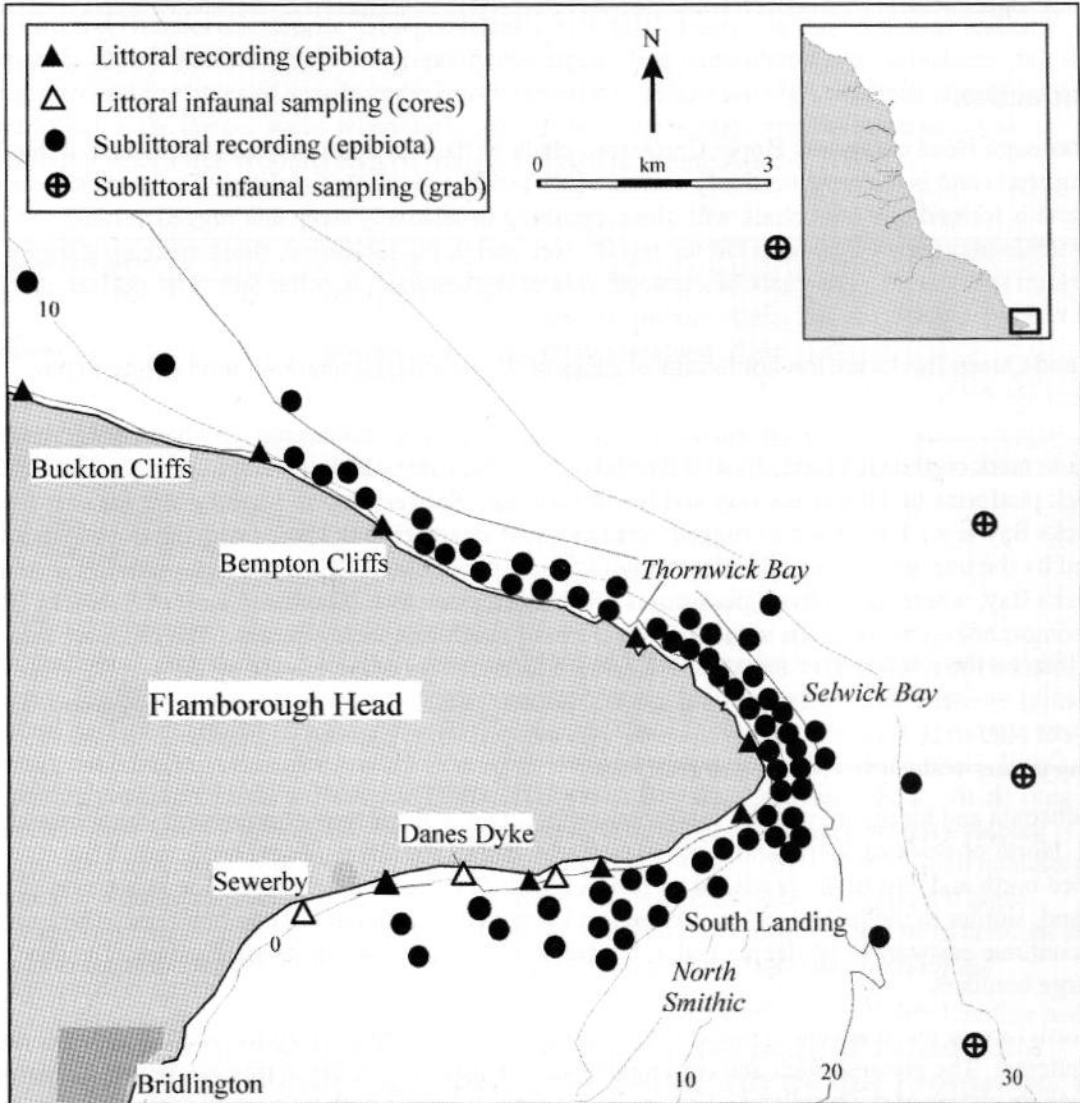


Figure 24.1 Location of area showing sites surveyed and main bathymetric features.

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Marine surveys				
	Survey methods	No. of sites	Date of survey	Source
<i>Littoral</i>	Recording (epibiota)	9	August 1993	MNCR survey 399
	Infaunal cores and granulometry	3	April - September 1991	Morris & Bird (1992)
	Recording (epibiota)	1	May - August 1991	Bird & Morris (1992)
<i>Sublittoral</i>	Recording (epibiota)	56	August 1987	Wood (1988)
	Recording (epibiota)	12	August 1993	MNCR survey 400
	Infaunal grab samples (0.1 m ² Day grab) and granulometry	4	July 1993	Turner <i>et al.</i> 1993

Introduction

Flamborough Head comprises Upper Cretaceous chalk cliffs with approximately horizontal or gently sloping strata and is the most northerly coastal chalk outcrop in the British Isles. The north side of the headland is formed of a hard chalk with flints, resulting in relatively steep and rugged vertical cliffs with mobile boulders at the base. On the lower shore and in the sublittoral, flints make up a large part of the hard substratum. The chalk of the south side of the headland is softer and more porous, with broad wave-cut platforms and gently sloping shores.

King and Queen Rocks are the northernmost rocks of the headland and are scoured owing to the adjacent sand shores. Further south-east, 2 km of the shores consist of large chalk boulders, grading to steep, stepped chalk ledges as far as North Cliff. These shores are accessible only by boat and have a high tide mark on the cliff face. East of North Cliff are the extensive stepped and gently sloping bedrock platforms of Thornwick Bay and North Landing. Between North Landing and the east-facing Selwicks Bay is a 1 km stretch of rugged headlands and steep bedrock shores with caves and stacks, formed by the uneven erosion of faults and joints in the chalk cliff. This topography persists across Selwicks Bay, where the bedrock platform is much more extensive. South and west of Selwicks Bay, the geomorphology is much the same for over 3 km of south-east facing shores. The cliffs are less steep than on the north side of the headland and are less actively being eroded by the sea. The bedrock platform is overlain by cobbles and boulders and smaller patches of fine sediment are apparent. The wave-cut platforms gradually slope seawards with stepped strata running perpendicular to the shore, causing pitting with vertical faces and rockpools.

The substrata and topography in the sublittoral reflects that in the littoral zone around Flamborough Head. North of Buckton Cliffs and south of Sewerby Rocks are plains of fine sand, which are replaced north and east of the headland by bedrock with steps up to 2.5 m high. The south side of the headland, similar to the littoral, is less stepped and is mixed with fields of large boulders. The bedrock steps continue eastwards into deeper water, but become less steep and form small ridges of bedrock and large boulders.

The north face of the headland is moderately exposed to wave action, whilst the south-facing shores are sheltered. The greatest fetch and consequent wave action is from the north-east, perpendicular to the northern shores of the headland. The sea bed is gently sloping with only small reefs in places that may locally reduce the wave action on the shores. On the south side of Flamborough Head the shores are naturally sheltered from the north, and south of the headland lies a sand and cobble bank called North Smithic. This shoal has a mean depth of approximately 5 m below chart datum and dissipates wave action from the south and south-east. Additionally, the long, shallow platforms of the south and east-facing shores moderate wave action.

The tidal currents around Flamborough Head reach 3 knots on spring tides, flowing south on the flood and north on the ebb to approximately the same degree. The tidal streams form localised eddies and backflows around the headland; some sites, such as off North Cliff and the eastern point of Flamborough Head, never experienced slack water during survey work. A greater degree of slack existed south of the headland, possibly due to the deflection by North Smithic reef.

During the summer months two distinct water bodies form either side of the 'Flamborough Front'. These are distinguished by the development of stable, stratified waters to the north of the headland and by mixed water to the south. The Flamborough Front is a recognised boundary between coastal cells, indicating distinct areas of sediment and water flow (Pingree & Griffiths 1978). The surface water temperatures range from 5°C in winter to 14°C in summer (Lee & Ramster 1981) off the headland. Observations during August 1993 showed a surface water temperature of 12°C north and of 14°C south of Flamborough Head. There are no major freshwater inputs near Flamborough Head and the mean surface salinity is 34.3‰ (Lee & Ramster 1981).

Turbidity is influenced by the soft limestone and chalk rocks and overlying boulder clay of the North Yorkshire and Humberside shores. The persistently high tidal streams on the north-east and east-facing parts of the headland tend to continually re-suspend fine particulate material inshore. Silt is common around the bases of sessile organisms where tidal streams are high, whereas all surfaces are coated by silt in the deeper water where turbulence from wave action and tidal streams is less influential. Underwater visibility ranged from 0.5 m to 8 m during August 1993.

Physical features

<i>Physiographic type</i>	Open coast
<i>Length of coast</i>	18 km
<i>Bathymetry</i>	40 m maximum depth within 3-mile limit
<i>Wave exposure range</i>	Moderately exposed to sheltered
<i>Tidal stream range</i>	Strong to negligible
<i>Tidal range</i>	5.0 m (springs), 2.4 m (neaps)
<i>Salinity range</i>	Fully marine

Marine biology

Littoral

The supralittoral zone on the chalk cliffs are characterised by numerous green and red microalgal species, (Chr; RhoCv, Bli and UloUro); these communities are unique to chalk cliffs and are fully described by Tittley (1988). Lichen cover by *Verrucaria* spp. is generally sparse on the upper shore reflecting the friability of the substratum (Ver.Ver). A band of spiral wrack *Fucus spiralis* (Fspi) is recorded on the harder chalk at Bempton Cliffs, Thornwick Bay and Cattlemere Scar. At all sites surveyed except South Landing, barnacles *Semibalanus balanoides* and limpets *Patella vulgata* dominate the fauna in areas of the littoral bedrock and stable boulders (BPat.Sem). Such habitats are often pitted, with small patches of algae such as the green algae *Enteromorpha* spp., red algae *Ceramium* spp., pink coralline crusts and coral weed *Corallina officinalis* in pools or in crevices and, adjacent to steps in the rock, with fucoids, algae *Porphyra* spp. and *Osmundea pinnatifida*.

Areas of rounded, less stable upper shore boulders and cobbles are extensive at South Landing and at Sewerby Rocks where the rock is softer, but are also present in small patches elsewhere around Flamborough Head. The characterising species on these boulders is the red algae *Porphyra* spp., with few other algal species capable of colonising the mobile substratum (Ent). Dense bladder wrack *Fucus vesiculosus* is evident at South Landing and Sewerby Rocks and on the sheltered shores of Thornwick Bay, where the headlands provide protection from wave action (Fves). Similar substrata, but with greater exposure to wave action, are colonised by the red algae *Mastocarpus stellatus* and *Osmundea pinnatifida* and thongweed *Himantalia elongata*, often as a patchwork with barnacles (Him). Throughout the eulittoral zone, burrows of the polychaete *Polydora* sp. are present in the rock where pitting in the rock surface provides damp patches. Larger wet areas and rockpools are present in the mid and lower eulittoral of most shores and enhance the species richness of a site by providing a damp site for fucoids, red algae *Ceramium* spp., pink coralline crusts, the less common china limpet *Patella ulysiponensis*, kelps *Laminaria* spp. and shannies *Lipophrys pholis* (Cor). In deeper pools at Buckton

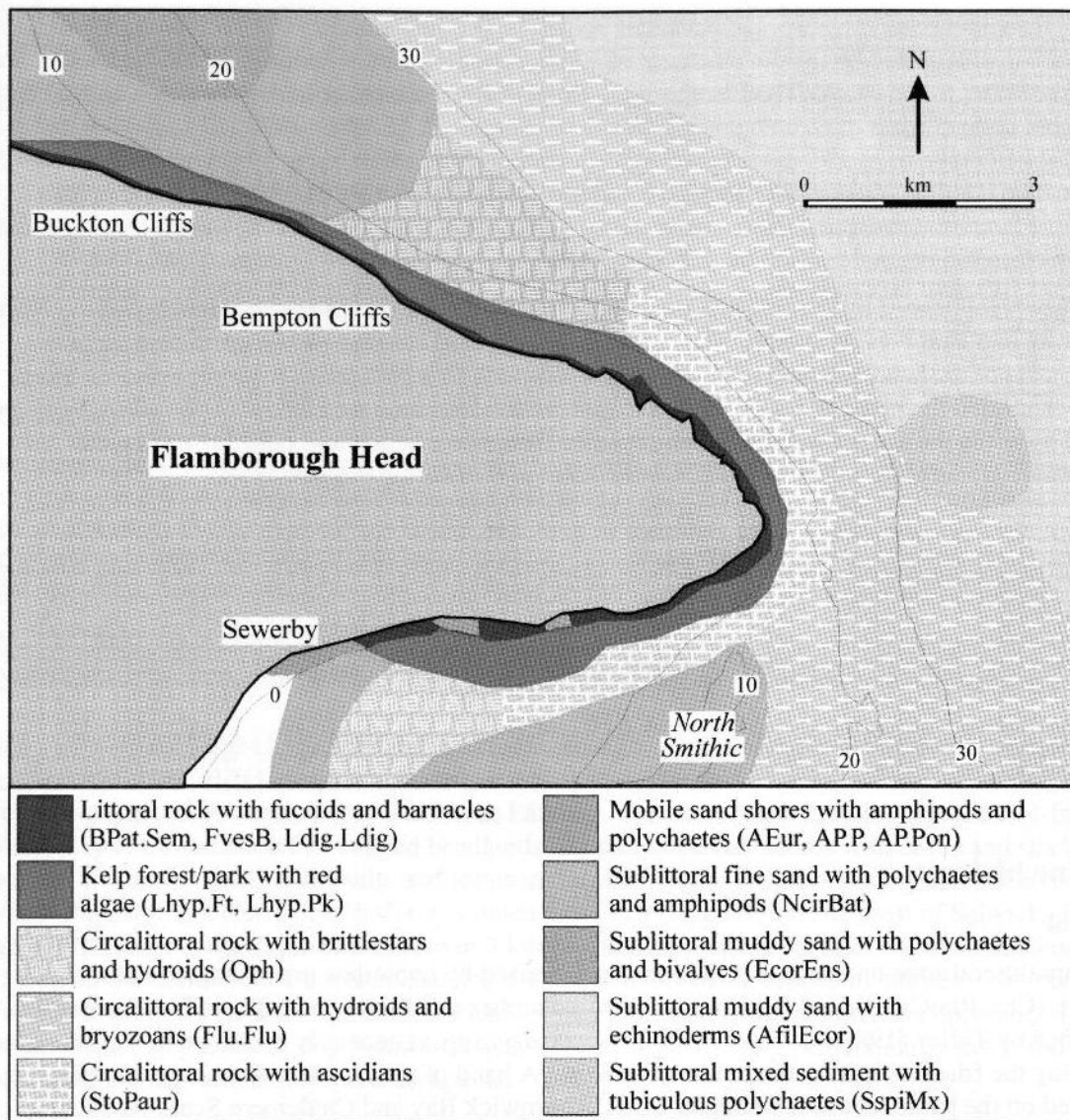


Figure 24.2 Indicative distribution of the main biotopes in the area (based on data from survey sites shown in Figure 24.1 and additional field observations).

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Cliffs and Cattlemere Scar, kelps *Laminaria* spp. and red algae are recorded (FK), which are normally found in the sublittoral fringe and deeper water.

The caves at Buckton Cliffs and Thornwick Bay provide damp, cool rock surfaces that are less exposed to desiccation than on the open shores. Cave walls adjacent to the cave floor are influenced by sand scour and are dominated by the red algae *Audouinella* spp. (Rho). Above the sand-influenced rock, the sponges *Halichondria panicea* and *Clathrina coriacea*, the beadlet anemone *Actinia equina*, spirorbid polychaetes and the tubeworm *Pomatoceros triqueter* completely cover the vertical and overhanging walls and, where there is sufficient light, the red alga *Plumaria elegans* is present. In the splash zone, on the upper walls and ceilings of the caves, the barnacle *Semibalanus balanoides* and spirorbid polychaetes are common.

A dense cover of serrated wrack *Fucus serratus* is notably lacking on the mid- to lower shores of most of Flamborough Head, possibly reflecting the soft nature of the rock and localised increase in wave action. At South Landing, very dense serrated wrack *F. serratus* is recorded on boulders and cobbles

(MytFR). In the sublittoral fringe, communities are characterised by kelp *Laminaria digitata*, abundant coralline crusts, white tortoiseshell limpets *Tectura virginea* and sponges such as *Grantia compressa* and *H. panicea* (Ldig.Ldig). Along a short stretch of the north-facing shores between North Cliff and Petrel Hole, a high abundance of the white tortoiseshell limpet *T. virginea* is notable, being recorded at such levels only at two other sites in Sector 5. Where limpet grazing has not diminished the variety of algae growing in the sublittoral fringe, the kelp *Laminaria hyperborea*, common mussels *Mytilus edulis* and red algae *Palmaria palmata*, *Corallina officinalis*, *Chondrus crispus*, *Plocamium cartilagineum* and *Osmundea pinnatifida* are present. At South Landing, a layer of sand is bound by the red algae *Audouinella* spp., a habitat that is more common north of Flamborough Head (Rho). Abundant mussels *M. edulis* are recorded in the sublittoral fringe, beneath the kelp on the north-facing shores of Bempton and Buckton Cliffs.

Sediment shores are restricted to small pockets of sand at South Landing and Danes Dyke. However, Bridlington North Sands extend southwards from Flamborough Head and consists of a coarse sand upper shore with enchytraeids (Tal), a poorly sorted sand mid-shore with the polychaete *Scolecopsis squamata* (AP.P), and a more species rich fine sand on the lower shore with polychaetes, amphipods and bivalves (AP.Pon). The upper shore sand at Danes Dyke is characterised by the presence of crustaceans such as *Bathyporeia elegans* and *Eurydice pulchra* (AEur) and the upper shore of South Landing is of coarse sand and gravel with no recorded species (BarSh). The mid- and lower shores here and at South Landing are muddy or wet fine chalk sand dominated by the polychaetes *Eteone longa*, *S. squamata*, *Capitella capitata* and *Arenicola marina* and the crustaceans *Bathyporeia pilosa* and *E. pulchra* (AP.P). At Sewerby, the sheltered sand plain and adjacent bedrock is covered by abundant mussels *Mytilus edulis* (MytFves; MytFR).

Sublittoral

In the upper infralittoral, the majority of sites surveyed are characterised by dense kelp *L. hyperborea* forest on upward-facing chalk bedrock, usually the tops of square profile outcrops with 2-4 m deep gullies between them. The short kelp stipes are well covered with the bryozoan *Electra pilosa* (Lhyp.Ft) and red algae *Palmaria palmata*, *Membranoptera alata* and *Plocamium cartilagineum*, while the holdfasts are rich in colonial ascidians such as *Botrylloides leachi* and sponges *Halichondria panicea* and *Leucosolenia* spp. At many sites, the rock surface is covered with little other than pink coralline crusts. Where grazed coralline crusts do not dominate the rock cover, the community on the rock beneath the kelp forest is characterised by sponges *H. panicea*, *Leucosolenia* spp., *Scypha ciliata* and *Cliona celata*, bryozoans *Scrupocellaria* spp. and *Bugula* spp., ascidians *Polyclinum aurantium*, *Botryllus schlosseri*, *Botrylloides leachi* including a scarce species *Perophora listeri* and the red algae *Plocamium cartilagineum*, *Delesseria sanguinea*, *Hypoglossum hypoglossoides* and *Brongniartella byssoides* (Lhyp.Ft).

A number of algal species reach their northern limit of distribution on the east coast at Flamborough Head, for example the red algae *Schottera nicaeensis*, *Calliblepharis ciliata* and *Halurus equisetifolius* and the brown alga *Taonia atomaria*. Less frequently recorded in Sector 5 are the red algae *Haraldophyllum bonnemaisonii* and *Halurus flosculosa*, which although not uncommon throughout Great Britain, within Sector 5 they are seldom recorded outside of the Farne Islands and Flamborough Head. On the east coast, *H. bonnemaisonii* has not been recorded south of Flamborough Head. The brown alga *Sphacelaria plumosa* is also rarely recorded in Sector 5 (mostly in south-east Scotland), although it has been recorded on the west and north coasts of Great Britain.

Seasonally mobile cobbles and boulders or sand-scoured upper infralittoral hard substrata are covered by kelps *Laminaria hyperborea* and *L. saccharina*, usually with a reduced richness of red algae and encrusting fauna and a greater abundance of mobile fauna such as common brittlestars *Ophiothrix fragilis*, starfish *Asterias rubens* and crustacea such as the shore crab *Carcinus maenas* and spider crabs *Hyas* spp. (XKScrR). In depths less than 5 m to the south-east of North Landing and south of South Cliff, substratum mobility is great enough that the cobbles and pebbles are encrusted with tubeworms *Pomatoceros triqueter*, coralline crusts and bryozoan crusts, with only occasional hydroid species and small filamentous algae (EphR). Decapod crustaceans are also common at these sites. Some heavily sand-influenced habitats on the north-facing coast have small reefs of the polychaete

Sabellaria spinulosa tubes constructed out of sand particles on bedrock (SspiMx). Where there is also a mud fraction the delicate tubes made by polychaetes *Polydora* spp. are also evident (Pol). The many vertical-sided gullies in the sublittoral fringe bedrock provide a shaded habitat dominated by tubeworms *P. triqueter* and a thick faunal turf (AlcByH.Hia). The turf is largely made up of the purse sponge *Grantia compressa*, hydroids *Tubularia indivisa* and *Nemertesia antennina*, and erect bryozoans *Flustra foliacea*, *Scrupocellaria* spp., *Bugula* spp. and *Alcyonidium diaphanum* with light-bulb sea squirt *Clavelina lepadiformis* and colonial ascidians *Archidistoma aggregatum*, *Polyclinum aurantium* and *Aplidium* spp. within the turf. Spider crabs *Hyas* spp. and *Inachus* spp. are also recorded, camouflaged on the turf. The boring piddocks *Hiatella arctica* and *Zirfaea crispata* form burrows in the soft chalk sublittoral fringe bedrock. Empty burrows are inhabited by common brittlestars *O. fragilis*, solitary ascidians and mobile species such as squat lobsters *G. strigosa* and fish such as the butterfish *Pholis gunnellus*.

Below 2 m depth, the kelp *Laminaria hyperborea* park is sparse all around Flamborough Head, reflecting the high turbidity that reduces the photic zone to a few metres. On the rock surface beneath the kelp, foliose red algae, mainly *Palmaria palmata*, *Phyllophora* spp., *Plocamium cartilagineum*, *Rhodymenia* spp., *H. flosculosa*, *Delesseria sanguinea*, *Hypoglossum hypoglossoides*, *Membranoptera alata* and *Brongniartella byssoides* are recorded amongst an animal-dominated turf. This turf consists of hydroids *Tubularia indivisa*, *Nemertesia antennina* and dead-man's fingers *Alcyonium digitatum*, bryozoans *Crisia* spp., *Flustra foliacea*, *Scrupocellaria* spp. and *Bugula* spp., the boring polychaete *Polydora* sp., and sea squirts *Clavelina lepadiformis*, *Polyclinum aurantium*, *Aplidium* spp. and *Botryllus schlosseri* (Lhyp.Pk). As with the sublittoral fringe at many sites, the infralittoral is often scoured by sand or cobbles, reducing the diversity of species present (XKScrR).

As in the infralittoral rock, the circalittoral bedrock and boulders are notable for the degree of boring by the piddocks *Hiatella arctica* and *Zirfaea crispata* and polychaetes of the genus *Polydora*. The circalittoral zone extends below 2 m depth with a faunal turf covering bedrock platforms and boulder fields throughout. Dead-man's fingers *Alcyonium digitatum*, erect bryozoans *Flustra foliacea*, *Securiflustra securifrons* and the hydroid *T. indivisa* are recorded on the upper edges of rock platforms and on reefs exposed to strong tidal streams (Flu.Flu). This biotope is common, reflecting the strong tidal streams that are regularly encountered around the headland. Below a depth of approximately 8 m, hydroids such as *Abietinaria* spp., and *Halecium* spp. are more conspicuous, as well as the light-bulb sea squirt *C. lepadiformis* and the bryozoan *Alcyonidium diaphanum*. Upward-facing surfaces are frequently dominated by the colonial ascidians *Archidistoma aggregatum* and *Polyclinum aurantium* that are also found in the infralittoral (StoPaur). The ascidian *Perophora listeri* is also occasionally recorded on circalittoral bedrock and boulders. Immediately east of Flamborough Head, bedrock, boulders and cobbles are completely coated by mussels *Mytilus edulis* with abundant starfish *Asterias rubens* and plaice *Pleuronectes platessa* feeding on the mussels (MytHAs). The cobble and pebble substratum found to the north of Flamborough Head and to the south of Danes Dyke, in the circalittoral, is tide-swept and is characterised by tubeworms *Pomatoceros triqueter* with very few other species recorded (Oph).

In deeper water (37 m) east of Flamborough Head, a level plain of cobbles and pebbles exposed to strong tidal streams is bound together by the byssus threads of the horse mussel *Modiolus modiolus* with a sparse epifaunal turf of hydroids *T. indivisa*, *Halecium halecinum*, *Abietinaria abietina* and *Hydrallmania falcata* on the hard substrata (ModMx). A similar habitat further east and to the north-east was also sampled by grab at 46 m depth, that was also found to have reefs of the polychaete *Melinna cristata* (SspiMx). South-east of the headland, at a depth of 44 m, a finer mixed sediment of mud and gravel is found with a greater diversity of polychaetes *Pholoe* sp., *Glycera lapidum*, *Exogone hebes*, *Lumbrineris gracilis*, *Prionospio fallax*, *Lagis koreni*, bivalves *Macra stultorum*, *Dosinia lupinus*, *Sphenia binghami*, *Hiatella arctica* and *Thracia pubescens*, and echinoderms *Amphiura* spp., *Ophiura albida*, *Echinocypris pusillus* and *Echinocardium* spp. (AbrNucCor).

Inshore sediment is of fine sand and is restricted to areas west of Bempton Cliffs and west of South Cliff. Infaunal records are few, although the sediment is dominated by polychaete species and appears similar to communities sampled elsewhere in Sector 5 that contain the polychaetes *Nephtys* spp., *Spio*

spp., *Spiophanes bombyx*, *Magelona mirabilis*, *Chaetozone setosa*, bivalves *Spisula elliptica*, *Gari fervensis*, *Abra* spp., and low numbers of the heart urchin *Echinocardium cordatum* (NcirBat). Further offshore, the sea bed is characterised by muddy sand with echinoderms (Afilecor).

Nature conservation

Conservation sites			
Site name	Designation	Centre grid ref.	Main features
Flamborough Head	SSSI	TA 143 764	Geology, ornithology, flora
Flamborough Head and Bempton Marshes	SPA	TA 258 705	Ornithology
Flamborough Head	pSAC	TA 255 705	Marine habitats
Flamborough Head	SMA	TA 141 765 - TA 194 679	Marine biology
Flamborough Head	HC	TA 202 686 - TA 151 757	Landscape
Bempton Cliffs	RSPB	TA 197 738	Ornithology

Human influences

Coastal development and uses

Access to much of Flamborough Head is limited by the steep cliffs on the north and the south-east facing shores. This is in contrast to Thornwick Bay, North Landing, Selwicks Bay, South Landing and Sewerby Rocks where visitor pressure is intensified due to easy access. Access to each of these sites is by steps or ramps onto the upper shore resulting in localised trampling at these points, and at locations where the littoral zone is narrow due to cliffs.

Leisure boating from Bridlington and Scarborough ranges from jet-skis and small speedboats to larger vessels used for organised trips around the headland. SCUBA diving and angling are popular activities. All boating activities involve the risk of disturbance to nesting seabirds, to seals and to cetaceans.

In general, the waters and sea bed around the headland appear to be relatively clean although turbidity can be high. There are no nearby river inputs, and sewage discharges are limited to small outfalls at Danes Dyke and at Thornwick Bay, which receive primary treatment. Bridlington to the south of Flamborough Head is the nearest large town and is also a popular resort.

Fisheries

Commercial fisheries for lobsters *Homarus gammarus* and crabs *Cancer pagurus* thrive inshore, with queen scallop, cod, sole and other fish species being caught from areas of soft sea bed and mixed ground. Drift-nets are laid around the headland to take salmon as they move along the coast. The inshore fishery is based at Bridlington harbour.

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Survey sites

Surveys

- 145: NCC sublittoral survey of Flamborough Head, 1987 (Wood 1988).
- 391: National Rivers Authority (NRA), Yorkshire region intertidal invertebrate survey of the EC designated bathing beaches, 1991 (Morris & Bird 1992).
- 395: NRA Yorkshire region summary report on the rocky shore surveys, 1991 (Bird & Morris 1992).
- 399: MNCR littoral survey from Saltburn to Flamborough Head, 1993.
- 400: MNCR sublittoral survey from Saltburn to Flamborough Head, 1993.
- 461: Grab sampling survey of north-east England, Analytical and Environmental Services 1993 (Turner *et al.* 1993).

Littoral sites

Survey Site	Site name	Grid reference	Latitude & longitude	Biotopes present
391 9	Reighton, Bridlington.	TA 147 763	54°10.1'N 00°14.5'W	AEur; AP.Pon; NcirBat
391 11	South Landing, Bridlington.	TA 233 692	54°06.2'N 00°06.8'W	AP.P
391 12	Danes Dyke, Bridlington.	TA 216 692	54°06.2'N 00°08.4'W	AEur; AP.P; AP.Pon
391 13	Bridlington North Sands.	TA 189 672	54°05.2'N 00°10.9'W	Tal; AP.P; AP.Pon
395 7	Flamborough South Landing.	TA 234 692	54°06.2'N 00°06.7'W	Fves; Fser; Fser.Fser; Fser.Fser.Bo; Rho; BarSh
399 30	Speeton Cliffs, Filey.	TA 177 749	54°09.4'N 00°11.7'W	EntPor; BPat.Sem; Mas; Ldig
399 31	Buckton Cliffs, Flamborough Head.	TA 182 747	54°09.2'N 00°11.3'W	Ent; MytB; MytFR; Cor; FK; Ldig.Ldig
399 32	Bempton Cliffs, Flamborough Head.	TA 196 743	54°09.0'N 00°10.1'W	Fspi; BPat.Sem; Lhyp.Ft

Littoral sites - continued

<i>Survey Site</i>	<i>Site name</i>	<i>Grid reference</i>	<i>Latitude & longitude</i>	<i>Biotores present</i>
399 33	Thornwick Bay, Flamborough Head.	TA 233 723	54°07.8'N 00°06.7'W	Ver.Ver; Fspi; BPat.Sem; Fves; Rho; SR; Ldig.Ldig
399 34	Selwicks Bay, Flamborough Head.	TA 255 708	54°07.0'N 00°04.7'W	BPat.Sem; Him; Rho; Ldig.Ldig
399 35	Cattlemore Scar, Flamborough Head.	TA 258 703	54°06.7'N 00°04.5'W	Fspi; FvesB; Fser.Fser; Cor; FK; Ldig.Ldig; Lhyp.Ft
399 36	South Landing, Flamborough Head.	TA 234 692	54°06.2'N 00°06.7'W	Ent; Fves; MytFR; SwSed; Lhyp.Ft
399 37	Sewerby Rocks, Flamborough Head.	TA 203 686	54°05.9'N 00°09.6'W	Ent; BPat; MytFves; MytFR

Sublittoral sites

<i>Survey Site</i>	<i>Site name</i>	<i>Grid reference</i>	<i>Latitude & longitude</i>	<i>Biotores present</i>
145 1	Speeton Sands, Flamborough Headland.	TA 157 760	54°09.9'N 00°13.6'W	IGS
145 2	King and Queens Rocks, Flamborough Headland.	TA 162 745	54°09.1'N 00°13.2'W	IGS
145 3	Buckton Cliffs, Flamborough Headland.	TA 177 756	54°09.7'N 00°11.8'W	EcorEns
145 4	Buckton Cliffs, Flamborough Headland.	TA 177 752	54°09.5'N 00°11.8'W	EcorEns
145 5	Buckton Cliffs, Flamborough Headland.	TA 176 750	54°09.4'N 00°11.9'W	IGS
145 6	Nettle Trip, Flamborough Headland.	TA 192 748	54°09.3'N 00°10.4'W	Flu.Flu; IGS
145 7	Nettle Trip, Flamborough Headland.	TA 191 746	54°09.1'N 00°10.5'W	AlcByH.Hia; IGS
145 8	Bartlett Nab, Bempton Cliffs.	TA 196 744	54°09.0'N 00°10.1'W	Ldig.Ldig; FoR; Urt.Urt
145 9	Scale Nab, Flamborough Headland.	TA 206 739	54°08.7'N 00°09.2'W	Flu.Flu; Oph
145 10	Scale Nab, Flamborough Headland.	TA 207 742	54°08.9'N 00°09.1'W	Lhyp.Pk; AlcByH.Hia; FaAIC
145 11	Cat Nab, Flamborough Headland.	TA 214 736	54°08.6'N 00°08.4'W	AlcByH.Hia; Flu.Flu
145 12	Cat Nab, Flamborough Headland.	TA 213 734	54°08.5'N 00°08.5'W	LhypFa
145 13	North Cliff, Flamborough Headland.	TA 224 728	54°08.1'N 00°07.5'W	LhypFa; AlcByH.Hia
145 14	North Cliff, Flamborough Headland.	TA 228 727	54°08.1'N 00°07.2'W	Lhyp.Ft
145 15	Little Thornwick, Flamborough Headland.	TA 231 725	54°08.0'N 00°06.9'W	Lhyp.Ft
145 16	Thornwick Nab, Flamborough Headland.	TA 233 727	54°08.1'N 00°06.7'W	AlcByH.Hia
145 17	High Holme, Flamborough Headland.	TA 237 726	54°08.0'N 00°06.3'W	Lhyp.Pk; FoR
145 18	High Holme, Flamborough Headland.	TA 239 729	54°08.2'N 00°06.2'W	AlcByH.Hia; StoPaur; Oph
145 19	North Landing (East Carr), Flamborough Headland.	TA 234 723	54°07.8'N 00°06.6'W	Lhyp.Ft; SCAs.ByH; Flu.Flu
145 20	Carter Lane, Flamborough Headland.	TA 246 722	54°07.8'N 00°05.5'W	LhypR.Pk
145 21	Breil Nook, Flamborough Headland.	TA 247 720	54°07.7'N 00°05.4'W	Flu.Flu; AlcByH.Hia
145 22	Breil Nook (200-300 m off headland), Flamborough Headland.	TA 248 721	54°07.7'N 00°05.3'W	StoPaur
145 23	Breil Nook, Flamborough Headland.	TA 249 723	54°07.8'N 00°05.2'W	Flu.Flu; Pol
145 24	Petrel Hole, Flamborough Headland.	TA 248 718	54°07.6'N 00°05.4'W	LhypFa; EphR
145 25	Petrel Hole, Flamborough Headland.	TA 248 718	54°07.6'N 00°05.4'W	Lhyp.Ft
145 26	Cradle Head, Flamborough Headland.	TA 253 715	54°07.4'N 00°04.9'W	Lhyp.Ft; AlcByH.Hia
145 27	Cradle Head, Flamborough Headland.	TA 254 717	54°07.5'N 00°04.8'W	Lhyp.Ft; AlcByH.Hia; StoPaur
145 28	Off Cradle Head, Flamborough Headland.	TA 257 723	54°07.8'N 00°04.5'W	Flu.Flu
145 29	Selwicks Bay, Flamborough Headland.	TA 259 716	54°07.4'N 00°04.3'W	StoPaur
145 30	Selwicks Bay, Flamborough Headland.	TA 257 715	54°07.4'N 00°04.5'W	StoPaur
145 31	Selwicks Bay, Flamborough Headland.	TA 270 714	54°07.3'N 00°03.3'W	AlcByH.Hia; StoPaur
145 32	Selwicks Bay, Flamborough Headland.	TA 257 713	54°07.3'N 00°04.5'W	StoPaur
145 33	Selwicks Bay off fog station, Flamborough Headland.	TA 262 710	54°07.1'N 00°04.1'W	StoPaur
145 34	Selwicks Bay off fog station, Flamborough Headland.	TA 260 709	54°07.1'N 00°04.3'W	Flu.Flu; Oph
145 35	Fog Station, Flamborough Headland.	TA 258 707	54°06.9'N 00°04.5'W	Lhyp.Ft; AlcByH.Hia
145 37	Fog Station, Flamborough Headland.	TA 257 707	54°06.9'N 00°04.6'W	Ldig.Ldig; SCAn.Tub; AlcByH.Hia

Sublittoral sites - continued

Survey Site	Site name	Grid reference	Latitude & longitude	Biotopes present
145 38	Fog Station, Flamborough Headland.	TA 259 706	54°06.9'N 00°04.4'W	Lhyp.Ft; XKScrR; EphR; AlcByH.Hia
145 39	High Stacks-Selwicks Bay, Flamborough Headland.	TA 263 706	54°06.9'N 00°04.0'W	StoPaur; Oph
145 40	High Stacks-Selwicks Bay, Flamborough Headland.	TA 262 707	54°06.9'N 00°04.1'W	StoPaur
145 41	Cattlemere, Flamborough Headland.	TA 262 703	54°06.7'N 00°04.1'W	Lhyp.TFt
145 42	Cattlemere, Flamborough Headland.	TA 261 707	54°07.0'N 00°04.2'W	Lhyp.TFt; Lhyp.Ft; EphR; AlcByH
145 43	Cattlemere, Flamborough Headland.	TA 262 700	54°06.6'N 00°04.1'W	Lhyp.TFt; lcByH.Hia; StoPaur
145 44	Old Fall, Flamborough Headland.	TA 256 696	54°06.4'N 00°04.7'W	StoPaur; AlcByH.Hia
145 45	Old Fall, Flamborough Headland.	TA 256 696	54°06.4'N 00°04.7'W	StoPaur
145 46	Old Fall, Flamborough Headland.	TA 254 695	54°06.3'N 00°04.9'W	StoPaur; XKScrR
145 47	Old Fall, Flamborough Headland.	TA 252 694	54°06.3'N 00°05.0'W	StoPaur
145 48	South Cliff, Flamborough Headland.	TA 246 690	54°06.0'N 00°05.6'W	StoPaur; AlcByH.Hia
145 49	South Cliff, Flamborough Headland.	TA 240 685	54°05.8'N 00°06.2'W	StoPaur
145 50	South Cliff, Flamborough Headland.	TA 240 685	54°05.8'N 00°06.2'W	Lhyp.TFt
145 51	South Cliff, Flamborough Headland.	TA 239 698	54°06.5'N 00°06.2'W	Lhyp.TFt
145 52	South Cliff, Flamborough Headland.	TA 239 690	54°06.1'N 00°06.2'W	XKScrR; IGS
145 53	Off South Landing, Flamborough Headland.	TA 235 687	54°05.9'N 00°06.6'W	FoR
145 54	Off South Landing, Flamborough Headland.	TA 235 684	54°05.7'N 00°06.6'W	XKScrR; StoPaur
145 55	South Landing, Flamborough Headland.	TA 236 683	54°05.7'N 00°06.5'W	StoPaur
145 56	South Landing, Flamborough Headland.	TA 236 681	54°05.6'N 00°06.5'W	StoPaur
145 57	Off South Landing, Flamborough Headland.	TA 228 679	54°05.5'N 00°07.3'W	StoPaur
145 58	Beacon Hill, Flamborough Headland.	TA 226 688	54°06.0'N 00°07.4'W	XKScrR
145 59	Danes Dyke, Flamborough Headland.	TA 220 685	54°05.8'N 00°08.0'W	XKScrR; IMS
145 60	Danes Dyke, Flamborough Headland.	TA 219 687	54°05.9'N 00°08.1'W	Pol
145 61	Sewerby Rocks, Flamborough Headland.	TA 207 681	54°05.6'N 00°09.2'W	XKScrR; EphR; Oph; IMX
145 62	Sewerby Rocks, Flamborough Headland.	TA 206 683	54°05.7'N 00°09.3'W	XKScrR; IGS
400 56	Onshore Speeton Cliffs, Filey.	TA 173 751	54°09.4'N 00°12.1'W	Lhyp.Ft; FoR; NcirBat
400 58	Inshore Buckton Cliffs, Flamborough Head.	TA 197 744	54°09.0'N 00°10.0'W	Lhyp.Ft; Lhyp.Pk; StoPaur
400 59	Offshore Buckton Cliffs, Flamborough Head.	TA 202 755	54°09.7'N 00°09.4'W	IGS
400 60	Inshore Bempton Cliffs, Flamborough Head.	TA 222 729	54°08.2'N 00°07.7'W	Lhyp.Ft; FoR; SCAs.ByH; CC.BalPom; AlcByH.Hia
400 61	Bempton Cliffs, Flamborough Head.	TA 230 729	54°08.2'N 00°06.9'W	Flu.SerHyd; Pol
400 62	NW entrance to North Landing, Flamborough Head.	TA 237 726	54°08.0'N 00°06.3'W	StoPaur
400 63	North Cliffs, Flamborough Head.	TA 249 720	54°07.7'N 00°05.2'W	StoPaur
400 64	NE of North Cliffs, Flamborough Head.	TA 266 732	54°08.3'N 00°03.7'W	Flu
400 65	E of Flamborough Light, Flamborough Head.	TA 255 709	54°07.1'N 00°04.7'W	Lhyp.Ft
400 66	Offshore, E of Flamborough Light, Flamborough Head.	TA 289 710	54°07.1'N 00°01.6'W	Flu.SerHyd
400 67	Flamborough Head.	TA 262 705	54°06.9'N 00°04.0'W	Pol; FaAlC; MytHAs
400 68	SE of North Smithick, Flamborough Head.	TA 279 682	54°05.6'N 00°02.6'W	Flu.Flu
400 69	S of Flamborough Lighthouse, Flamborough Head.	TA 249 690	54°06.1'N 00°05.3'W	StoPaur
400 70	S of South Landing, Flamborough Head.	TA 236 682	54°05.6'N 00°06.5'W	StoPaur
461 22	Offshore Bempton Cliffs, Flamborough Head.	TA 291 783	54°11.0'N 00°01.2'W	AfilEcor
461 23	Offshore North Cliffs, Flamborough Head.	TA 293 751	54°09.3'N 00°01.1'W	AbrNucCor
461 24	Offshore Flamborough Head.	TA 305 711	54°07.1'N 00°00.1'W	SspiMx; ModMx
461 25	Offshore Bridlington, Flamborough Head.	TA 295 676	54°05.3'N 00°01.1'W	AfilEcor

Compiled by: Paul Brazier

Appendix A

Species recorded in MNCR Sector 5

All taxa recorded during the surveys given in Table 1 are listed below. Nomenclature follows Howson & Picton (1997); that for lichens follows Purvis *et al.* (1992).

Numbers refer to the area summaries as follows:

- | | |
|---|-----------------------------------|
| 1. Bass Rock | 13. Coquet estuary |
| 2. Gin Head to Dunbar | 14. Alnmouth to Newbiggin Point |
| 3. Tynninghame Bay | 15. Newbiggin Point to Hartlepool |
| 4. Dunbar to Fast Castle Head | 16. Wansbeck estuary |
| 5. Fast Castle Head to Eyemouth | 17. Blyth estuary |
| 6. Eyemouth to the Tweed estuary | 18. Tyne estuary |
| 7. Tweed estuary | 19. Wear estuary |
| 8. Tweed estuary to Bamburgh | 20. Tees Bay |
| 9. Budle Bay | 21. Tees estuary |
| 10. Holy Island (N & E) and the Farne Islands | 22. Saltburn to Filey Bay |
| 11. Bamburgh to Alnmouth | 23. Esk estuary |
| 12. Aln estuary | 24. Flamborough Head |

Desmacidon spp. 11

PROTOZOA

Haliphysema tumanowiczii 11, 24

PORIFERA

Clathrina coriacea 1, 2, 4, 5, 6, 8, 10, 11, 22, 24

Clathrina lacunosa 15

Leucosolenia spp. 1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 22, 24

Leucosolenia botryoides 1, 4, 5, 6, 8, 10, 11, 15, 22, 24

Leucosolenia variabilis 21

Amphoriscidae indet. 15

Grantia compressa 1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 19, 20, 22, 24

Leuconia nivea 7, 8, 11, 22, 24

Scypha ciliata 1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 21, 22, 24

Demospongiae indet. 4, 24

Oscarella spp. 8, 10

Oscarella lobularis 8, 10, 14

Polymastia boletiformis 6, 14, 15, 22, 24

Polymastia mamillaris 11, 14, 15, 22, 24

Spinularia spinularia 8, 11, 22

Suberites spp. 11

Suberites carnosus 22

Suberites ficus 1, 24

Stelligera rigida 15

Stelligera stuposa 15

Cliona celata 2, 4, 5, 6, 8, 10, 11, 15, 20, 22, 24

Halichondria bowerbanki 2, 5, 15, 22

Halichondria panicea 1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 19, 20, 21, 22, 24

Hymeniacidon perleve 2, 5, 10, 11, 22, 24

Mycale spp. 15, 22

Esperiopsis fucorum 5, 8, 10, 11, 15, 24

Hymedesmia brondstedii 14, 15

Hemimycale columella 15

Phorbast fictitius 22

Stylostichon plumosum 14

Myxilla incrustans 1, 2, 4, 5, 6, 8, 10, 11, 15, 22, 24

Myxilla rosacea 15

Ophlitaspongia seriata 11, 22

Raspaillidae indet. 15

Haliclona spp. 5, 8, 11, 15, 22

Haliclona oculata 1, 2, 4, 11, 14, 15, 22, 24

Haliclona urceolus 11, 14, 22, 24

Haliclona viscosa 11

Aplysilla spp. 15

Dysidea fragilis 1, 5, 8, 10, 11, 15, 22, 24

Halisarca dujardini 1, 2, 4, 5, 6, 7, 10, 11, 14, 15, 18, 20, 22, 24

Porifera indet. crusts 1, 2, 4, 7, 8, 10, 11, 14, 15, 21, 22, 24

CNIDARIA

Haliclystus spp. 10, 11

Haliclystus auricula 7

Cyanea capillata 24

Cyanea lamarckii 24

Aurelia aurita 8, 10, 24

Hydrozoa indet. 1, 6, 15, 21, 22, 24

Corymorphidae indet. 15

Corymorpha nutans 4, 5, 8

Tubularia sp. 5

Tubularia indivisa 4, 5, 8, 10, 11, 14, 15, 20, 22, 24

Tubularia larynx 5, 8, 10, 11, 14, 15, 22, 24

Coryne spp. 10, 11, 14, 24

Sarsia spp. 8

Sarsia eximia 1, 5, 10, 15

Eudendrium capillare 1, 10, 15

<i>Eudendrium rameum</i>	22	<i>Obelia</i> spp.	1, 5, 6, 8, 11, 14, 15, 20, 22, 24
<i>Eudendrium ramosum</i>	24	<i>Obelia dichotoma</i>	1, 4, 6, 8, 10, 11, 15, 24
<i>Bougainvillia ramosa</i>	4	<i>Obelia geniculata</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 15, 20, 22, 24
<i>Dicoryne conferta</i>	15, 22	<i>Obelia longissima</i>	1, 14, 24
<i>Garveia nutans</i>	15, 22	<i>Rhizocaulus verticillatus</i>	1, 2, 15, 22, 24
<i>Hydractinia echinata</i>	10, 11, 24	Anthozoa indet.	1, 2, 4, 5, 10, 24
<i>Clava</i> spp.	8, 14	<i>Alcyonium digitatum</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 15, 20, 22, 24
<i>Calycella syringa</i>	22	<i>Virgularia mirabilis</i>	4, 5, 14, 15, 20
<i>Lovenella clausa</i>	22	<i>Cerianthus lloydii</i>	1, 2, 4, 5, 6, 8, 10, 11, 15
<i>Lafoea dumosa</i>	5, 8	<i>Epizoanthus couchii</i>	22
<i>Halecium beanii</i>	8, 11, 24	Actiniaria indet.	5
<i>Halecium halecinum</i>	1, 2, 4, 5, 8, 11, 14, 15, 22, 24	<i>Actinia equina</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 20, 21, 22, 23, 24
<i>Halecium labrosium</i>	11	<i>Actinia fragacea</i>	8, 11, 15
<i>Halecium muricatum</i>	8, 15	<i>Anemonia viridis</i>	5
<i>Aglaophenia</i> spp.	11	<i>Bolocera tuediae</i>	2, 4, 5, 6, 8
<i>Aglaophenia pluma</i>	15	<i>Urticina felina</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 20, 22, 24
<i>Gymnangium</i> spp.	24	<i>Urticina eques</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 15, 22, 24
Plumulariidae indet.	8	<i>Aulactinia verrucosa</i>	8
<i>Halopteris catharina</i>	4, 8, 10, 11, 15, 22	<i>Stomphia coccinea</i>	2, 4, 11, 14
<i>Kirchenpaueria pinnata</i>	1, 4, 6, 10, 14, 15, 22, 24	<i>Metridium senile</i>	1, 2, 4, 5, 8, 10, 11, 14, 15, 22, 24
<i>Nemertesia antennina</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 15, 22, 20, 24	<i>Sagartia</i> spp.	14, 22
<i>Nemertesia ramosa</i>	5, 6, 8, 10, 11, 15, 22, 24	<i>Sagartia elegans</i>	1, 4, 5, 6, 8, 10, 11, 14, 15, 22, 24
<i>Plumularia</i> spp.	11, 14	<i>Sagartia troglodytes</i>	1, 2, 8, 11, 24
<i>Plumularia setacea</i>	2, 4, 11, 14, 15, 24	<i>Cereus pedunculatus</i>	10
<i>Polyplumaria frutescens</i>	6, 8, 10	<i>Actinothoe</i> spp.	10
<i>Ventromma halecioides</i>	11	<i>Sagartiogeton laceratus</i>	24
Sertulariidae indet.	5, 10, 24	<i>Hormathia nodosa</i>	14
<i>Abietinaria abietina</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 15, 22, 24	<i>Adamsia carciniopados</i>	4, 5, 6
<i>Abietinaria filicula</i>	1, 8, 10, 11, 15, 24	<i>Peachia cylindrica</i>	22
<i>Diphasia</i> spp.	1, 14, 24	<i>Halcampa chrysanthellum</i>	1, 2, 5, 10, 15, 22
<i>Diphasia alata</i>	24	<i>Edwardsiella carnea</i>	11
<i>Diphasia attenuata</i>	5, 10, 15, 24	<i>Edwardsia claparedii</i>	20, 22
<i>Diphasia nigra</i>	10, 24	<i>Caryophyllia smithii</i>	4, 5, 6, 8, 14
<i>Diphasia pinaster</i>	1, 14, 15, 22, 24	PLATYHELMINTHES	
<i>Diphasia rosacea</i>	1, 4, 11, 15, 22	Platyhelminthes indet.	1, 2, 4, 5, 7, 14, 15, 20, 22, 24
<i>Dynamena pumila</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 19, 20, 22, 24	Turbellaria indet.	4, 22
<i>Hydrallmania falcata</i>	1, 4, 5, 6, 8, 10, 11, 15, 22, 24	NEMERTEA	
<i>Thuiaria articulata</i>	8, 11, 15, 22, 24	Nemertea indet.	1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 18, 19, 20, 21, 22, 24
<i>Thuiaria thuja</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 15, 22, 24	<i>Tubulanus</i> spp.	1, 2, 4, 5, 8, 15, 22, 24
<i>Selaginopsis fusca</i>	22	<i>Tubulanus annulatus</i>	1, 2
<i>Sertularella gaudichaudi</i>	14	<i>Cerebratulus</i> spp.	1, 2, 4, 5, 8, 15, 20, 22, 24
<i>Sertularella gayi</i>	1, 15	<i>Cerebratulus pantherinus</i>	11
<i>Sertularella polyzonias</i>	1, 10, 11, 24	<i>Lineus</i> spp.	3, 4, 8, 10, 13, 17
<i>Sertularella rugosa</i>	5, 6, 15	<i>Lineus longissimus</i>	1, 2, 5, 8, 10, 11, 15, 20, 21, 22
<i>Sertularella tenella</i>	4	<i>Lineus ruber</i>	7, 10, 15, 22, 24
<i>Sertularia</i> spp.	22, 24	<i>Amphiporus lactifloreus</i>	15
<i>Sertularia argentea</i>	4, 5, 6, 8, 10, 11, 14, 15, 22, 24	<i>Nipponnemertes pulcher</i>	4, 6
<i>Sertularia cupressina</i>	1, 8, 14, 15	<i>Tetrastemma robertianae</i>	5, 15
<i>Symplectoscyphus</i>	15		
<i>tricuspidatus</i>	22		
<i>Tamarisca tamarisca</i>	11, 22		
<i>Campanularia hincksii</i>	5		
<i>Campanularia volubilis</i>	1, 4, 5, 8, 10, 11, 14, 15, 22, 24		
<i>Clytia hemisphaerica</i>	22, 24		
<i>Gonothyrea loveni</i>	21		
<i>Laomedea flexuosa</i>	1, 5, 8, 10, 14, 22		

NEMATODA			
Nematoda indet.	1, 2, 3, 4, 5, 8, 9, 14, 15, 20, 21, 22, 24		
PRIAPULIDA			
<i>Priapulid caudatus</i>	2, 4, 5, 8, 15		
ENTOPROCTA			
<i>Pedicellina cernua</i>	5		
SIPUNCULA	14		
<i>Sipunculus</i> spp.	2, 4, 5, 15, 20, 24		
<i>Golfingia</i> spp.	2, 4, 5, 8, 15, 22		
<i>Golfingia vulgaris vulgaris</i>	14, 20, 22		
<i>Phascolion strombus strombus</i>	1, 2, 4, 5, 8, 20		
<i>Thysanocardia procera</i>	14, 20		
ANNELIDA			
Polychaete indet.	1, 2, 4, 5, 7, 8, 11, 12, 14, 15, 18, 19, 20, 22, 23		
Phyllodocida indet.	1		
<i>Pisione remota</i>	14, 15, 22, 24		
Aphroditidae indet.	11, 15, 20, 22		
<i>Aphrodita aculeata</i>	1, 2, 4, 5, 8, 14, 15, 22		
<i>Hermonia hystrix</i>	24		
Polynoidae indet.	2, 5, 8, 11, 14, 15, 20, 22, 24		
<i>Adyte assimilis</i>	1		
<i>Alentia gelatinosa</i>	1, 2, 4, 6, 8, 10, 11, 14, 15, 22		
<i>Enipo kinbergi</i>	1		
<i>Eunoe nodosa</i>	15, 22, 24		
<i>Gattyana cirrosa</i>	1, 4, 15, 18, 20, 22		
<i>Harmothoe</i> spp.	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 17, 18, 20, 21, 22, 24		
<i>Harmothoe extenuata</i>	10, 11		
<i>Harmothoe imbricata</i>	4, 6, 7, 8, 14		
<i>Harmothoe impar</i>	1, 5, 6, 14, 15, 22		
<i>Harmothoe maxillospinosa</i>	15		
<i>Harmothoe villosa</i>	14		
<i>Harmothoe andreapolis</i>	15		
<i>Harmothoe lunulata</i>	1, 2, 4, 5, 15, 20, 24		
<i>Harmothoe marphysae</i>	22		
<i>Lepidonotus squamatus</i>	1, 4, 7, 10, 11, 14, 15, 22, 24		
Sigalionidae indet.	4, 15, 22		
<i>Pholoe</i> spp.	1, 2, 4, 5, 8, 15, 20, 22, 24		
<i>Pholoe inornata</i>	11, 13, 14, 15, 17, 18, 19, 20, 21, 22, 24		
<i>Pholoe pallida</i>	5, 14		
<i>Pholoe synophthalmica</i>	19, 21		
<i>Sigalion mathildae</i>	11, 15, 20, 22		
<i>Sthenelais</i> spp.	4		
<i>Sthenelais limicola</i>	1, 2, 4, 14, 15, 20, 22, 24		
<i>Sthenelais zetlandica</i>			
Phyllodocidae indet.	2, 8, 14, 15, 20, 22, 24		
<i>Eteone</i> spp.	2, 15, 20, 22, 24		
<i>Eteone longa</i>	1, 2, 3, 4, 5, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24		
<i>Hypereteone foliosa</i>	2, 5, 14, 15, 22		
<i>Mysta picta</i>	21		
<i>Anaitides</i> spp.	15, 20, 21, 22		
<i>Anaitides groenlandica</i>	1, 2, 4, 11, 14, 15, 20, 21, 22, 24		
<i>Anaitides maculata</i>	7, 8, 13, 14, 16, 17, 18, 19, 21, 22		
<i>Anaitides mucosa</i>	4, 7, 8, 9, 11, 13, 14, 15, 17, 18, 19, 20, 21, 22		
<i>Anaitides rosea</i>	1, 2, 4, 5, 14, 15, 22		
<i>Eulalia viridis</i>	1, 2, 4, 5, 7, 8, 10, 11, 14, 15, 20, 21, 22, 24		
<i>Eumida</i> spp.	1, 2, 5, 8, 11, 14, 15, 22, 24		
<i>Eumida bahusiensis</i>	2, 4, 14, 15, 18, 19, 21, 22, 23, 24		
<i>Eumida sanguinea</i>	1, 8, 15, 22, 24		
<i>Phyllodoce</i> spp.	2, 4, 5, 11, 14, 15, 22, 24		
<i>Phyllodoce laminosa</i>	14		
Glyceridae indet.	14		
<i>Glycera</i> spp.	1, 2, 4, 5, 8, 14, 15, 19, 20, 21, 22, 24		
<i>Glycera alba</i>	1, 2, 4, 5, 8, 14, 15, 17, 22		
<i>Glycera lapidum</i>	5, 8, 10, 15, 22, 24		
<i>Glycera rouxii</i>	1, 2, 4, 5, 8, 14, 15, 20, 22, 24		
<i>Glycera tridactyla</i>	15, 17, 20, 22		
Goniadidae indet.	1, 2, 4, 5, 15, 22		
<i>Glycinde nordmanni</i>	1, 2, 4, 5, 8, 15, 20, 22		
<i>Goniada</i> spp.	1		
<i>Goniada maculata</i>	1, 2, 4, 5, 8, 14, 15, 20, 22 15		
<i>Goniadella</i> spp.	15		
<i>Goniadella bobretzkii</i>	5		
<i>Sphaerodoropsis minuta</i>	17, 22		
<i>Sphaerodorum gracilis</i>	14, 22		
Hesionidae indet.	2, 4, 22, 24		
<i>Gyptis</i> spp.	14, 22		
<i>Kefersteinia cirrata</i>	7, 14, 15, 21, 24		
<i>Nereimyra punctata</i>	21		
<i>Ophiidromus flexuosus</i>	2, 5, 11, 14, 15, 21, 22		
<i>Podarkeopsis capensis</i>	1, 2, 4, 5, 14, 22		
<i>Syllidia armata</i>	5		
<i>Microphthalmus szcelkowi</i>	18		
<i>Microphthalmus similis</i>	10		
<i>Glyphohesione klatti</i>	4, 5, 14, 20		
Syllidae indet.	5, 8, 15, 22, 24		
<i>Syllis</i> spp.	2, 5, 8, 15, 22, 24		
<i>Typosyllis</i> spp.	22		
<i>Typosyllis prolifera</i>	22		
<i>Eusyllis blomstrandii</i>	22		
<i>Odontosyllis fulgurans</i>	7		
<i>Streptosyllis websteri</i>	8, 11, 22		
<i>Syllides</i> spp.	15		
<i>Syllides longocirrata</i>	22		
<i>Exogone</i> spp.	4, 5, 8, 20, 22, 24		
<i>Exogone hebes</i>	2, 5, 8, 9, 10, 11, 15, 22, 24		
<i>Exogone naidina</i>	1, 2, 5, 8, 15, 20, 22, 24		
<i>Exogone verugera</i>	1, 2, 5, 8, 15, 20, 22, 24		
<i>Sphaerosyllis</i> spp.	2, 5, 8, 22, 24		
<i>Sphaerosyllis bulbosa</i>	14, 15		
<i>Sphaerosyllis tetralix</i>	5, 15		
<i>Autolytus</i> spp.	24		
<i>Autolytus brachycephalus</i>	24		
<i>Proceraea picta</i>	2		
Nereididae indet.	4, 7, 8, 12, 14, 15, 16, 17, 19, 20, 21, 23		

<i>Hediste diversicolor</i>	3, 7, 8, 9, 12, 13, 16, 17, 18, 19, 20, 21, 22, 23, 24	<i>Aonides paucibranchiata</i>	10, 14, 15, 22, 24
<i>Neanthes virens</i>	8, 13, 17, 20, 21, 23	<i>Laonice</i> spp.	1, 4, 5, 20, 22, 24
<i>Nereis</i> spp.	2, 15, 21, 22	<i>Laonice bahusiensis</i>	2, 4, 5, 15, 22, 24
<i>Nereis longissima</i>	2, 4, 14, 15	<i>Laonice cirrata</i>	5, 14
<i>Nereis pelagica</i>	2, 11, 15, 20, 21, 22, 24	<i>Malacoceros</i> spp.	3
<i>Nereis zonata</i>	4	<i>Malacoceros fuliginosus</i>	3, 7, 9, 11, 13, 14, 17, 18, 19, 20, 21, 22, 24
<i>Perinereis cultrifera</i>	7, 8, 15	<i>Malacoceros tetracerus</i>	4, 7, 9, 16, 19, 21, 23
<i>Nephtys</i> spp.	1, 2, 4, 5, 8, 13, 14, 15, 17, 18, 19, 20, 21, 22, 24	<i>Malacoceros vulgaris</i>	8, 10, 18
<i>Nephtys caeca</i>	2, 7, 11, 13, 15, 18, 21, 22, 24	<i>Marenzelleria</i> spp.	19
<i>Nephtys cirrosa</i>	1, 2, 3, 4, 5, 8, 11, 14, 15, 18, 20, 21, 22, 24	<i>Minuspio cirrifera</i>	20
<i>Nephtys hombergii</i>	1, 2, 4, 5, 11, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24	<i>Polydora</i> spp.	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 20, 21, 22, 24
<i>Nephtys incisa</i>	1, 15	<i>Polydora caeca</i>	1, 2, 4, 5, 14, 22, 24
<i>Nephtys kersivalensis</i>	1, 4, 5, 13, 14, 15, 18, 20, 21, 22, 24	<i>Polydora caulleryi</i>	2, 14, 15, 22, 24
<i>Nephtys longosetosa</i>	1, 8, 11, 14, 15, 20, 21, 22, 24	<i>Polydora ciliata</i>	17, 18, 20, 21, 22
<i>Nephtys pente</i>	5	<i>Polydora flava</i>	20
<i>Nothria conchylega</i>	2	<i>Polydora quadrilobata</i>	8
<i>Eunice</i> spp.	15, 21	<i>Prionospio</i> spp.	1, 2, 4, 5, 8, 15, 17, 20, 22, 24
Lumbrineridae indet.	1, 15, 20	<i>Prionospio fallax</i>	1, 2, 4, 5, 8, 14, 15, 17, 18, 19, 20, 21, 22, 24
<i>Lumbrineris</i> spp.	1, 2, 4, 5, 8, 15, 22, 24	<i>Pseudopolydora</i> spp.	2, 4, 5
<i>Lumbrineris fragilis</i>	4	<i>Pseudopolydora antennata</i>	2, 5
<i>Lumbrineris gracilis</i>	1, 2, 4, 5, 8, 14, 15, 20, 22, 24	<i>Pseudopolydora</i> cf. <i>paucibranchiata</i>	15
<i>Lumbrineris hibernica</i>	4, 5, 15, 20	<i>Pseudopolydora pulchra</i>	22
<i>Lumbrineris tetraura</i>	2, 22	<i>Pygospio elegans</i>	1, 3, 7, 8, 9, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 23
<i>Drilonereis filum</i>	2, 5, 22	<i>Scolecopsis</i> spp.	1, 4, 5, 14, 15, 20, 22, 24
Dorvilleidae indet.	1, 4, 15, 20, 22	<i>Scolecopsis bonnieri</i>	22
<i>Ophryotrocha</i> spp.	17, 21	<i>Scolecopsis foliosa</i>	7, 9, 18
<i>Ophryotrocha hartmanni</i>	17, 18, 19, 21	<i>Scolecopsis squamata</i>	1, 2, 3, 4, 5, 7, 8, 9, 11, 13, 14, 15, 19, 20, 22, 24
<i>Parougia</i> spp.	10	<i>Scolecopsis tridentata</i>	7, 13, 16, 22
<i>Protodorvillea kefersteini</i>	8, 14, 15, 18, 20, 22	<i>Spio</i> spp.	14, 15, 20, 21, 22, 24
<i>Schistomeringos</i> spp.	1, 2, 4, 5, 15, 22	<i>Spio armata</i>	2, 4, 7, 8, 11, 14, 15, 17, 20, 22
Orbiniidae indet.	5, 15, 22	<i>Spio decorata</i>	1, 2, 4, 5, 14, 15, 18, 22, 24
<i>Orbinia latreillii</i>	22	<i>Spio filicornis</i>	8, 19, 20, 21, 22
<i>Orbinia sertulata</i>	2, 4, 5, 8, 14, 20, 22	<i>Spio martinensis</i>	3, 4, 7, 8, 10, 11, 12, 13, 14, 17, 18, 19, 21, 22, 23, 24
<i>Scopelos armiger</i>	1, 2, 3, 4, 5, 7, 8, 9, 11, 13, 14, 15, 17, 18, 20, 21, 22, 23, 24	<i>Spiophanes bombyx</i>	1, 2, 4, 5, 8, 10, 11, 13, 14, 15, 18, 20, 21, 22, 24
Paraonidae indet.	15, 20, 22	<i>Spiophanes kroeyeri</i>	1, 2, 4, 5, 8, 14, 15, 20, 22, 24
<i>Aricidea</i> spp.	14, 15, 22, 24	<i>Streblospio shrubsolii</i>	17, 19, 21, 23
<i>Aricidea minuta</i>	2, 3, 8, 11, 13, 14, 15, 18, 22	<i>Magelona</i> spp.	14, 15, 22
<i>Aricidea simonae</i>	22	<i>Magelona alleni</i>	2, 4, 5, 15, 20, 22
<i>Levinsenia gracilis</i>	1, 2, 4, 5, 8, 14, 15, 20, 22, 24	<i>Magelona filiformis</i>	2, 14, 15, 22
<i>Paradoneis lyra</i>	2, 5, 8, 22, 24	<i>Magelona minuta</i>	1, 2, 4, 5, 8, 14, 15, 20, 22
<i>Paradoneis</i> spp.	8	<i>Magelona mirabilis</i>	1, 2, 4, 5, 8, 9, 11, 13, 14, 15, 18, 19, 20, 22, 24
<i>Paraonis fulgens</i>	1, 2, 3, 4, 5, 7, 8, 9, 11, 12, 13, 14, 15, 16, 18, 19, 20, 22, 24	<i>Chaetopterus variopedatus</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 20
<i>Apistobranthus tullbergi</i>	1, 2, 4, 5, 8, 15, 22	<i>Spiochaetopterus typicus</i>	5
<i>Poecilochaetus serpens</i>	1, 4, 5, 8, 11, 14, 15, 20, 22	Cirratulidae indet.	1, 2, 4, 5, 8, 11, 14, 15, 17, 18, 19, 20, 21, 22, 24
Spionidae indet.	5, 8, 11, 14, 15, 17, 22		
<i>Aonides</i> spp.	14		
<i>Aonides oxycephala</i>	3		

<i>Caulleriella</i> spp.	21	<i>Amphictene auricoma</i>	1, 2, 4, 5, 8, 15, 20, 21, 22
<i>Caulleriella alata</i>	8, 14, 24	<i>Lagis koreni</i>	1, 2, 4, 5, 7, 8, 11, 13, 14, 15, 18, 20, 22, 24
<i>Caulleriella caputesocis</i>	14	<i>Pectinaria</i> spp.	4, 5, 14, 15, 22, 24
<i>Caulleriella zetlandica</i>	2, 4, 5, 8, 14, 15, 20, 22	<i>Sabellaria</i> spp.	8, 11, 14, 15, 22, 24
<i>Chaetozone setosa</i>	1, 2, 4, 5, 8, 9, 10, 11, 14, 15, 18, 19, 20, 21, 22, 24	<i>Sabellaria alveolata</i>	11, 15, 22, 24
<i>Cirratulus</i> spp.	4, 5, 11, 21, 22, 24	<i>Sabellaria spinulosa</i>	2, 4, 5, 8, 11, 14, 15, 20, 22, 24
<i>Cirratulus cirratus</i>	2, 11, 21	Ampharetidae indet.	2, 3, 4, 5, 8, 15, 20, 22, 24
<i>Cirriformia tentaculata</i>	1, 3, 4, 10, 20, 21, 22	<i>Melinna cristata</i>	2, 14, 15, 22, 24
<i>Dodecaceria concharum</i>	2	Ampharetinae indet.	5, 8, 15
<i>Tharyx</i> spp.	1, 2, 4, 15, 18, 22	<i>Ampharete</i> spp.	1, 2, 4, 5, 8
<i>Tharyx killariensis</i>	2, 5	<i>Ampharete baltica</i>	4, 5, 8, 20
<i>Apelochaeta marioni</i>	3, 8, 17, 18, 21, 23	<i>Ampharete grubei</i>	14
<i>Apelochaeta multibranchiis</i>	5, 15	<i>Ampharete lindstroemi</i>	1, 2, 4, 5, 8, 15, 22
<i>Apelochaeta vivipara</i>	17, 18, 19, 21	<i>Amphicteis gunneri</i>	14, 15
<i>Psammodrilus</i>	14, 20	<i>Anobothrus gracilis</i>	1, 2, 5, 14, 15, 20, 22
<i>balanoglossoides</i>		<i>Sabellides</i> spp.	21
<i>Diplocirrus glaucus</i>	14, 15, 20, 22	<i>Samytha sexcirrata</i>	20
<i>Flabelligera affinis</i>	4, 5, 19, 21	<i>Terebellides stroemi</i>	1, 2, 4, 5, 8, 14, 15, 20, 22
<i>Pherusa plumosa</i>	6, 21, 24	<i>Trichobranchus</i> spp.	5
Capitellidae indet.	14, 17, 20, 21, 22	<i>Trichobranchus glacialis</i>	14, 20
<i>Capitella capitata</i>	3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24	<i>Trichobranchus roseus</i>	1, 2, 4, 5, 8, 15
<i>Baldia johnstoni</i>	8, 11	Terebellidae indet.	1, 2, 4, 5, 8, 10, 14, 15, 22, 24
<i>Capitomastus minimus</i>	20	Amphitritinae indet.	2
<i>Heteromastus filiformis</i>	1, 2, 4, 5, 14, 20	<i>Amphitrite</i> spp.	2
<i>Mediomastus fragilis</i>	1, 2, 3, 4, 5, 8, 10, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24	<i>Eupolymnia</i> spp.	24
<i>Notomastus</i> spp.	2, 4	<i>Eupolymnia nebulosa</i>	22
<i>Notomastus latericeus</i>	8	<i>Lanice conchilega</i>	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 19, 20, 22, 23, 24
<i>Peresiella clymenoides</i>	1, 2, 4, 5, 8	<i>Neoamphitrite figulus</i>	2
<i>Arenicola marina</i>	1, 2, 3, 4, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 23, 24	<i>Pista cristata</i>	4, 14, 22
Maldanidae indet.	1, 5, 8, 14, 15, 22	Polycirrinae indet.	1
<i>Praxillura longissima</i>	22	<i>Lysilla loveni</i>	1, 4
<i>Maldane</i> spp.	22	<i>Polycirrus</i> spp.	1, 4, 15, 20, 22
<i>Maldane sarsi</i>	2	Sabellidae indet.	2, 5, 11, 15, 22, 24
Euclymeninae indet.	4, 5, 22	<i>Bispira volutacornis</i>	24
<i>Euclymene</i> spp.	20, 22	<i>Branchiomma bombyx</i>	15, 24
<i>Euclymene oerstedii</i>	22	<i>Chone</i> spp.	4, 14, 15, 22
<i>Praxillella affinis</i>	4	<i>Chone filicaudata</i>	5, 8
<i>Rhodine</i> spp.	14	<i>Chone infundibuliformis</i>	5
<i>Rhodine gracilior</i>	1, 2, 4, 5, 14, 15, 20, 24	<i>Demonax</i> spp.	5, 8
Opheliidae indet.	15, 22, 24	<i>Euchone rubrocincta</i>	14, 22
<i>Ophelia borealis</i>	8, 10, 11, 20	<i>Fabricia sabella</i>	8, 9, 11, 18
<i>Ophelia limacina</i>	11, 22	<i>Jasmineira</i> spp.	22
<i>Ophelia rathkei</i>	1, 3, 7, 8, 9, 11	<i>Jasmineira elegans</i>	5, 8
<i>Travisia forbesii</i>	11	<i>Laonome kroyeri</i>	1, 5, 15, 22
<i>Ophelina acuminata</i>	1, 2, 4, 5, 8, 14, 15, 17, 20, 22, 24	<i>Manayunkia aestuarina</i>	7, 8, 9, 12, 13, 16, 17, 18, 19, 21, 23
<i>Ophelina modesta</i>	22	<i>Myxicola</i> spp.	6, 8
<i>Scalibregma inflatum</i>	1, 2, 4, 5, 8, 13, 14, 15, 17, 18, 19, 20, 22, 24	<i>Myxicola aesthetica</i>	6, 8
Nerillidae indet.	24	<i>Myxicola infundibulum</i>	4, 10, 11, 14, 15, 22, 24
Protodrilidae indet.	11, 22	<i>Potamilla neglecta</i>	20
<i>Protodrilus purpureus</i>	22	<i>Sabella</i> spp.	22, 24
<i>Galathowenia oculata</i>	1, 2, 4, 5, 8, 14, 15, 17, 20, 22, 24	<i>Sabella pavonina</i>	4, 5, 6, 8, 11, 14, 15, 20, 22, 24
<i>Owenia fusiformis</i>	1, 2, 4, 5, 8, 14, 15, 20, 22, 24	Serpulidae indet.	2, 14, 20
Terebellida indet.	8, 15	<i>Hydroides</i> spp.	22
		<i>Hydroides norvegica</i>	2, 5, 6, 8, 22
		<i>Pomatoceros</i> spp.	11, 15, 22, 24
		<i>Pomatoceros lamarcki</i>	4, 5, 7, 11, 14, 15, 22, 24

<i>Pomatoceros triqueter</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 13, 14, 15, 17, 18, 19, 20, 21, 22, 24	CRUSTACEA	
<i>Serpula vermicularis</i>	2, 4, 5, 8, 11, 22, 24	<i>Cirripedia</i> indet.	1, 5, 10, 14, 15, 24
<i>Filograna implexa</i>	5, 8, 10, 11	<i>Verruca stroemia</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 20, 22, 24
<i>Protula tubularia</i>	22	<i>Chthamalus montagui</i>	1, 2, 5, 14, 17
<i>Salmacina dysteri</i>	2, 10, 11, 22	<i>Chthamalus stellatus</i>	1, 4, 5
<i>Spirorbidae</i> indet.	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 19, 22, 24	<i>Balanus</i> spp.	8, 15, 22, 24
<i>Janua pagenstecheri</i>	10	<i>Semibalanus balanoides</i>	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24
<i>Spirorbis</i> spp.	1, 2, 4, 5, 6, 7, 8, 11, 15, 22	<i>Balanus balanus</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 15, 22, 24
<i>Spirorbis corallinae</i>	11, 15, 22, 24	<i>Balanus crenatus</i>	1, 2, 4, 5, 7, 8, 10, 11, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24
<i>Spirorbis inornatus</i>	22	<i>Balanus improvisus</i>	7, 17
<i>Spirorbis rupestris</i>	11	<i>Elminius modestus</i>	7, 8, 14, 15, 16, 17, 18, 19, 20, 21, 23
<i>Spirorbis spirorbis</i>	4, 7, 8, 11, 14, 15, 22	<i>Sacculina carcini</i>	1
<i>Spirorbis tridentatus</i>	7, 8, 10, 11, 14, 15, 22, 24	<i>Copepoda</i> indet.	1, 2, 4, 5, 8, 10, 14, 15, 22
<i>Oligochaeta</i> indet.	3, 7, 8, 9, 11, 15, 17, 18, 19, 20, 21, 22, 24	<i>Oothrix bidentata</i>	15
<i>Naididae</i> indet.	19	<i>Tigriopus brevicornis</i>	15
<i>Paranais litoralis</i>	18, 19	<i>Ameira</i> spp.	22
<i>Tubificidae</i> indet.	1, 2, 4, 5, 8	<i>Dinemoura producta</i>	24
<i>Clitellio arenarius</i>	8, 9	<i>Ostracoda</i> indet.	1, 2, 4, 5, 9, 14, 15, 22, 24
<i>Heterochaeta costatus</i>	3, 7, 8, 9, 12, 13, 17, 18, 19, 21, 23	<i>Myodocopida</i> indet.	8
<i>Tubificoides</i> spp.	18, 19, 20, 21, 23	<i>Mysidae</i> indet.	1, 2, 5, 6, 8, 10, 11, 13, 14, 15, 19, 22, 23, 24
<i>Tubificoides benedii</i>	3, 7, 8, 9, 10, 12, 13, 16, 17, 18, 19, 20, 21, 22, 23	<i>Erythrope elegans</i>	15
<i>Tubificoides pseudogaster</i>	3, 7, 8, 9, 10, 12, 13, 16, 17, 18, 19, 21, 23	<i>Neomysis integer</i>	7, 12, 14, 19
<i>Tubificoides swirencoides</i>	17, 18, 19, 21	<i>Praunus</i> spp.	24
<i>Tubificoides insularis</i>	18	<i>Praunus inermis</i>	22
<i>Monopylephorus irroratus</i>	19	<i>Amphipoda</i> indet.	1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24
<i>Enchytraeidae</i> indet.	1, 3, 4, 7, 8, 9, 12, 13, 15, 16, 17, 18, 20, 21, 22, 23, 24	<i>Apherusa bispinosa</i>	21
<i>Grania</i> spp.	22	<i>Apherusa jurinei</i>	22
<i>Lumbricillus</i> spp.	17	<i>Calliopius laeviusculus</i>	22
CHELICERATA		<i>Epimeria cornigera</i>	5, 22
<i>Nymphon</i> spp.	10	<i>Oedicerotidae</i> indet.	1, 4, 15, 22, 24
<i>Nymphon brevirostre</i>	24	<i>Perioculodes longimanus</i>	2, 4, 14, 15, 20, 21, 22
<i>Nymphon gracile</i>	22	<i>Pontocrates</i> spp.	14
<i>Nymphon hirtum</i>	24	<i>Pontocrates altamarinus</i>	4, 7, 8, 9, 10, 11, 14, 15, 19, 20, 21, 22, 24
<i>Achelia</i> spp.	24	<i>Pontocrates arenarius</i>	1, 4, 7, 8, 9, 11, 14, 15, 18, 19, 20, 21, 22, 24
<i>Achelia laevis</i>	24	<i>Westwoodilla caecula</i>	1, 5, 15
<i>Achelia longipes</i>	15	<i>Parapleustes bicuspis</i>	24
<i>Callipallene brevirostris</i>	24	<i>Amphilochidae</i> indet.	22, 24
<i>Callipallene emaciata</i>	24	<i>Amphilochus manudens</i>	24
<i>Anoplodactylus petiolatus</i>	22	<i>Paramphilochooides</i>	22
<i>Anoplodactylus pygmaeus</i>	22	<i>intermedius</i>	
<i>Phoxichilidium femoratum</i>	18	<i>Paramphilochooides odontonyx</i>	14
<i>Pycnogonidae</i> indet.	5, 8, 11, 18, 22, 24	<i>Leucothoe incisa</i>	1, 5, 20
<i>Pycnogonum</i> spp.	24	<i>Leucothoe lilljeborgi</i>	1, 14
<i>Pycnogonum littorale</i>	1, 2, 4, 7, 11, 14, 15, 18, 22, 24	<i>Cressa dubia</i>	24
<i>Arachnida</i> indet.	11	<i>Stenothoidae</i> indet.	22, 24
<i>Halacaridae</i> indet.	1, 2, 4, 5, 7, 11, 13, 14, 15, 18, 22, 24	<i>Metopa</i> spp.	22
		<i>Metopa latimana</i>	5
		<i>Hardametopa nasuta</i>	24
		<i>Stenothoe</i> spp.	2, 15, 22, 24
		<i>Stenothoe marina</i>	8
		<i>Hyale</i> spp.	15
		<i>Hyale prevostii</i>	2, 3, 10, 15, 18, 22

<i>Hyale pontica</i>	23	<i>Echinogammarus stoerensis</i>	3, 11
<i>Hyale stebbingi</i>	7	<i>Gammarus</i> spp.	5, 8, 19, 23
<i>Orchestia gammarellus</i>	10, 22	<i>Gammarus finmarchicus</i>	14
<i>Talitrus saltator</i>	15, 20, 22	<i>Gammarus locusta</i>	7, 15, 22
<i>Urothoe brevicornis</i>	14, 24	<i>Gammarus oceanicus</i>	20
<i>Urothoe elegans</i>	4	<i>Gammarus salinus</i>	7, 8, 9, 13, 19
<i>Urothoe poseidonis</i>	1, 2, 3, 4, 5, 8, 9, 11, 14, 22, 24	<i>Gammarus zaddachi</i>	11, 19
Phoxocephalidae indet.	4, 15, 22, 24	Melphidippidae indet.	20
<i>Harpinia</i> spp.	1, 2, 4, 5, 8, 15, 20, 22, 24	<i>Megaluropus agilis</i>	22
<i>Harpinia antennaria</i>	1, 2, 4, 5, 8, 14, 15, 20, 22, 24	Melitidae indet.	24
<i>Harpinia crenulata</i>	1, 2, 4, 5, 8, 14, 15, 24	<i>Abludomelita obtusata</i>	5, 15
<i>Harpinia pectinata</i>	1, 5, 8, 22	<i>Ceradocus semiserratus</i>	2, 8
<i>Parametaphoxus fultoni</i>	14	<i>Cheirocratus</i> spp.	5
<i>Phoxocephalus holbolli</i>	10	<i>Cheirocratus sundevallii</i>	2, 4, 5, 8
Lysianassidae indet.	1, 2, 20, 21, 22	<i>Maera</i> spp.	20
<i>Acidostoma obesum</i>	20	<i>Maera othonis</i>	2
<i>Hippomedon denticulatus</i>	8, 14, 15, 20, 22	<i>Melita</i> spp.	22, 24
<i>Orchomene humilis</i>	22	Ampithoidae indet.	2, 22
<i>Argissa hamatipes</i>	4, 20, 22	<i>Ampithoe</i> spp.	7, 22
<i>Stegocephaloides</i>	22	<i>Ampithoe (Pleonexes)</i> spp.	5
<i>christianiensis</i>		<i>Ampithoe ramondi</i>	14, 22
<i>Iphimedia minuta</i>	5	<i>Ampithoe rubricata</i>	10, 14, 22
<i>Liljeborgia pallida</i>	14	Isaeidae indet.	2, 5, 8, 14, 15, 22, 24
<i>Atylus</i> spp.	5, 8, 22, 24	<i>Gammaropsis</i> spp.	15, 24
<i>Atylus falcatus</i>	4, 9, 14, 15, 20, 21, 22, 24	<i>Gammaropsis maculata</i>	14, 24
<i>Atylus guttatus</i>	20, 22	<i>Gammaropsis nitida</i>	2
<i>Atylus swammerdami</i>	2, 5, 8, 9, 14, 15, 17, 18, 20, 21, 22, 24	<i>Gammaropsis palmata</i>	1, 4, 5, 14
<i>Atylus vedlomensis</i>	5, 8, 15, 22	<i>Microprotopus maculatus</i>	15
<i>Dexamine thea</i>	11	<i>Photis</i> spp.	14, 15, 22
<i>Guerneia coalita</i>	8, 22	<i>Photis longicaudata</i>	2, 5, 14, 15, 20, 22
Ampeliscidae indet.	15, 22, 24	<i>Photis pollex</i>	20
<i>Ampelisca</i> spp.	1, 2, 5, 8, 14, 15, 20, 22, 24	<i>Photis reinhardi</i>	2, 14, 22, 24
<i>Ampelisca aequicornis</i>	14	<i>Protomedeia fasciata</i>	4, 5, 20
<i>Ampelisca brevicornis</i>	1, 2, 8, 11, 14, 15, 20, 21, 22, 24	Ischyroceridae indet.	22
<i>Ampelisca diadema</i>	15, 22	<i>Erichthonius difformis</i>	15
<i>Ampelisca macrocephala</i>	4, 15	<i>Ischyrocerus anguipes</i>	8, 11, 14, 22, 24
<i>Ampelisca spinipes</i>	2, 5, 8, 14, 15, 22	<i>Jassa</i> spp.	8, 10, 11, 22, 24
<i>Ampelisca tenuicornis</i>	1, 2, 4, 5, 8, 14, 15, 22, 24	<i>Jassa falcata</i>	7, 8, 10, 18, 22, 24
<i>Ampelisca typica</i>	22	<i>Microjassa cumbrensis</i>	1, 4, 5
<i>Haploops tubicola</i>	22	<i>Parajassa pelagica</i>	5, 10
<i>Bathyporeia</i> spp.	1, 4, 14, 15, 18, 20, 22	Aoridae indet.	2, 5, 8, 15, 22, 24
<i>Bathyporeia elegans</i>	14, 15, 18, 19, 20, 22, 24	<i>Aora</i> spp.	22
<i>Bathyporeia gracilis</i>	22	<i>Aora gracilis</i>	14, 15, 20
<i>Bathyporeia guilliamsoniana</i>	10, 11, 15, 22	<i>Lembos</i> spp.	15, 22
<i>Bathyporeia pelagica</i>	1, 2, 4, 5, 7, 8, 11, 13, 14, 15, 19, 20, 22, 24	<i>Autonoe longipes</i>	15
<i>Bathyporeia pilosa</i>	3, 7, 8, 9, 11, 12, 13, 14, 16, 22, 24	<i>Leptocheirus hirsutimanus</i>	24
<i>Bathyporeia sarsi</i>	3, 4, 7, 9, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 24	<i>Corophium</i> spp.	1, 8, 10, 18, 20, 21, 24
<i>Bathyporeia tenuipes</i>	22	<i>Corophium affine</i>	14
<i>Haustorius arenarius</i>	1, 3, 4, 7, 8, 11, 14, 15, 16, 20, 22, 24	<i>Corophium bonnellii</i>	10
Gammaridae indet.	1, 2, 4, 5, 6, 7, 8, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24	<i>Corophium crassicorne</i>	11, 15, 20, 22
<i>Echinogammarus marinus</i>	4, 13, 15	<i>Corophium insidiosum</i>	18, 21
<i>Echinogammarus obtusatus</i>	7, 14	<i>Corophium voluator</i>	3, 7, 8, 9, 12, 13, 16, 17, 18, 19, 20, 21, 23
<i>Echinogammarus pirloti</i>	15	<i>Siphonoecetes kroyeranus</i>	1, 8, 14
		Podoceridae indet.	15, 22, 24
		<i>Dyopedos</i> spp.	15, 20, 22, 24
		<i>Dyopedos monacanthus</i>	1, 14, 15, 22
		<i>Dyopedos porrectus</i>	4, 5, 11, 14, 15, 22, 24
		Caprellidae indet.	5, 8, 10, 11, 14, 22, 24
		<i>Pariambus typicus</i>	1, 2, 5, 8, 14, 15, 20, 22, 24
		Cyamidae indet.	11
		Hyperidae indet.	4
		<i>Hyperia galba</i>	22
		<i>Phronima colletti</i>	15

Isopoda indet.	1, 2, 4, 5, 7, 8, 10, 15, 17, 18, 22, 23, 24	<i>Palaemon elegans</i>	1, 4, 5, 6, 22, 24
Gnathiidae indet.	15	<i>Palaemon serratus</i>	1, 4, 5, 6, 8, 10, 11, 14, 21, 22, 24
<i>Gnathia</i> spp.	2, 24	<i>Eualus</i> spp.	11
<i>Cyathura carinata</i>	22	<i>Eualus gaimardii</i>	6, 8
<i>Eurydice pulchra</i>	3, 4, 7, 8, 9, 11, 12, 13, 14, 15, 16, 20, 22, 24	<i>Eualus pusiolus</i>	1, 6, 10, 11, 22, 24
<i>Sphaeroma rugicauda</i>	22	<i>Hippolyte varians</i>	15, 22
<i>Jaera</i> spp.	7	<i>Spirontocaris spinus</i>	11
<i>Jaera albifrons</i>	2, 3, 4, 5, 7, 13, 14, 22	<i>Processa nouveli holthuisi</i>	15
<i>Janira</i> spp.	9	<i>Pandalina brevisrostris</i>	2, 4, 14, 22
<i>Munna</i> spp.	1, 15, 20, 22, 24	<i>Pandalus montagui</i>	1, 2, 4, 5, 6, 8, 10, 11, 15, 22, 24
<i>Idotea</i> spp.	2, 7, 8, 10, 11, 14, 15, 18, 22, 23	Crangonidae indet.	5
<i>Idotea baltica</i>	2, 8, 10, 11, 14, 15, 18, 24	<i>Crangon crangon</i>	1, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24
<i>Idotea emarginata</i>	4, 8	<i>Homarus gammarus</i>	1, 4, 6, 8, 10, 11, 14, 15, 22, 24
<i>Idotea granulosa</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 13, 14, 15, 18, 20, 22, 24	<i>Nephrops norvegicus</i>	22
<i>Idotea linearis</i>	22	<i>Philoceras trispinosus</i>	2
<i>Idotea pelagica</i>	8, 13, 22	<i>Upogebia deltaura</i>	22
<i>Zenobiana prismatica</i>	11	Anomura indet.	22
<i>Astacilla longicornis</i>	1, 4, 8, 10, 11, 15, 22	Paguroidea indet.	2, 15, 22, 24
<i>Ligia oceanica</i>	1, 2, 4, 5, 7, 8, 11, 14, 15, 18, 20, 22, 24	Paguridae indet.	5, 6, 8, 10, 11, 15, 22, 24
Tanaidacea indet.	1, 4, 14, 22	<i>Anapagurus chiroacanthus</i>	24
<i>Tanais dulongii</i>	11	<i>Anapagurus hyndmanni</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 15, 22, 24
<i>Araphura brevimana</i>	1, 2, 4, 5, 15	<i>Anapagurus laevis</i>	4, 5
<i>Leptognathia breviremis</i>	1, 2, 4, 5, 15	<i>Pagurus</i> spp.	8, 22
<i>Leptognathia gracilis</i>	1, 2, 4, 5, 8, 11, 14, 15	<i>Pagurus bernhardus</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 19, 20, 22, 24
<i>Leptognathia manca</i>	22	<i>Pagurus cuanensis</i>	2, 4, 6, 8, 11
<i>Tanaopsis graciloides</i>	1, 2, 5, 11, 15, 22	<i>Pagurus prideaux</i>	4, 5, 8, 18, 22, 24
<i>Tanaissus lilljeborgi</i>	13, 14, 18, 22	<i>Pagurus pubescens</i>	4, 5, 24
Cumacea indet.	17, 20, 22	<i>Galathea</i> spp.	2, 4, 5, 6, 8, 11, 15, 22, 24
<i>Cumopsis goodsiri</i>	11, 14, 15, 18, 19, 22, 24	<i>Galathea dispersa</i>	6, 10
<i>Vauntomponia cristata</i>	11	<i>Galathea intermedia</i>	1, 2, 4, 6, 8, 10, 11, 15
<i>Bodotria arenosa arenosa</i>	2, 8, 14, 22	<i>Galathea nexa</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 15, 22
<i>Bodotria pulchella</i>	14	<i>Galathea squamifera</i>	1, 2, 8, 10, 11, 14, 15, 22, 24
<i>Bodotria scorpionoides</i>	22	<i>Galathea strigosa</i>	1, 2, 5, 6, 8, 10, 11, 14, 15, 22, 24
<i>Iphinoe serrata</i>	20	<i>Munida rugosa</i>	4, 5, 6, 8, 11, 14, 15, 22
<i>Iphinoe trispinosa</i>	1, 8, 14, 15, 21, 22	Porcellanidae indet.	24
<i>Eudorella</i> spp.	15, 22	<i>Pisidia longicornis</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 20, 21, 22, 24
<i>Eudorella truncatula</i>	1, 2, 4, 5, 8, 14, 15, 20, 22, 24	<i>Porcellana platycheles</i>	1, 2, 4, 5, 6, 7, 8, 11, 14, 15, 22, 24
<i>Leucon nasica</i>	1, 14, 15	Brachyura indet.	15, 22
<i>Campylaspis costata</i>	8	<i>Ebalia</i> spp.	11, 22
Pseudocumatidae indet.	22	<i>Ebalia tuberosa</i>	10, 11, 22, 24
<i>Petalosarsia declivis</i>	5, 22	<i>Hyas</i> spp.	2, 8
<i>Pseudocuma gilsoni</i>	22	<i>Hyas araneus</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 22, 24
<i>Pseudocuma longicornis</i>	4, 11, 15, 18, 21, 22	<i>Hyas coarctatus</i>	1, 4, 5, 6, 8, 10, 11, 14, 15, 22, 24
<i>Pseudocuma similis</i>	24	Inachinae indet.	22, 24
<i>Hemilamprops rosea</i>		<i>Inachus</i> spp.	10, 11, 14, 24
<i>Lamprops fasciata</i>	8	<i>Inachus dorsettensis</i>	1, 4, 8, 11, 14, 15, 22, 24
Diastylidae indet.	1, 4, 5, 8, 15, 22	<i>Inachus leptochirus</i>	11, 24
<i>Diastylis</i> spp.	2, 4, 5, 14, 15, 18, 20, 22	<i>Inachus phalangium</i>	5, 8, 10, 11, 14, 15, 24
<i>Diastylis bradyi</i>	5, 14, 15, 17, 18, 20, 21, 22		
<i>Diastylis cornuta</i>	22		
<i>Diastylis laevis</i>	4, 15, 21		
<i>Diastylis lucifera</i>	1, 2, 4, 5, 14, 15, 20, 22		
<i>Diastylis rathkei typica</i>	14, 15, 20, 22, 24		
<i>Diastylis biplicata</i>	5		
Decapoda indet.	5, 11, 14, 15, 20, 22, 24		
Caridea indet.	4, 11, 14, 15, 22, 24		
Palaemonidae indet.	22		

<i>Macropodia</i> spp.	14, 15, 20	<i>Patella vulgata</i>	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24
<i>Macropodia rostrata</i>	2, 4, 5, 6, 8, 10, 11, 14, 15, 22, 24	<i>Helcion pellucidum</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 19, 22, 24
<i>Macropodia tenuirostris</i>	24	<i>Iothia fulva</i>	2
<i>Eurynome aspera</i>	11, 15	<i>Margarites helicinus</i>	1, 10
<i>Eurynome spinosa</i>	11	<i>Margarites undulata</i>	15
<i>Corystes cassivelaunus</i>	4, 8, 14, 15, 20, 22, 24	<i>Gibbula</i> spp.	14, 24
<i>Atelecyclus rotundatus</i>	2, 4, 5, 8, 11, 22	<i>Gibbula tunida</i>	2, 4, 5, 6, 8, 10, 11, 14
<i>Pirimela denticulata</i>	7	<i>Gibbula cineraria</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 20, 22, 24
<i>Cancer pagurus</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 20, 21, 22, 24	<i>Gibbula umbilicalis</i>	4, 5, 6, 11, 14
<i>Liocarcinus</i> spp.	14, 15, 20, 22, 24	<i>Calliostoma zizyphinum</i>	2, 4, 5, 6, 8, 10, 11, 14, 15, 22, 24
<i>Liocarcinus arcuatus</i>	24	<i>Skenea</i> spp.	8
<i>Liocarcinus depurator</i>	1, 5, 6, 8, 10, 11, 14, 15, 20, 22, 24	<i>Tricolia pullus</i>	15
<i>Liocarcinus holsatus</i>	14, 22, 24	<i>Lacuna pallidula</i>	5, 6, 7, 8, 10, 22, 24
<i>Liocarcinus marmoreus</i>	11	<i>Lacuna parva</i>	7, 11
<i>Liocarcinus puber</i>	1, 5, 8, 10, 11, 14, 15, 20, 22, 24	<i>Lacuna crassior</i>	8
<i>Liocarcinus pusillus</i>	1, 2, 4, 5, 6, 8, 10, 11	<i>Lacuna vineta</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 19, 21, 22, 24
<i>Carcinus maenas</i>	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24	<i>Littorina</i> spp.	18, 22
<i>Goneplax rhomboides</i>	14	<i>Littorina littorea</i>	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24
Xanthidae indet.	13	<i>Littorina maria</i>	1, 2, 4, 5, 6, 7, 11, 14, 15, 19, 21, 22
INSECTA		<i>Littorina obtusata</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 13, 14, 15, 17, 18, 21, 22, 24
<i>Chironomida</i> spp.	9, 22, 24	<i>Littorina neglecta</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 13, 14, 15, 21, 22, 24
<i>Collembola</i> spp.	15	<i>Littorina nigrolineata</i>	1, 4, 5, 7, 14, 15
Insecta indet.	4, 8, 15, 19, 22, 24	<i>Littorina saxatilis</i>	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 17, 18, 21, 22, 23, 24
<i>Petrobius maritimus</i>	2, 5, 11, 12, 15, 22, 24	<i>Littorina saxatilis arcana</i>	4
<i>Anurida maritima</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 21, 22, 24	<i>Littorina saxatilis var. rudis</i>	10
MOLLUSCA		<i>Littorina obtusata/mariae</i>	8, 11, 15, 22, 24
<i>Chaetoderma nitidulum</i>	1, 2, 4, 5, 8, 14, 15, 20, 22, 24	<i>Melarhaphé neritoides</i>	2, 4, 5, 7, 8, 10, 11, 14, 15, 22, 24
Polyplacophora indet.	5, 6, 8, 10, 11, 14, 15, 22, 24	<i>Hydrobia</i> spp.	13
<i>Leptochiton asellus</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 15, 17, 22, 24	<i>Hydrobia ulvae</i>	8, 9, 13, 17, 21
<i>Leptochiton cancellatus</i>	5, 6, 8, 15	<i>Potamopyrgus jenkinsi</i>	19, 22, 23
<i>Ischnochiton albus</i>	4	Rissoidae	4, 7, 11, 22
<i>Lepidochitona cinereus</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 14, 15, 22, 23, 24	<i>Rissoa</i> spp.	8, 11, 18, 22, 24
<i>Tonicella</i> spp.	4, 15, 22	<i>Rissoa interrupta</i>	1, 2, 7
<i>Tonicella marmorea</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 15, 22, 24	<i>Rissoa parva</i>	1, 2, 4, 5, 7, 8, 10, 11, 14, 15, 18, 19, 21
<i>Tonicella rubra</i>	1, 2, 4, 5, 7, 8, 10, 11, 14, 15, 22, 24	<i>Alvania semistriata</i>	1
<i>Callochiton septemvalvis</i>	10, 15	<i>Cingula cingillus</i>	5
Acanthochitonidae	11	<i>Onoba aculeus</i>	4
<i>Acanthochiton</i> spp.	11	<i>Onoba semicostata</i>	7, 22
<i>Acanthochitona crinita</i>	1, 2, 5, 7, 8, 10, 11, 14	<i>Skeneopsis planorbis</i>	4, 5, 6, 7, 10
Gastropoda indet.	2, 11, 14, 15, 20, 22, 24	<i>Turritella communis</i>	1, 2, 4, 14, 15, 20, 22
<i>Emarginula</i> spp.	22	<i>Chrysallida indistincta</i>	22
<i>Emarginula fissura</i>	2, 4, 8, 11, 15	<i>Odostomia plicata</i>	5
<i>Tectura testudinalis</i>	1, 2, 5, 6, 8, 10, 11, 14, 15, 22	<i>Brachystomia scalaris</i>	4
<i>Tectura virginea</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 22, 24	<i>Eulimella</i> spp.	22
<i>Patella</i> spp.	8, 11, 24	<i>Eulimella laevis</i>	5, 22
<i>Patella ulyssiponensis</i>	4, 5, 7, 10, 11, 14, 15, 22, 24	<i>Eulimella ventricosa</i>	5

<i>Aporrhais pespelecani</i>	2, 4, 5, 14, 15, 22	<i>Onchidoris sparsa</i>	14
<i>Aporrhais serresianus</i>	4	<i>Diapharodoris luteocincta</i>	1, 2, 5, 8, 11
<i>Trivia</i> spp.	7, 10	<i>Aegires punctilucens</i>	7, 15
<i>Trivia arctica</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 22, 24	<i>Limacia clavigera</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 22, 24
<i>Trivia monacha</i>	2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 24	<i>Polycera</i> spp.	5, 11, 22, 24
<i>Lamellaria latens</i>	11	<i>Polycera faeroensis</i>	5, 8, 15, 24
<i>Lamellaria perspicua</i>	4	<i>Polycera quadrilineata</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 22, 24
<i>Velutina plicatilis</i>	5	<i>Palio nothus</i>	21
<i>Velutina velutina</i>	11	<i>Cadlina laevis</i>	1, 2, 4, 5, 7, 8, 10, 11, 14, 24
<i>Polinices</i> spp.	15, 22, 24	<i>Rostanga rubra</i>	5
<i>Polinices poliana</i>	1, 5, 6, 8, 10, 11, 14, 15, 20, 22	<i>Archidoris pseudoargus</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 15, 21, 22, 24
<i>Trophon truncatus</i>	24	<i>Jorunna</i> spp.	14
<i>Nucella lapillus</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 20, 22, 24	<i>Jorunna tomentosa</i>	4, 6, 7, 10, 11, 14, 15, 22, 24
<i>Ocenebra erinacea</i>	5, 11, 14	<i>Janolus cristatus</i>	1, 4, 5, 6, 8, 11, 14, 15, 22, 24
Buccinidae indet.	22	<i>Coryphella</i> spp.	10, 11, 20
<i>Buccinum undatum</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 13, 14, 15, 22, 24	<i>Coryphella browni</i>	4, 8, 10, 11
<i>Neptunea antiqua</i>	4, 14, 15, 22	<i>Coryphella gracilis</i>	14, 15
<i>Colus gracilis</i>	13	<i>Coryphella lineata</i>	1, 5, 8, 22, 24
<i>Hinia</i> spp.	5, 11, 24	<i>Coryphella verrucosa</i>	15
<i>Hinia incrassata</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 22, 24	<i>Flabellina pedata</i>	10, 22, 24
<i>Hinia reticulata</i>	1, 2, 5, 6, 7, 22, 24	<i>Cuthona</i> spp.	8, 22
<i>Mangelia nebula</i>	5	<i>Cuthona concinna</i>	10, 15, 22
Opisthobranchia indet.	9, 14, 22, 24	<i>Cuthona rubescens</i>	15
<i>Acteon tornatilis</i>	5	<i>Tergipes tergipes</i>	15
<i>Cylichna cylindracea</i>	1, 2, 4, 5, 8, 14, 15, 20, 22	<i>Eubbranchus</i> spp.	15
<i>Philine</i> spp.	1, 15, 20, 22, 24	<i>Eubbranchus farrani</i>	5, 6, 8, 15, 22, 24
<i>Philine aperta</i>	15	<i>Eubbranchus pallidus</i>	5, 22
<i>Philine punctata</i>	19, 21	<i>Eubbranchus tricolor</i>	1, 5, 8, 15, 24
<i>Philine scabra</i>	20, 22	<i>Facelina</i> spp.	5, 10, 24
<i>Diaphana minuta</i>	22	<i>Facelina annulicornis</i>	15
Retusidae indet.	22	<i>Facelina auriculata</i>	4, 5, 7
<i>Retusa</i> spp.	1, 5, 8	<i>Facelina bostoniensis</i>	5, 8, 14, 22, 24
<i>Retusa obtusa</i>	1, 9	<i>Caloria elegans</i>	22
<i>Retusa truncatula</i>	7	<i>Aeolidia</i> spp.	8, 14
<i>Retusa umbilicata</i>	8	<i>Aeolidia papillosa</i>	1, 5, 8, 11
<i>Elysia viridis</i>	24	<i>Aeolidiella alderi</i>	5
<i>Akera bullata</i>	8	<i>Aeolidiella glauca</i>	10
<i>Aplysia punctata</i>	2, 8, 11, 14, 24	Scaphopoda indet.	8
<i>Tritonia</i> spp.	22	<i>Antalis entalis</i>	1, 2, 14, 20
<i>Tritonia hombergii</i>	1, 2, 4, 5, 10, 11, 14, 15, 22, 24	Pelecypoda indet.	1, 2, 5, 8, 9, 11, 14, 15, 17, 18, 19, 20, 21, 22, 24
<i>Tritonia plebeia</i>	1, 5, 8, 22	Nuculacea indet.	24
<i>Dendronotus frondosus</i>	1, 5, 6, 10, 14, 22, 24	<i>Nucula</i> spp.	5
<i>Doto</i> spp.	1, 4, 8, 11, 14, 15, 22	<i>Nucula nitidosa</i>	2, 8, 14, 15, 20, 21, 22, 24
<i>Doto coronata</i>	2, 4, 5, 8, 11, 15, 24	<i>Nucula nucleus</i>	1, 2, 5, 14, 15, 22, 24
<i>Doto fragilis</i>	6, 8, 15, 22	<i>Nuculoma</i> spp.	14
<i>Goniodoris</i> spp.	24	<i>Nuculoma tenuis</i>	1, 2, 4, 5, 14, 15, 18, 20, 21, 22
<i>Goniodoris castanea</i>	1, 5, 6, 8	<i>Jupiteria minuta</i>	2, 4, 5, 8, 14, 15, 22, 24
<i>Goniodoris nodosa</i>	1, 2, 4, 5, 6, 8, 14, 15, 20, 22, 24	Mytilidae indet.	15, 19, 20, 21, 22
<i>Ancula gibbosa</i>	5, 11, 14	<i>Mytilus edulis</i>	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24
Onchidorididae indet.	15	<i>Musculus</i> spp.	15, 22
<i>Acanthodoris pilosa</i>	5, 6, 7, 8, 10, 11, 22, 24	<i>Musculus discors</i>	1, 5, 7, 22
<i>Adalaria proxima</i>	5, 6	<i>Modiolarca tumida</i>	5
<i>Onchidoris</i> spp.	14, 15		
<i>Onchidoris bilamellata</i>	1, 2, 4, 5, 6, 7, 8, 11, 14, 15, 22, 24		
<i>Onchidoris depressa</i>	8, 11		
<i>Onchidoris muricata</i>	2, 11, 14, 22, 24		

<i>Modiolus modiolus</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 13, 14, 15, 18, 21, 22, 24	<i>Ensis</i> spp.	1, 2, 4, 6, 8, 11, 14, 15, 20, 22, 24
<i>Modiolula phaseolina</i>	14	<i>Ensis arcuatus</i>	4, 8, 11, 22
<i>Arca tetragona</i>	8	<i>Ensis ensis</i>	4, 11, 14, 15, 22
Limacea indet.	8	<i>Ensis siliqua</i>	1, 2, 5, 8, 11, 14, 22, 24
Pectinidae indet.	22, 24	<i>Phaxas pellucidus</i>	1, 2, 4, 5, 8, 14, 15, 20, 21, 22, 24
<i>Palliolum tigrinum</i>	1, 2, 4, 8, 15, 22	Tellinacea indet.	1, 2, 4, 5, 15, 20, 22
<i>Chlamys</i> spp.	4, 8, 11	<i>Angulus</i> spp.	22
<i>Chlamys distorta</i>	1, 2, 4, 5, 6, 8, 10, 11, 15	<i>Angulus tenuis</i>	1, 2, 3, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24
<i>Chlamys varia</i>	1, 2, 4, 8, 11, 14, 15, 22	<i>Fabulina fabula</i>	2, 4, 8, 11, 14, 15, 18, 19, 20, 21, 22
<i>Aequipecten opercularis</i>	1, 6, 8, 14, 15, 20	<i>Moerella pygmaea</i>	10
<i>Pecten maximus</i>	8, 11, 24	<i>Macoma balthica</i>	3, 7, 8, 9, 11, 12, 13, 16, 17, 18, 19, 21, 22, 23
Anomiidae indet.	7, 8, 10, 11, 14, 15, 22, 24	<i>Donax vittatus</i>	2, 7, 8, 9, 11, 13, 14, 20, 21, 22, 24
<i>Anomia</i> spp.	1, 5, 6, 8, 11, 14, 15, 21, 22, 24	<i>Gari</i> spp.	1, 2, 4, 5, 15, 22, 24
<i>Anomia ephippium</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 13, 14, 15, 18, 19, 20, 21, 22, 24	<i>Gari fervensis</i>	1, 2, 5, 11, 14, 15, 20, 22, 24
<i>Heteranomia squamula</i>	1, 8, 10, 11, 24	<i>Gari costulata</i>	22
<i>Pododesmus</i> spp.	4, 7, 14, 22	<i>Gari depressa</i>	22
<i>Pododesmus patelliformis</i>	1, 2, 4, 5, 6, 8, 10, 11, 13, 14, 15, 17, 18, 22, 24	<i>Scrobicularia plana</i>	3, 12, 21
<i>Lucinoma borealis</i>	1, 4, 5, 8, 9, 11, 14, 15, 20	<i>Abra</i> spp.	4, 5, 14, 15, 17, 20, 21, 22, 24
<i>Thyasira</i> spp.	22	<i>Abra alba</i>	1, 2, 4, 5, 7, 8, 11, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24
<i>Thyasira flexuosa</i>	1, 2, 4, 5, 8, 14, 15, 17, 20, 21, 22	<i>Abra nitida</i>	1, 2, 4, 5, 14, 15, 17, 18, 20, 22, 24
<i>Thyasira obsoleta</i>	22	<i>Abra prismatica</i>	2, 8, 11, 14, 15, 20, 22, 24
Galeommatacea indet.	22	<i>Abra tenuis</i>	2, 8, 9, 13, 17
<i>Lasaea adansonii</i>	8, 10, 11	<i>Arctica islandica</i>	11, 14, 15, 20, 21, 22
<i>Kellia suborbicularis</i>	2, 4, 5, 8, 14, 15, 18, 20, 21, 22	<i>Venus</i> spp.	10
Montacutidae indet.	22	<i>Venus verrucosa</i>	11
<i>Montacuta</i> spp.	14	<i>Circumphalus casina</i>	10, 11
<i>Montacuta substriata</i>	5	<i>Gouldia minima</i>	5
<i>Mysella bidentata</i>	1, 2, 4, 5, 8, 10, 11, 14, 15, 17, 18, 20, 21, 22, 23, 24	<i>Dosinia</i> spp.	1, 2, 4, 5, 15, 20, 21, 22
<i>Tellimya ferruginosa</i>	1, 2, 4, 5, 8, 11, 14, 15, 20, 22, 24	<i>Dosinia lupinus</i>	1, 2, 4, 5, 8, 11, 14, 15, 18, 20, 21, 22, 24
<i>Astarte sulcata</i>	22	<i>Dosinia exoleta</i>	2, 5, 10, 11, 14, 15, 22
<i>Goodallia triangularis</i>	10, 22	<i>Venerupis senegalensis</i>	8, 18, 21, 24
<i>Tridonta montagui</i>	5, 8, 15, 22	<i>Chamelea gallina</i>	1, 2, 4, 5, 7, 8, 9, 10, 11, 14, 15, 18, 20, 21, 22
Cardiidae indet.	2, 14, 15, 20, 22, 24	<i>Clausinella fasciata</i>	1, 2, 22
<i>Acanthocardia</i> spp.	15, 20, 22	<i>Timoclea ovata</i>	8, 10, 22
<i>Acanthocardia aculeata</i>	22	<i>Turtonia minuta</i>	7, 15, 22
<i>Acanthocardia echinata</i>	14, 15, 20, 22	Myidae indet.	8, 18, 22, 24
<i>Parvicardium ovale</i>	2, 5, 8, 22	<i>Mya truncata</i>	4, 8, 11, 14, 15, 22
<i>Parvicardium scabrum</i>	5, 10	<i>Mya arenaria</i>	8, 15, 17, 18, 20, 21, 22
<i>Laevicardium crassum</i>	22	<i>Sphenia binghami</i>	1, 2, 4, 5, 8, 15, 20, 22, 24
<i>Cerastoderma edule</i>	3, 7, 8, 9, 13, 16, 17, 18, 20, 21, 23	<i>Corbula gibba</i>	1, 2, 5, 8, 14, 15, 17, 20, 21, 22
<i>Cerastoderma glaucum</i>	11	<i>Hiatella arctica</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 20, 22, 24
Mactridae indet.	5, 15, 20, 22, 24	Pholadacea indet.	20
<i>Mactra stultorum</i>	15, 20, 22, 24	Pholadidae indet.	4, 15
<i>Mactra glauca</i>	14	<i>Pholas dactylus</i>	2, 4, 6, 8, 11, 22, 24
<i>Spisula</i> spp.	10, 14, 20, 22	<i>Zirfaea crispata</i>	11, 20, 22, 24
<i>Spisula elliptica</i>	1, 2, 4, 10, 14, 15, 18, 20, 21, 22, 24	Pandoracea indet.	1
<i>Spisula solida</i>	10, 22	<i>Thracia</i> spp.	1, 2, 5, 20, 22
<i>Spisula subtruncata</i>	18, 22	<i>Thracia phaseolina</i>	8, 10
<i>Lutraria</i> spp.	22	<i>Thracia pubescens</i>	24
<i>Lutraria lutraria</i>	5, 8		
Solenidae indet.	1, 2, 14, 15, 20, 22		

<i>Thracia villosiuscula</i>	2, 5, 14	<i>Hippothoa divaricata</i>	6
Cephalopoda indet.	1, 8	<i>Celleporella hyalina</i>	5
<i>Sepia officinalis</i>	15	<i>Cellepora pumicosa</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 22, 24
<i>Sepiolo atlantica</i>	10, 22	<i>Celleporina hassallii</i>	1, 8, 11
<i>Eledone cirrhosa</i>	1, 5, 8, 10, 11, 15, 20, 22	<i>Turbicellepora avicularis</i>	5, 8
BRYOZOA		<i>Omalosecosa ramulosa</i>	4, 5, 6, 14, 15
Cyclostomatidae indet.	1, 4, 5, 15, 22	<i>Buskea dichotoma</i>	15
Crisiidae indet.	1, 2, 5, 6, 8, 10, 11, 14, 15, 22, 24	<i>Scruparia chelata</i>	8
<i>Crisidia cornuta</i>	6, 8, 10, 24	<i>Eucratea loricata</i>	1, 5, 6, 8, 10, 11, 14, 15, 22, 24
<i>Crisia</i> spp.	10	<i>Membranipora membranacea</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 19, 20, 22, 24
<i>Crisia aculeata</i>	8, 10, 24	<i>Conopeum</i> spp.	11
<i>Crisia denticulata</i>	11, 24	<i>Conopeum reticulum</i>	11
<i>Crisia eburnea</i>	1, 4, 5, 6, 8, 10, 11, 14, 22, 24	<i>Conopeum seurati</i>	18
<i>Crisia ramosa</i>	8	<i>Electra pilosa</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 13, 14, 15, 18, 19, 20, 21, 22, 24
Tubuliporidae indet.	6, 8	<i>Flustra foliacea</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 15, 20, 22, 24
<i>Tubulipora</i> spp.	11	<i>Securiflustra securifrons</i>	5, 6, 8, 10, 11, 14, 15, 20, 22, 24
<i>Tubulipora liliacea</i>	5, 22	<i>Amphiblestrum auritum</i>	5
Diastoporidae indet.	8	<i>Callopora craticula</i>	8
<i>Plagioecia patina</i>	5, 6, 8, 24	<i>Callopora dumerilii</i>	8
<i>Disporella hispida</i>	14, 15, 22	<i>Cauloramphus spiniferum</i>	7, 11
<i>Alcyonidium</i> spp.	7, 11, 24	<i>Membraniporella nitida</i>	5, 11
<i>Alcyonidium cellarioides</i>	24	<i>Cellaria</i> spp.	4, 5, 11, 15, 22
<i>Alcyonidium diaphanum</i>	2, 4, 5, 6, 8, 10, 11, 14, 15, 20, 22, 24	<i>Cellaria fistulosa</i>	5, 6, 8, 24
<i>Alcyonidium gelatinosum</i>	1, 2, 5, 6, 7, 8, 10, 11, 14, 20	<i>Cellaria sinuosa</i>	5, 6, 8, 11, 15, 24
<i>Alcyonidium hirsutum</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 22, 24	<i>Scrupocellaria</i> spp.	1, 2, 4, 5, 6, 8, 10, 11, 15, 22, 24
<i>Alcyonidium mytili</i>	5, 7, 11, 14	<i>Scrupocellaria reptans</i>	1, 2, 5, 10, 11, 24
<i>Alcyonidium parasiticum</i>	1, 4, 5, 6, 8, 10, 11, 14, 15, 22, 24	<i>Scrupocellaria scruposa</i>	1, 2, 5, 6, 8, 10, 11, 14, 15, 22, 24
<i>Flustrellidra hispida</i>	1, 2, 4, 5, 7, 8, 10, 11, 14, 15, 22, 24	<i>Tricellaria ternata</i>	10, 11
<i>Walkeria uva</i>	22	<i>Bicellariella ciliata</i>	10, 11, 22, 24
<i>Vesicularia spinosa</i>	22, 24	<i>Bugula</i> spp.	6, 10, 11, 22, 24
<i>Bowerbankia</i> spp.	8, 15	<i>Bugula avicularia</i>	8, 10, 24
<i>Bowerbankia gracilis</i>	8, 24	<i>Bugula flabellata</i>	1, 2, 5, 6, 8, 10, 11, 14, 22, 24
<i>Bowerbankia pustulosa</i>	24	<i>Bugula plumosa</i>	2, 5, 6, 8, 15, 22, 24
<i>Ascophora</i> indet.	24	<i>Bugula purpurotincta</i>	11, 22
<i>Cribrilina</i> spp.	5	<i>Bugula stolonifera</i>	15
<i>Cribrilina annulata</i>	1	<i>Bugula turbinata</i>	8, 11, 14, 24
<i>Cribrilina cryptoecium</i>	11, 24	Bryozoan indet. crusts	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 20, 21, 22, 23, 24
<i>Cribrilina punctata</i>	5	PHORONIDA	
<i>Umbonula</i> spp.	11	<i>Phoronis</i> spp.	1, 2, 4, 5, 8, 14, 15, 20, 22, 24
<i>Umbonula littoralis</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 19, 20, 22, 24	<i>Phoronis muelleri</i>	10, 17
<i>Escharoides coccinea</i>	5, 6, 8, 10, 11, 24	ECHINODERMATA	
<i>Cryptosula pallasiana</i>	7, 11	<i>Antedon bifida</i>	6, 8, 11, 14, 15, 20, 22
<i>Smittina</i> spp.	11	Asteroidea indet.	15, 24
<i>Smittina landsborovii</i>	8, 10, 11, 24	<i>Astropecten irregularis</i>	8, 10, 14
<i>Smittoidea</i> spp.	24	<i>Asterina gibbosa</i>	5, 7, 8, 15
<i>Parasmittina trispinosa</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 22	<i>Solaster endeca</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 15, 22
<i>Porella compressa</i>	4, 8	<i>Crossaster papposus</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 15, 22, 24
<i>Escharella immersa</i>	5, 6, 8, 11, 24		
<i>Schizoporella</i> spp.	10		
<i>Schizoporella unicornis</i>	7, 11, 14, 22		
<i>Schizomavella</i> spp.	8		
<i>Schizomavella auriculata</i>	8		
<i>Schizomavella linearis</i>	5, 7, 8, 11		
<i>Phaeostachys spinifera</i>	11		
<i>Microporella ciliata</i>	6, 8		

<i>Henricia</i> spp.	2, 4, 5, 7, 8, 10, 11, 14, 15, 20, 22, 24	<i>Polyclinum aurantium</i>	1, 4, 5, 6, 7, 8, 10, 11, 14, 22, 24
<i>Henricia oculata</i>	5, 15, 22	<i>Synoicum pulmonaria</i>	11
<i>Henricia sanguinolenta</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 22, 24	<i>Morchellium argus</i>	1, 2, 5, 8, 11, 15, 24
<i>Asterias rubens</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 20, 21, 22, 24	<i>Sidnyum</i> spp.	5, 10, 11
<i>Leptasterias muelleri</i>	1, 8, 10, 11	<i>Sidnyum turbinatum</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 20, 22, 24
Ophiuroidea indet.	14, 18, 21, 22, 24	<i>Aplidium</i> spp.	1, 8, 11, 14, 24
<i>Ophiothrix</i> spp.	24	<i>Aplidium glabrum</i>	2, 5, 11
<i>Ophiothrix fragilis</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 20, 22, 24	<i>Aplidium nordmanni</i>	1, 10, 11, 22, 24
<i>Ophiocomina nigra</i>	1, 2, 4, 5, 6, 8, 10, 11	<i>Aplidium proliferum</i>	11, 24
<i>Ophiactis</i> spp.	24	<i>Aplidium punctum</i>	8, 14, 22, 24
<i>Ophiactis balli</i>	4, 11, 22, 24	Didemnidae indet.	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 22, 24
<i>Ophiopholis aculeata</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 20, 22, 24	<i>Tridemnum cereum</i>	11
<i>Amphiura</i> spp.	1, 2, 4, 5, 8, 14, 15, 20, 22, 24	<i>Didemnum</i> spp.	11
<i>Amphiura brachiata</i>	10, 15	<i>Didemnum maculosum</i>	1, 2, 5, 6, 11, 15, 22, 24
<i>Amphiura chiajei</i>	15, 20	<i>Diplosoma</i> spp.	7, 8
<i>Amphiura filiformis</i>	1, 2, 4, 5, 8, 14, 15, 20, 22, 24	<i>Diplosoma listerianum</i>	1, 5, 6, 8, 10, 11, 24
<i>Amphiura chiajei/filiformis</i>	8	<i>Diplosoma spongiforme</i>	5, 8
<i>Amphipholis squamata</i>	1, 2, 4, 5, 6, 7, 8, 11, 14, 15, 20, 22, 24	<i>Lissoclinum perforatum</i>	5, 8, 11, 24
<i>Ophiura</i> spp.	1, 2, 4, 5, 8, 14, 15, 20, 22, 24	<i>Ciona intestinalis</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 15, 18, 22, 24
<i>Ophiura affinis</i>	5, 22	<i>Diazona violacea</i>	8
<i>Ophiura albida</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 20, 22, 24	<i>Perophora listeri</i>	22, 24
<i>Ophiura ophiura</i>	11, 14, 15, 20, 22, 24	<i>Corella parallelogramma</i>	2, 4, 5, 6, 8, 10, 11, 14, 15, 20, 22
Echinoidea indet.	15, 20, 22, 24	<i>Asciidiella</i> spp.	5, 11
Echinidae indet.	14	<i>Asciidiella aspersa</i>	1, 2, 15, 24
<i>Psammechinus miliaris</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 20, 22, 24	<i>Asciidiella scabra</i>	1, 2, 4, 5, 8, 15, 22, 24
<i>Echinus esculentus</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 20, 22, 24	<i>Ascidia</i> spp.	24
<i>Echinocyamus pusillus</i>	5, 8, 15, 24	<i>Ascidia conchilega</i>	2, 4, 5, 8, 10, 11, 14, 15, 22, 24
Spatangoidae indet.	22	<i>Ascidia mentula</i>	4, 22
<i>Echinocardium</i> spp.	15, 20, 22, 24	<i>Pelonaia corrugata</i>	20
<i>Echinocardium cordatum</i>	1, 2, 4, 5, 6, 8, 11, 14, 15, 20, 22, 24	<i>Polycarpa</i> spp.	15
<i>Echinocardium flavescens</i>	5, 11	<i>Polycarpa pomaria</i>	8, 11, 14, 24
Holothurioideae indet.	4, 8, 14, 15, 22	<i>Polycarpa scuba</i>	1, 4, 6, 7, 10, 11, 15, 22
Holothuriidae indet.	14	<i>Dendrodoa grossularia</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 22, 24
<i>Holothuria</i> spp.	14	<i>Botryllus schlosseri</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 20, 22, 24
<i>Cucumaria</i> spp.	15	<i>Botrylloides leachi</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 20, 22, 24
<i>Leptopentacta elongata</i>	1, 15, 20	<i>Pyura</i> spp.	14
<i>Paracucumaria hyndmani</i>	22	<i>Molgula</i> spp.	15, 24
<i>Pawsonia saxicola</i>	10	<i>Molgula citrina</i>	14
<i>Aslia lefevrei</i>	5	<i>Molgula complanata</i>	11
<i>Ocnus planci</i>	22	<i>Molgula manhattensis</i>	4, 5, 10, 11, 22, 24
<i>Pseudothyone raphanus</i>	20, 22	<i>Molgula oculata</i>	15
<i>Neopentadactyla mixta</i>	11	PISCES	
<i>Psolus phantapus</i>	1, 2, 4, 5, 20, 22	<i>Myxine glutinosa</i>	15
<i>Leptosynapta inhaerens</i>	1, 2, 4, 5, 14, 15	Osteichthyes indet.	22, 24
<i>Labidoplax buski</i>	20	<i>Anguilla anguilla</i>	4, 7, 18, 23, 24
TUNICATA		<i>Conger conger</i>	24
Asciadiacea indet.	2, 4, 5, 8, 22, 24	<i>Salmo salar</i>	22
<i>Clavelina lepadiformis</i>	1, 2, 4, 5, 6, 8, 10, 11, 15, 20, 22, 24	<i>Lepadogaster lepadogaster</i>	4, 22
<i>Archidistoma aggregatum</i>	24	<i>Lophius piscatorius</i>	8, 11, 22
		Gadidae indet.	10, 24
		<i>Ciliata mustela</i>	11, 15, 22, 23, 24
		<i>Gadus morhua</i>	6, 8, 15, 22, 24
		<i>Gaidropsarus mediterraneus</i>	22
		<i>Gaidropsarus vulgaris</i>	10
		<i>Molva molva</i>	6, 8

<i>Pollachius pollachius</i>	5, 6, 8, 10, 11, 22, 24	<i>Porphyra</i> spp.	1, 2, 4, 5, 7, 8, 10, 11, 14, 15, 19, 22, 23, 24
<i>Pollachius virens</i>	2, 5, 6, 8, 10, 11, 22, 24	<i>Porphyra leucosticta</i>	4, 5, 7
<i>Trisopterus luscus</i>	8, 10, 15	<i>Porphyra linearis</i>	22, 24
<i>Gasterosteus aculeatus</i>	5, 6	<i>Porphyra purpurea</i>	1, 2, 4, 5, 7, 8, 12, 13, 14, 15, 19, 20, 21, 22
<i>Spinachia spinachia</i>	6, 24	<i>Porphyra umbilicalis</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 13, 14, 15, 16, 18, 20, 21, 22, 23, 24
<i>Nerophis lumbriciformis</i>	14	<i>Audouinella</i> spp.	1, 4, 5, 6, 7, 8, 10, 11, 13, 14, 15, 18, 19, 20, 21, 22, 23, 24
<i>Scorpaena scrofa</i>	24	<i>Audouinella conchicola</i>	15
<i>Aspitrigla cuculus</i>	22	<i>Audouinella purpurea</i>	5, 15
<i>Myoxocephalus scorpius</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 21, 22, 24	<i>Helminthora divaricata</i>	7
<i>Taurulus bubalis</i>	1, 5, 6, 10, 11, 15, 22, 24	<i>Nemalion</i> spp.	22
<i>Agonus cataphractus</i>	4, 8, 10, 11, 15, 24	<i>Atractophora</i> spp.	22
<i>Cyclopterus lumpus</i>	5, 8, 11, 14, 15, 22	<i>Rhodothamniella floridula</i>	4, 6, 7, 15, 24
<i>Liparis montagui</i>	11, 22	<i>Bonnemaisonia asparagoides</i>	1, 2, 5, 6, 8, 10
<i>Crenilabrus melops</i>	11	<i>Bonnemaisonia hamifera</i>	1, 5, 8, 10, 22
<i>Ctenolabrus rupestris</i>	8, 11, 24	<i>Gelidium</i> spp.	1, 8
<i>Labrus bergylta</i>	5, 6, 8, 10, 11, 15, 22, 24	<i>Gelidium latifolium</i>	1, 2, 4, 5, 6, 7, 11, 14
<i>Labrus mixtus</i>	1	<i>Gelidium pusillum</i>	1, 4, 5, 8, 10, 11, 14
<i>Trachinus</i> spp.	22	<i>Palmariaceae</i> indet.	22
<i>Echiichthys vipera</i>	14, 15, 20, 22, 24	<i>Palmaria palmata</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 20, 22, 23, 24
<i>Blennius</i> spp.	22	<i>Dilsea carnosa</i>	1, 2, 4, 5, 7, 8, 10, 11, 14, 15, 22, 24
<i>Lipophrys pholis</i>	2, 4, 5, 6, 7, 10, 11, 14, 15, 22, 24	<i>Dumontia contorta</i>	1, 2, 4, 5, 6, 7, 8, 11, 14, 15, 20, 22, 24
<i>Parablennius gattorugine</i>	11, 15	<i>Callophyllis cristata</i>	10
<i>Anarhichas lupus</i>	1, 8, 15	<i>Callophyllis laciniata</i>	1, 2, 5, 6, 8, 10, 11, 24
<i>Chirolophis ascanii</i>	1, 2, 5, 8, 11, 15, 24	<i>Gloiosiphonia capillarlis</i>	24
<i>Zoarces viviparus</i>	8, 11, 24	<i>Peyssonnelia</i> spp.	11
<i>Pholis gunnellus</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 21, 22, 23, 24	<i>Hildenbrandia</i> spp.	8, 10, 11, 14, 15, 22, 24
<i>Ammodytes</i> spp.	4, 9, 10, 11, 15, 22	<i>Hildenbrandia rubra</i>	1, 2, 4, 5, 6, 7, 11, 13, 14, 17, 18, 21, 23
<i>Ammodytes marinus</i>	22	<i>Corallinaceae</i> indet.	1, 2, 4, 5, 6, 7, 8, 10, 11, 13, 14, 15, 18, 20, 22, 24
<i>Ammodytes tobianus</i>	1, 2, 4, 5, 6, 7, 8, 11, 14, 18, 20, 22	<i>Corallina officinalis</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 22, 24
<i>Callionymus</i> spp.	10	<i>Lithophyllum</i> spp.	15
<i>Callionymus lyra</i>	8, 11, 14, 15, 22, 24	<i>Lithophyllum incrustans</i>	15
<i>Gobiidae</i> indet.	8, 15	<i>Lithophyllum orbiculatum</i>	4, 5, 6, 7
<i>Gobius</i> spp.	22	<i>Lithothamnion</i> spp.	2, 4, 5, 7, 8, 11, 14, 15, 22
<i>Gobiusculus flavescens</i>	1, 2, 5, 6, 8, 15, 22	<i>Lithothamnion glaciale</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 22, 24
<i>Pomatoschistus</i> spp.	1, 2, 4, 5, 8, 11, 15, 20, 22	<i>Lithothamnium sonderi</i>	11, 14, 15
<i>Pomatoschistus microps</i>	2	<i>Melobesia membranacea</i>	15, 22
<i>Pomatoschistus minutus</i>	2, 4, 6, 10, 11, 22, 24	<i>Phymatolithon</i> spp.	5, 6, 11, 14, 15
<i>Pomatoschistus pictus</i>	10, 11	<i>Phymatolithon laevigatum</i>	11, 14, 22
<i>Thorogobius ephippiatus</i>	1, 2, 8, 22, 24	<i>Phymatolithon lenormandii</i>	1, 4, 5, 6, 7, 11, 14, 15, 18, 22
<i>Phrynorhombus norvegicus</i>	1, 2, 4, 5, 6, 8, 15, 22	<i>Pneophyllum concollum</i>	24
<i>Phrynorhombus regius</i>	8	<i>Titanoderma pustulatum</i>	1, 6, 7, 11, 14, 15, 22
<i>Psetta maxima</i>	20	<i>Maerl</i> indet.	8
<i>Zeugopterus punctatus</i>	4, 5, 6, 8, 10, 11, 14, 15, 22, 24	<i>Gigartinales</i> indet.	14
<i>Pleuronectidae</i> indet.	1, 2, 4, 5, 6, 8, 10, 11, 20, 22, 24	<i>Gracilaria gracilis</i>	11, 14
<i>Limanda limanda</i>	8, 14, 20, 21	<i>Ahnfeltia plicata</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 15, 18, 22, 24
<i>Platichthys flesus</i>	22	<i>Erythordermis traillii</i>	2, 5, 6, 7, 10, 15, 22, 24
<i>Pleuronectes platessa</i>	5, 8, 10, 11, 14, 15, 20, 22, 24		
<i>Buglossidium luteum</i>	2		
<i>Solea solea</i>	22, 24		
CYANOPHYCOTA			
<i>Beggiatoa</i> spp.	1, 7		
Blue-green algae	15, 22, 24		
RHODOPHYCOTA			
<i>Porphyropsis coccinea</i>	14, 22		
<i>Bangia atropurpurea</i>	24		

<i>Phyllophora</i> spp.	4, 5, 6, 8, 10, 14	<i>Halurus flosculosa</i>	8, 11, 15, 24
<i>Phyllophora crispata</i>	1, 2, 4, 5, 7, 8, 10, 11, 14, 15, 22, 24	<i>Halurus equisetifolius</i>	24
<i>Phyllophora pseudoceranoides</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 22, 24	<i>Mesothamnion</i> spp.	15
<i>Coccolytus truncata</i>	2, 7, 8, 10	<i>Plumaria plumosa</i>	1, 4, 5, 6, 7, 8, 10, 11, 14, 18, 22, 24
<i>Schottera nicaeensis</i>	24	<i>Pterothamnion plumula</i>	1, 5, 6, 8, 10, 24
<i>Mastocarpus stellatus</i>	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24	<i>Ptilota gunneri</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 22, 24
<i>Mastocarpus stellatus (Petrocelis)</i>	4, 8, 10, 11, 15	<i>Ptilothamnion pluma</i>	24
<i>Chondrus crispus</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 20, 22, 24	<i>Seirospora seirosperma</i>	19
<i>Polyides rotundus</i>	6, 7, 8, 10, 11, 13, 14, 15, 22, 24	<i>Spermothamnion repens</i>	24
<i>Plocamium cartilagineum</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 22, 24	<i>Acrosorium reptans</i>	8, 10, 14, 15, 22
<i>Furcellaria lumbricalis</i>	2, 5, 6, 7, 8, 11, 14, 22, 24	<i>Apoglossum ruscifolium</i>	1, 8, 10, 11, 15, 22
<i>Halarachnion ligulatum</i>	8, 10	<i>Cryptopleura ramosa</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 22, 24
<i>Catenella caespitosa</i>	1, 2, 4, 5, 6, 7, 8, 14, 15, 22	<i>Delesseria sanguinea</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 22, 24
<i>Calliblepharis ciliata</i>	24	<i>Hypoglossum hypoglossoides</i>	1, 2, 4, 5, 6, 8, 10, 11, 14, 15, 22, 24
<i>Cystoclonium purpureum</i>	1, 4, 5, 6, 7, 8, 10, 11, 14, 15, 20, 22, 24	<i>Membranoptera alata</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 13, 14, 15, 20, 22, 24
<i>Rhodophyllis</i> spp.	1	<i>Drachiella heterocarpum</i>	14
<i>Rhodophyllis divaricata</i>	1, 5, 22, 24	<i>Haraldophyllum</i> spp.	11
<i>Cruoria</i> spp.	14	<i>Haraldophyllum bonnemaisonii</i>	2, 5, 8, 10, 11, 15, 24
<i>Cruoria pellita</i>	8, 10, 22	<i>Nitophyllum punctatum</i>	1, 2, 5, 8, 11
<i>Cruoria cruoriaeformis</i>	24	<i>Phycodrys rubens</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 20, 22, 24
<i>Rhodymeniales</i> indet.	15	<i>Polyneura</i> spp.	14
<i>Cordylecladia erecta</i>	8, 10, 11	<i>Erythroglossum laciniatum</i>	11
<i>Rhodymenia delicatula</i>	24	<i>Heterosiphonia plumosa</i>	1, 5, 6, 10, 24
<i>Rhodymenia holmesii</i>	24	<i>Brongniartella byssoides</i>	1, 2, 5, 6, 8, 10, 11, 22, 24
<i>Rhodymenia pseudopalmata</i>	11, 14, 15, 22, 24	<i>Laurencia</i> spp.	7, 22
<i>Lomentaria articulata</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 22, 24	<i>Osmundia hybrida</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 22
<i>Lomentaria clavellosa</i>	1, 2, 4, 5, 7, 8, 10, 11, 14, 22, 24	<i>Osmundia pinnatifida</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 22, 24
<i>Lomentaria orcadensis</i>	1, 2, 4, 5, 6, 8, 10, 11, 22, 24	<i>Odonthalia dentata</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 20, 22, 24
<i>Ceramiales</i> indet.	22, 24	<i>Polysiphonia</i> spp.	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 22, 24
<i>Aglaothamnium hookeri</i>	7, 14, 15	<i>Polysiphonia atlantica</i>	1, 5, 11, 15, 21, 22
<i>Aglaothamnium sepositum</i>	1, 5, 7, 10, 14, 15, 22	<i>Polysiphonia brodiaei</i>	5, 8, 15
<i>Antithamnion</i> spp.	2, 6, 8	<i>Polysiphonia elongata</i>	1, 4, 7, 10, 11, 14, 15, 22, 24
<i>Antithamnion cruciatum</i>	10	<i>Polysiphonia elongella</i>	11, 15
<i>Callithamnion</i> spp.	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 22, 24	<i>Polysiphonia fibrata</i>	10
<i>Callithamnion granulatum</i>	7, 11	<i>Polysiphonia fibrillosa</i>	22
<i>Callithamnion tetragonum</i>	2, 10, 14	<i>Polysiphonia fucooides</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 22, 23, 24
<i>Callithamnion</i> spp. (spongy)	14, 15, 22, 24	<i>Polysiphonia lanosa</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 22, 24
<i>Ceramium</i> spp.	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 20, 22, 24	<i>Polysiphonia nigra</i>	11, 22, 24
<i>Ceramium ciliatum</i>	7	<i>Polysiphonia stricta</i>	1, 4, 5, 8, 10, 11, 14, 15, 22, 24
<i>Ceramium echionotum</i>	4, 11, 22, 24	<i>Pterosiphonia parasitica</i>	1, 2, 4, 5, 6, 8, 10, 11, 12, 22, 24
<i>Ceramium gaditanum</i>	5, 7, 11, 15, 24	<i>Rhodomela</i> spp.	8, 24
<i>Ceramium nodulosum</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 14, 15, 18, 20, 22, 24	<i>Rhodomela confervoides</i>	1, 4, 6, 8, 10, 11, 14, 15, 22, 24
<i>Ceramium shuttleworthianum</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 20, 22, 24	<i>Rhodomela lycopodioides</i>	6, 7, 8, 10, 11, 14, 15, 18, 20, 22, 24
<i>Ceramium strictum</i>	4	<i>Rytiphlaea tinctoria</i>	22
<i>Compsothamnion gracillimum</i>	15	<i>Rhodophycota</i> indet. (non- calc. crusts)	1, 2, 4, 5, 6, 7, 8, 11, 12, 14, 15, 18, 21, 22, 24
<i>Compsothamnion thuyoides</i>	10, 15		
<i>Griffithsia</i> spp.	15		

CHRYSOPHYCOTA

Diatoms - colonial	22, 24
Diatoms - film	1, 2, 4, 5, 6, 8, 10, 11, 15, 17, 18, 19, 20, 21, 24

CHROMOPHYCOTA

Ectocarpaceae indet.	1, 2, 4, 5, 7, 8, 10, 11, 14, 15, 20, 22, 24
<i>Ectocarpus</i> spp.	7, 22, 24
<i>Ectocarpus siliculosus</i>	1, 15
<i>Hincksia</i> spp.	24
<i>Hincksia sandriana</i>	15, 24
<i>Pilayella littoralis</i>	11, 13, 15, 18
<i>Spongonema tomentosum</i>	6, 11, 14, 15, 22, 24
<i>Pseudolithoderma</i> spp.	14
<i>Pseudolithoderma extensum</i>	1, 4, 5, 8, 10
<i>Ralfsia</i> spp.	1, 4, 5, 7, 11, 14
<i>Ralfsia verrucosa</i>	4, 5, 7, 14, 15
<i>Elachista</i> spp.	1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 17, 18, 20, 22, 23, 24
<i>Elachista flaccida</i>	22
<i>Elachista fucicola</i>	4, 6, 10, 11, 14, 22
<i>Leathesia difformis</i>	1, 2, 4, 5, 6, 7, 11, 14, 22
<i>Chordaria flagelliformis</i>	1, 5, 11, 14
<i>Eudesme virescens</i>	1, 6
<i>Cutleria multifida</i>	1, 2, 6, 8
<i>Aglaozonia</i> (asexual <i>Cutleria</i>)	1, 2, 5, 6, 8, 10, 11, 14, 22
<i>Tilopteris mertensii</i>	24
<i>Sphacelaria</i> spp.	8, 10, 14, 22
<i>Sphacelaria plumosa</i>	1, 5, 24
<i>Sphacelaria radicans</i>	24
<i>Halopteris filicina</i>	5
<i>Stypocaulon scoparia</i>	24
<i>Cladostephus spongiosus</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 20, 22, 24
<i>Dictyota dichotoma</i>	1, 2, 4, 5, 6, 8, 10, 11, 22, 24
<i>Taonia atomaria</i>	22, 24
<i>Desmarestia aculeata</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 22, 24
<i>Desmarestia ligulata</i>	1, 2, 5, 8, 10, 11, 22
<i>Desmarestia viridis</i>	1, 5, 8, 10, 22, 24
<i>Arthrocladia villosa</i>	10, 11, 24
<i>Isthmoplea sphaerophora</i>	11
<i>Asperococcus</i> spp.	1, 6
<i>Asperococcus fistulosus</i>	1, 6, 11
<i>Litosiphon</i> spp.	5
<i>Dictyosiphon</i> spp.	14
<i>Dictyosiphon chordaria</i>	1, 5
<i>Dictyosiphon foeniculaceus</i>	5, 6
<i>Colpomenia peregrina</i>	1, 4
<i>Petalonia fasciata</i>	5
<i>Scytosiphon lomentaria</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15
<i>Chorda filum</i>	5, 6, 7, 11, 13, 14, 15, 24
<i>Chorda tomentosa</i>	1
<i>Laminaria</i> spp.	1, 2, 4, 5, 7, 8, 10, 11, 14, 15, 18, 20, 22, 24
<i>Laminaria digitata</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 19, 20, 22, 24
<i>Laminaria hyperborea</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 22, 24

<i>Laminaria saccharina</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 19, 20, 22, 24
<i>Saccorhiza polyschides</i>	10
<i>Alaria esculenta</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 22, 24
<i>Ascophyllum nodosum</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 13, 14, 15, 17, 18, 22, 23
<i>Fucus</i> spp.	1, 4, 5, 7, 10, 11, 14, 15, 22, 24
<i>Fucus ceranoides</i>	2, 3, 4, 7, 12, 13, 17, 21, 23
<i>Fucus serratus</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 19, 20, 22, 24
<i>Fucus spiralis</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 17, 18, 22, 23, 24
<i>Fucus vesiculosus</i>	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24
<i>Pelvetia canaliculata</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 14, 15, 22
<i>Himantalia elongata</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 22, 24
<i>Cystoseira</i> spp.	7
<i>Halidrys siliquosa</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 22, 24
Filamentous brown algae	1, 5, 6, 7, 8, 11, 13, 15, 22
Chromophycota indet. (crusts)	1, 2, 5, 6, 7, 8, 11, 14, 15, 22, 23, 24

CHLOROPHYCOTA

<i>Klebsormidium catenatum</i>	22
<i>Ulothrix flacca</i>	4, 6, 14
<i>Percursaria percursa</i>	14
<i>Enteromorpha</i> spp.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24
<i>Enteromorpha clathrata</i>	22
<i>Enteromorpha compressa</i>	6, 7
<i>Enteromorpha intestinalis</i>	1, 4, 5, 7, 11, 12, 14
<i>Enteromorpha linza</i>	1, 4, 5, 6, 11
<i>Enteromorpha prolifera</i>	13
<i>Enteromorpha torta</i>	22
<i>Ulva</i> spp.	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19, 20, 21, 22, 23, 24
<i>Ulva curvata</i>	22
<i>Ulva lactuca</i>	1, 4, 22, 24
<i>Blidingia</i> spp.	22
<i>Blidingia marginata</i>	1
<i>Blidingia minima</i>	7, 20, 24
<i>Monostroma</i> spp.	14, 22
<i>Prasiola stipitata</i>	1, 4, 5, 7, 10, 11, 14, 15, 18, 21, 22
<i>Spongomorpha</i> spp.	11, 14
<i>Spongomorpha aeruginosa</i>	1, 7, 11
<i>Spongomorpha arcta</i>	1, 11
<i>Chaetomorpha</i> spp.	2, 4, 5, 7, 8, 10, 11, 14, 15, 18, 21, 22, 24
<i>Chaetomorpha mediterranea</i>	1, 5, 8, 11

<i>Chaetomorpha linum</i>	2, 5, 6, 11, 14, 22
<i>Chaetomorpha melagonium</i>	1, 4, 6, 8, 10, 11, 14, 15, 18, 20, 22
<i>Cladophora</i> spp.	1, 2, 4, 5, 7, 8, 10, 11, 14, 15, 18, 19, 22, 24
<i>Cladophora albida</i>	14, 15
<i>Cladophora laetevirens</i>	4, 24
<i>Cladophora pellucida</i>	4, 11, 22
<i>Cladophora rupestris</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 18, 20, 22, 23, 24
<i>Cladophora sericea</i>	1, 2, 4, 5, 6, 7, 8, 11, 14, 15, 22
<i>Rhizoclonium</i> spp.	7, 11
<i>Rhizoclonium tortuosum</i>	8
<i>Bryopsis</i> spp.	10, 11
<i>Bryopsis plumosa</i>	4, 5, 6, 7, 8, 11, 15, 22, 24
<i>Derbesia marina</i> (<i>Halicystis</i>)	10
<i>Codium fragile</i> ssp. <i>atlanticum</i>	11, 15
Encrusting green algae indet.	4, 5, 15, 24
Filamentous green algae indet.	2, 4, 5, 7, 11, 13, 14, 15, 18, 22

ANGIOSPERMAE

<i>Zostera</i> spp.	8, 10
<i>Zostera marina</i>	2, 3
<i>Zostera angustifolia</i>	3, 8, 13
<i>Zostera noltii</i>	8
<i>Salicornia</i> spp.	13

LICHENS

<i>Anaptychia runcinata</i>	11
<i>Caloplaca</i> spp.	2, 11
<i>Caloplaca marina</i>	1, 2, 4, 5, 7, 8, 10, 11, 14, 15, 22
<i>Caloplaca thallicola</i>	5, 8, 10, 11
<i>Lecanora rupicola</i>	5
<i>Lichina confinis</i>	5, 8, 11
<i>Lichina pygmaea</i>	2, 5, 7, 10, 11, 15, 18, 24
<i>Ochrolechia parella</i>	5, 11
<i>Ramalina</i> spp.	5, 7, 8, 10, 11
<i>Rhizocarpon</i> spp.	22
<i>Tephromela atra</i>	5, 11, 14, 22
<i>Verrucaria maura</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 14, 15, 18, 19, 21, 22, 24
<i>Verrucaria mucosa</i>	1, 2, 4, 5, 6, 7, 8, 10, 11, 14, 15, 18, 22, 23, 24
<i>Verrucaria striatula</i>	15
<i>Xanthoria parietina</i>	1, 2, 4, 5, 7, 8, 11, 13, 15, 22
Grey lichens indet.	1, 2, 4, 5, 7, 8, 10, 11, 14, 15, 22

Appendix B

Biotores present in MNCR Sector 5

A hierarchical classification of the biotores present in Sector 5 is given below. The biotores listed are derived from the MNCR national biotope classification (Connor *et al.* 1997a, b) and are shown together with their higher types. Species nomenclature follows Howson & Picton (1997).

Higher code	Biotope code	Biotope
LR		LITTORAL ROCK (and other hard substrata)
LRL		Lichens or algal crusts
LRL	YG	Yellow and grey lichens on supralittoral rock
LRL	Pra	<i>Prasiola stipitata</i> on nitrate-enriched supralittoral or littoral fringe rock
LRL	Ver	<i>Verrucaria maura</i> on littoral fringe rock
LRL	Ver.Por	<i>Verrucaria maura</i> and <i>Porphyra umbilicalis</i> on very exposed littoral fringe rock
LRL	Ver.B	<i>Verrucaria maura</i> and sparse barnacles on exposed littoral fringe rock
LRL	Ver.Ver	<i>Verrucaria maura</i> on moderately exposed to very sheltered upper littoral fringe rock
LRL	Chr	Chrysophyceae on vertical upper littoral fringe soft rock
LRL	Bli	<i>Blidingia</i> spp. on vertical littoral fringe soft rock
LRL	UloUro	<i>Ulothrix flacca</i> and <i>Urospora</i> spp. on freshwater-influenced vertical littoral fringe soft rock
ELR		Exposed littoral rock (mussel/barnacle shores)
ELR.MB		Mytilus (mussels) and barnacles
ELR.MB	MytB	<i>Mytilus edulis</i> and barnacles on very exposed eulittoral rock
ELR.MB	BPat	Barnacles and <i>Patella</i> spp. on exposed or moderately exposed, or vertical sheltered, eulittoral rock
ELR.MB	BPat.Lic	Barnacles and <i>Lichina pygmaea</i> on steep exposed upper eulittoral rock
ELR.MB	BPat.Cat	<i>Catenella caespitosa</i> on overhanging, or shaded vertical, upper eulittoral rock
ELR.MB	BPat.Fvesl	Barnacles, <i>Patella</i> spp. and <i>Fucus vesiculosus</i> f. <i>linearis</i> on exposed eulittoral rock
ELR.MB	BPat.Sem	<i>Semibalanus balanoides</i> on exposed or moderately exposed, or vertical sheltered, eulittoral rock
ELR.FR		Robust fucoids or red seaweeds
ELR.FR	Coff	<i>Corallina officinalis</i> on very exposed lower eulittoral rock
ELR.FR	Him	<i>Himanthalia elongata</i> and red seaweeds on exposed lower eulittoral rock

MLR	Moderately exposed littoral rock (barnacle/fucoid shores)	
MLR.BF	Barnacles and fucoids (moderately exposed shores)	
MLR.BF	PelB	<i>Pelvetia canaliculata</i> and barnacles on moderately exposed littoral fringe rock
MLR.BF	FvesB	<i>Fucus vesiculosus</i> and barnacle mosaics on moderately exposed mid eulittoral rock
MLR.BF	Fser	<i>Fucus serratus</i> on moderately exposed lower eulittoral rock
MLR.BF	Fser.R	<i>Fucus serratus</i> and red seaweeds on moderately exposed lower eulittoral rock
MLR.BF	Fser.Fser	Dense <i>Fucus serratus</i> on moderately exposed to very sheltered lower eulittoral rock
MLR.BF	Fser.Fser.Bo	<i>Fucus serratus</i> and under-boulder fauna on lower eulittoral boulders
MLR.R	Red seaweeds (moderately exposed shores)	
MLR.R	XR	Mixed red seaweeds on moderately exposed lower eulittoral rock
MLR.R	Pal	<i>Palmaria palmata</i> on very to moderately exposed lower eulittoral rock
MLR.R	Mas	<i>Mastocarpus stellatus</i> and <i>Chondrus crispus</i> on very to moderately exposed lower eulittoral rock
MLR.R	Osm	<i>Osmundea (Laurencia) pinnatifida</i> and <i>Gelidium pusillum</i> on moderately exposed mid eulittoral rock
MLR.Eph	Ephemeral green or red seaweeds (freshwater or sand-influenced)	
MLR.Eph	Ent	<i>Enteromorpha</i> spp. on freshwater-influenced or unstable upper eulittoral rock
MLR.Eph	EntPor	<i>Porphyra purpurea</i> or <i>Enteromorpha</i> spp. on sand-scoured mid or lower eulittoral rock
MLR.Eph	Rho	<i>Rhodothamniella floridula</i> on sand-scoured lower eulittoral rock
MLR.MF	Mytilus (mussels) and fucoids (moderately exposed shores)	
MLR.MF	MytFves	<i>Mytilus edulis</i> and <i>Fucus vesiculosus</i> on moderately exposed mid eulittoral rock
MLR.MF	MytFR	<i>Mytilus edulis</i> , <i>Fucus serratus</i> and red seaweeds on moderately exposed lower eulittoral rock
SLR	Sheltered littoral rock (fucoid shores)	
SLR.F	Dense fucoids (stable rock)	
SLR.F	Pel	<i>Pelvetia canaliculata</i> on sheltered littoral fringe rock
SLR.F	Fspi	<i>Fucus spiralis</i> on moderately exposed to very sheltered upper eulittoral rock
SLR.F	Fves	<i>Fucus vesiculosus</i> on sheltered mid eulittoral rock

SLR.F	Asc	<i>Ascophyllum nodosum</i> on very sheltered mid eulittoral rock
SLR.F	Asc.Asc	<i>Ascophyllum nodosum</i> on full salinity mid eulittoral rock
SLR.F	Asc.VS	<i>Ascophyllum nodosum</i> and <i>Fucus vesiculosus</i> on variable salinity mid eulittoral rock
SLR.F	Fcer	<i>Fucus ceranoides</i> on reduced salinity eulittoral rock
SLR.FX		Fucoids, barnacles or ephemeral seaweeds (mixed substrata)
SLR.FX	BLlit	Barnacles and <i>Littorina littorea</i> on unstable eulittoral mixed substrata
SLR.FX	FvesX	<i>Fucus vesiculosus</i> on mid eulittoral mixed substrata
SLR.FX	AscX	<i>Ascophyllum nodosum</i> on mid eulittoral mixed substrata
SLR.FX	FserX	<i>Fucus serratus</i> on lower eulittoral mixed substrata
SLR.FX	EphX	Ephemeral green and red seaweeds on variable salinity or disturbed eulittoral mixed substrata
SLR.FX	FcerX	<i>Fucus ceranoides</i> on reduced salinity eulittoral mixed substrata
SLR.MX		<i>Mytilus</i> (mussel) beds (mixed substrata)
SLR.MX	MytX	<i>Mytilus edulis</i> beds on eulittoral mixed substrata

Littoral rock (other)

LR.Rkp		Rockpools
LR.Rkp	G	Green seaweeds (<i>Enteromorpha</i> spp. and <i>Cladophora</i> spp.) in upper shore rockpools
LR.Rkp	Cor	<i>Corallina officinalis</i> and coralline crusts in shallow eulittoral rockpools
LR.Rkp	FK	Fucoids and kelps in deep eulittoral rockpools
LR.Rkp	SwSed	Seaweeds in sediment (sand or gravel)-floored eulittoral rockpools
LR.Ov		Overhangs and caves
LR.Ov	RhoCv	<i>Rhodothamniella floridula</i> in upper littoral fringe soft rock caves
LR.Ov	SR	Sponges and shade-tolerant red seaweeds on overhanging lower eulittoral bedrock
LR.Ov	SByAs	Sponges, bryozoans and ascidians on deeply overhanging lower shore bedrock

LITTORAL SEDIMENTS

LGS		Littoral gravels and sands
LGS.Sh		Shingle (pebble) and gravel shores
LGS.Sh	BarSh	Barren shingle or gravel shores

LGS.S		Sand shores
LGS.S	Tal	Talitrid amphipods in decomposing seaweed on the strand-line
LGS.S	BarSnd	Barren coarse sand shores
LGS.S	AEur	Burrowing amphipods and <i>Eurydice pulchra</i> in well-drained clean sand shores
LGS.S	AP	Burrowing amphipods and polychaetes in clean sand shores
LGS.S	AP.P	Burrowing amphipods and polychaetes (often with <i>Arenicola marina</i>) in clean sand shores
LGS.S	AP.Pon	Burrowing amphipods <i>Pontocrates</i> spp. and <i>Bathyporeia</i> spp. in lower shore clean sand
LGS.S	Lan	Dense <i>Lanice conchilega</i> in tide-swept lower shore sand
LGS.Est		Estuarine coarse sediment shores
LGS.Est	OI	Oligochaetes in reduced or low salinity gravel or coarse sand shores
LMS		Littoral muddy sands
LMS.MS		Muddy sand shores
LMS.MS	PCer	Polychaetes and <i>Cerastoderma edule</i> in fine sand and muddy sand shores
LMS.MS	MacAre	<i>Macoma balthica</i> and <i>Arenicola marina</i> in muddy sand shores
LMS.Zos		Littoral <i>Zostera</i> (seagrass) beds
LMS.Zos	Znol	<i>Zostera noltii</i> beds in upper to mid shore muddy sand
LMU		Littoral muds
LMU.Sm		Saltmarsh
		Saltmarsh habitats were not considered in MNCR surveys (except SM8 which forms a transition from the saltmarsh to intertidal sediments); they have been the subject of another major Nature Conservancy Council survey.
LMU.Sm	NVC SM8	<i>Salicornia</i> spp.
LMU.SMu		Sandy mud shores
LMU.SMu	HedMac	<i>Hediste diversicolor</i> and <i>Macoma balthica</i> in sandy mud shores
LMU.SMu	HedMac.Are	<i>Hediste diversicolor</i> , <i>Macoma balthica</i> and <i>Arenicola marina</i> in muddy sand or sandy mud shores
LMU.SMu	HedMac.Pyg	<i>Hediste diversicolor</i> , <i>Macoma balthica</i> and <i>Pygospio elegans</i> in sandy mud shores

LMU.Mu		Soft mud shores
LMU.Mu	HedScr	<i>Hediste diversicolor</i> and <i>Scrobicularia plana</i> in reduced salinity mud shores
LMU.Mu	HedStr	<i>Hediste diversicolor</i> and <i>Streblospio shrubsolii</i> in sandy mud or soft mud shores
LMU.Mu	HedOI	<i>Hediste diversicolor</i> and oligochaetes in low salinity mud shores
IR		INFRA-LITTORAL ROCK (and other hard substrata)
EIR		Exposed infralittoral rock
EIR.KFaR		Kelp with cushion fauna, foliose red seaweeds or coralline crusts (exposed rock)
EIR.KFaR	Ala	<i>Alaria esculenta</i> on sublittoral fringe bedrock
EIR.KFaR	Ala.Myt	<i>Alaria esculenta</i> , <i>Mytilus edulis</i> and coralline crusts on very exposed sublittoral fringe bedrock
EIR.KFaR	Ala.Ldig	<i>Alaria esculenta</i> and <i>Laminaria digitata</i> on exposed sublittoral fringe bedrock
EIR.KFaR	LhypFa	<i>Laminaria hyperborea</i> forest with a faunal cushion (sponges and polyclinids) and foliose red seaweeds on very exposed infralittoral rock
EIR.KFaR	LhypR	<i>Laminaria hyperborea</i> with dense foliose red seaweeds on exposed infralittoral rock
EIR.KFaR	LhypR.Ft	<i>Laminaria hyperborea</i> forest with dense foliose red seaweeds on exposed upper infralittoral rock
EIR.KFaR	LhypR.Pk	<i>Laminaria hyperborea</i> park with dense foliose red seaweeds on exposed lower infralittoral rock
EIR.KFaR	FoR	Foliose red seaweeds on exposed or moderately exposed lower infralittoral rock
EIR.SG		Robust faunal cushions and crusts (surge gullies & caves)
EIR.SG	SCAn	Sponge crusts and anemones on wave-surged vertical infralittoral rock
EIR.SG	SCAn.Tub	Sponge crusts, anemones and <i>Tubularia indivisa</i> in shallow infralittoral surge gullies
EIR.SG	SCAs	Sponge crusts and colonial ascidians on wave-surged vertical infralittoral rock
EIR.SG	SCAs.DenCla	<i>Dendrodoa grossularia</i> and <i>Clathrina coriacea</i> on wave-surged vertical infralittoral rock
EIR.SG	SCAs.ByH	Sponge crusts, colonial (polyclinid) ascidians and a bryozoan/hydroid turf on wave-surged vertical or overhanging infralittoral rock
EIR.SG	CC	<i>Balanus crenatus</i> and/or <i>Pomatoceros triqueter</i> with spirorbid worms and coralline crusts on severely scoured infralittoral rock
EIR.SG	CC.BalPom	<i>Balanus crenatus</i> and/or <i>Pomatoceros triqueter</i> with spirorbid worms and coralline crusts on severely scoured vertical infralittoral rock

MIR		Moderately exposed infralittoral rock
MIR.KR		Kelp with red seaweeds (moderately exposed rock)
MIR.KR	Ldig	<i>Laminaria digitata</i> on moderately exposed or tide-swept sublittoral fringe rock
MIR.KR	Ldig.Ldig	<i>Laminaria digitata</i> on moderately exposed sublittoral fringe rock
MIR.KR	Ldig.Ldig.Bo	<i>Laminaria digitata</i> and under-boulder fauna on sublittoral fringe boulders
MIR.KR	Lhyp	<i>Laminaria hyperborea</i> and foliose red seaweeds on moderately exposed infralittoral rock
MIR.KR	Lhyp.Ft	<i>Laminaria hyperborea</i> forest and foliose red seaweeds on moderately exposed upper infralittoral rock
MIR.KR	Lhyp.Pk	<i>Laminaria hyperborea</i> park and foliose red seaweeds on moderately exposed lower infralittoral rock
MIR.KR	Lhyp.TFt	<i>Laminaria hyperborea</i> forest, foliose red seaweeds and a diverse fauna on tide-swept upper infralittoral rock
MIR.KR	Lhyp.TPk	<i>Laminaria hyperborea</i> park with hydroids, bryozoans and sponges on tide-swept lower infralittoral rock
MIR.GzK		Grazed kelp with algal crusts
MIR.GzK	LhypGz	Grazed <i>Laminaria hyperborea</i> with coralline crusts on infralittoral rock
MIR.GzK	LhypGz.Ft	Grazed <i>Laminaria hyperborea</i> forest with coralline crusts on upper infralittoral rock
MIR.GzK	LhypGz.Pk	Grazed <i>Laminaria hyperborea</i> park with coralline crusts on lower infralittoral rock
MIR.SedK		Sand or gravel-affected or disturbed kelp and seaweed communities
MIR.SedK	XKScrR	Mixed kelps with scour-tolerant and opportunistic foliose red seaweeds on scoured or sand-covered infralittoral rock
MIR.SedK	SabKR	<i>Sabellaria spinulosa</i> with kelp and red seaweeds on sand-influenced infralittoral rock
MIR.SedK	EphR	Ephemeral red seaweeds and kelps on tide-swept mobile infralittoral cobbles
MIR.SedK	HalXK	<i>Halidrys siliquosa</i> and mixed kelps on tide-swept infralittoral rock with coarse sediment
SIR		Sheltered infralittoral rock
SIR.K		Silted kelp (stable rock)
SIR.K	Lsac	<i>Laminaria saccharina</i> on very sheltered infralittoral rock
SIR.K	Lsac.Ldig	<i>Laminaria saccharina</i> and <i>Laminaria digitata</i> on sheltered sublittoral fringe rock

Infralittoral rock (other)

IR.FaSwV		Fauna and seaweeds (shallow vertical rock)
IR.FaSwV	AlcByH	<i>Alcyonium digitatum</i> and a bryozoan, hydroid and ascidian turf on moderately exposed vertical infralittoral rock
IR.FaSwV	AlcByH.Hia	<i>Hiatella arctica</i> , bryozoans and ascidians on vertical infralittoral soft rock

CR CIRCALITTORAL ROCK (and other hard substrata)

ECR Exposed circalittoral rock

ECR.Alc		<i>Alcyonium</i>-dominated communities (tide-swept/vertical)
ECR.Alc	AlcTub	<i>Alcyonium digitatum</i> with dense <i>Tubularia indivisa</i> and anemones on strongly tide-swept circalittoral rock
ECR.Alc	AlcSec	<i>Alcyonium digitatum</i> with <i>Securiflustra securifrons</i> on weakly tide-swept or scoured moderately exposed circalittoral rock
ECR.Alc	AlcC	<i>Alcyonium digitatum</i> , <i>Pomatoceros triqueter</i> , algal and bryozoan crusts on vertical exposed circalittoral rock

MCR Moderately exposed circalittoral rock

MCR.ByH		Bryozoan/hydroid turfs (sand-influenced)
MCR.ByH	Flu	<i>Flustra foliacea</i> and other hydroid/bryozoan turf species on slightly scoured circalittoral rock or mixed substrata
MCR.ByH	Flu.Flu	<i>Flustra foliacea</i> on slightly scoured silty circalittoral rock or mixed substrata
MCR.ByH	Flu.SerHyd	<i>Sertularia argentea</i> , <i>S. cupressina</i> and <i>Hydrallmania falcata</i> on tide-swept circalittoral cobbles and pebbles
MCR.ByH	Urt	<i>Urticina felina</i> on sand-affected circalittoral rock
MCR.ByH	Urt.Urt	<i>Urticina felina</i> on sand-scoured circalittoral rock

MCR.CSab Circalittoral *Sabellaria* reefs

MCR.CSab	Sspi	<i>Sabellaria spinulosa</i> crusts on silty turbid circalittoral rock
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MCR.M Mussel beds (open coast circalittoral rock/mixed substrata)

MCR.M	MytHAs	<i>Mytilus edulis</i> beds with hydroids and ascidians on tide-swept moderately exposed circalittoral rock
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MCR.Bri Brittlestar beds

MCR.Bri	Oph	<i>Ophiothrix fragilis</i> and/or <i>Ophiocomina nigra</i> beds on slightly tide-swept circalittoral rock or mixed substrata
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MCR.GzFa		Grazed fauna (moderately exposed or sheltered rock)
MCR.GzFa	FaAIC	Faunal and algal crusts, <i>Echinus esculentus</i> , sparse <i>Alcyonium digitatum</i> and grazing-tolerant fauna on moderately exposed circalittoral rock
MCR.GzFa	FaAIC.Abi	Faunal and algal crusts, <i>Echinus esculentus</i> , sparse <i>Alcyonium digitatum</i> , <i>Abietinaria abietina</i> and other grazing-tolerant fauna on moderately exposed circalittoral rock
MCR.As		Ascidian communities (silt-influenced)
MCR.As	StoPaur	<i>Stolonica socialis</i> and/or <i>Polyclinum aurantium</i> with <i>Flustra foliacea</i> on slightly sand-scoured tide-swept moderately exposed circalittoral rock
MCR.SfR		Soft rock communities
MCR.SfR	Pol	<i>Polydora</i> sp. tubes on upward-facing circalittoral soft rock

SS SUBLITTORAL SEDIMENTS

IGS Infralittoral gravels and sands

IGS.FaG Shallow gravel faunal communities

IGS.FaG Sell *Spisula elliptica* and venerid bivalves in infralittoral clean sand or shell gravel

IGS.FaS Shallow sand faunal communities

IGS.FaS NcirBat *Nephtys cirrosa* and *Bathyporeia* spp. in infralittoral sand

IGS.FaS Lcon Dense *Lanice conchilega* and other polychaetes in tide-swept infralittoral sand

IGS.FaS FabMag *Fabulina fabula* and *Magelona mirabilis* with venerid bivalves in infralittoral compacted fine sand

IGS.EstGS Estuarine sublittoral gravels and sands

IGS.EstGS MobRS Sparse fauna in reduced salinity infralittoral mobile sand

IGS.EstGS Ncir *Nephtys cirrosa* and fluctuating salinity-tolerant fauna in reduced salinity infralittoral mobile sand

CGS Circalittoral gravels and sands

CGS Ven Venerid bivalves in circalittoral coarse sand or gravel

IMS Infralittoral muddy sands

IMS.FaMS Shallow muddy sand faunal communities

IMS.FaMS EcorEns *Echinocardium cordatum* and *Ensis* sp. in lower shore or shallow sublittoral muddy fine sand

CMS		Circolittoral muddy sands
CMS	AbrNucCor	<i>Abra alba</i> , <i>Nucula nitida</i> and <i>Corbula gibba</i> in circolittoral muddy sand or slightly mixed sediment
CMS	AfilEcor	<i>Amphiura filiformis</i> and <i>Echinocardium cordatum</i> in circolittoral clean or slightly muddy sand
IMU		Infralittoral muds
IMU.EstMu		Estuarine sublittoral muds
IMU.EstMu	PolVS	<i>Polydora ciliata</i> in variable salinity infralittoral firm mud or clay
IMU.EstMu	AphTub	<i>Aphelocheata marioni</i> and <i>Tubificoides</i> spp. in variable salinity infralittoral mud
IMU.EstMu	NhomTub	<i>Nephtys hombergii</i> and <i>Tubificoides</i> spp. in variable salinity infralittoral soft mud
IMU.EstMu	MobMud	Infralittoral fluid mobile mud
IMU.EstMu	CapTub	<i>Capitella capitata</i> and <i>Tubificoides</i> spp. in reduced salinity infralittoral muddy sediment
IMU.EstMu	Tub	<i>Tubificoides</i> spp. in reduced salinity infralittoral muddy sediment
IMX		Infralittoral mixed sediments
IMX.KSw		<i>Laminaria saccharina</i> (sugar kelp) and filamentous seaweeds (mixed sediment)
IMX.KSw	LsacX	<i>Laminaria saccharina</i> , <i>Chorda filum</i> and filamentous red seaweeds on sheltered infralittoral sediment
IMX.FaMx		Shallow mixed sediment faunal communities
IMX.FaMx	VsenMtru	<i>Venerupis senegalensis</i> and <i>Mya truncata</i> in lower shore or infralittoral muddy gravel
IMX.EstMx		Estuarine sublittoral mixed sediments
IMX.EstMx	MytV	<i>Mytilus edulis</i> beds in variable salinity infralittoral mixed sediment
IMX.EstMx	PolMtru	<i>Polydora ciliata</i> , <i>Mya truncata</i> and solitary ascidians in variable salinity infralittoral mixed sediment
CMX		Circolittoral mixed sediments
CMX	SspiMx	<i>Sabellaria spinulosa</i> and <i>Polydora</i> spp. on stable circolittoral mixed sediment
CMX	ModMx	<i>Modiolus modiolus</i> beds on circolittoral mixed sediment
COS		CIRCALITTORAL OFFSHORE SEDIMENTS
COS	AmpPar	<i>Ampharete falcata</i> turf with <i>Parvicardium ovale</i> on cohesive muddy very fine sand near margins of deep stratified seas

AREA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
INFRA LITTORAL GRAVELS AND SANDS																								
IGS		•		•	•	•		•		•	•			•	•							•		•
Sell																						•		•
NcirBat				•						•	•			•						•		•		•
Lcon		•						•			•				•							•		•
FabMag		•						•		•				•	•					•		•		•
MobRS																						•		•
Ncir																					•			
CIRCALITTORAL GRAVELS AND SANDS																								
CGS		•						•																
Ven										•														
INFRA LITTORAL MUDDY SANDS																								
IMS											•				•						•		•	•
EcorEns		•		•	•			•			•			•	•						•		•	•
CIRCALITTORAL MUDDY SANDS																								
AbrNucCor	•			•	•									•	•					•		•		•
AfilEcor		•		•	•	•		•						•	•					•		•		•
INFRA LITTORAL MUDS																								
PoIVS																						•		
AphTub																	•	•				•		
NhomTub																					•	•		
MobMud																						•		
CapTub																			•	•		•		•
Tub																						•		
INFRA LITTORAL MIXED SEDIMENTS																								
IMX											•				•									•
LsacX										•														
VsenMtru																			•			•		
MytV																			•					
PolMtru																				•		•		
CIRCALITTORAL MIXED SEDIMENTS																								
SspiMx				•		•									•							•		•
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CIRCALITTORAL OFFSHORE SEDIMENTS																								
AmpPar														•										