Cefas

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Radiological Habits Survey: Sellafield Beach Occupancy, 2007

Environment Report RL 02/08

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Radiological Habits Survey: Sellafield Beach Occupancy, 2007

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1. Introduction

The public may be exposed to radiation as a result of the operations of the Sellafield Ltd. nuclear site, Cumbria. This report is intended to aid assessment of the potential exposure to members of the public from radioactive particles that have been detected on beaches in the vicinity of the site.

Historically, radioactive particles and contaminated debris were found on beaches in the Sellafield area following incidents in 1983 and 1992. Monitoring work carried out after these incidents identified particles attached to beach debris such as seaweed, plastic and wood, which were predominantly recovered from the strandline of the beach. Particles were also recovered from the sand on various sections of beach.

Monitoring trials were carried out at Sellafield and Braystones in November 2006 and January 2007 using equipment designed to monitor large areas. The trial was followed up with further monitoring during 2007. Radioactive particles were detected at both beaches on the upper foreshore (on shingle) and the lower foreshore (on sand). The particles were located at varying depths, ranging from the surface to depths of 120 mm. The particles ranged in size from particles similar to sand grains up to small stones. The source of the particles appears to be a combination of historic and recent releases (EA Progress Report, 2007).

This report provides information about activities carried out by members of the public under everyday circumstances on beaches in the vicinity of the Sellafield nuclear site, in particular those which may affect their potential exposure to radioactive particles. Data were collected for activities relating to occupancy of beach areas, and the handling of beach materials, sediment and fishing gear. The study has been funded by the Environment Agency in order to support their role in protecting the public from the effects of radiation.

2. The survey

2.1 Survey objectives

The aim of the survey was to obtain data on activities undertaken on beaches relating to potential public exposure to radioactive particles in the vicinity of the Sellafield nuclear site. The survey results will allow more realistic radiological assessments of the public using these beaches. Fieldwork was undertaken to interview members of the public, both frequent and infrequent beach users. Additionally, known high-rate beach users were contacted. These interviews were used to establish exposure pathways for the local population.

The specific survey objectives were:

- To identify individuals who, through their activities on beaches in the vicinity of Sellafield, may increase their potential exposure to radioactive particles

- To identify the locations of activities
- To identify the distribution of individuals or groups of people at locations in the survey area
- To obtain data for occupancy rates on beaches and handling rates for beach materials, sediment and fishing gear
- To investigate activities that may give rise to inadvertent ingestion and inhalation

2.2 Conduct of the survey

Prior to the survey fieldwork, as part of the survey preparation, a desk study of the Sellafield Habits Survey Report (Clyne *et al.*, 2004) and subsequent Sellafield Reviews (Tipple, 2005, 2006 and 2007) was carried out to identify individuals with high intertidal occupancy and handling rates. Information regarding activities and distribution of people on beaches within the survey area was collated and used to direct the fieldwork. Additional information on individuals who carried out activities on beaches in the survey area was provided by the Environment Agency.

Known individuals with high occupancy or handling rates on the beaches in the survey area were contacted and interviewed. Phone interviews were conducted with certain individuals or groups when it was not possible to arrange an interview in person, such as schools and people who did not live in the area.

The fieldwork was staggered over five months between May and September 2007. It was concentrated during school holidays, but also spanned time either side of holidays to get a varied spread of weather conditions and activities. The survey team aimed to undertake fieldwork predominantly during periods of sunny weather when people are most likely to use the beaches, as well as periods following storms to find people undertaking activities such as beachcombing.

Ten main locations were visited in the survey area. People undertaking activities on the beaches were interviewed. These included local people, visitors and tourists who used the beaches both regularly and infrequently. People were asked about the time spent undertaking activities on the beaches in the survey area. Particular attention was paid to the following: individuals handling beach materials, sediment or fishing gear; people carrying out activities which brought them into direct contact with the beach substrates, such as walking barefoot and playing on the beach; and individuals undertaking activities that could lead to inadvertent ingestion or inhalation of particles. Commercial potting fishermen were interviewed; their time spent handling fishing gear was predominantly offshore, with some time spent repairing gear on shore.

Where possible, quantifiable data were collected. Where this was not possible, activities were recorded and are described in Section 4 under the locations where the activities occurred, in Section 5 relating to headcount and in Section 7.2 relating to generic group data.

3. Methods for data analysis

A headcount of all people interviewed and observed on the beaches during the fieldwork is provided in Annex 1. Information is also provided on the activities of those interviewed and observed, and of the weather for each day of fieldwork. The headcount is summarised in Table 1.

The main output of the survey is the occupancy and handling rates shown in Annexes 2 to 6. These data are presented in this report in three ways, which reflects the use of the data for radiological assessments purposes.

Firstly, data are presented for use in probabilistic assessments, where the risk of someone encountering a particle is to be assessed. The complete data set is shown in Annex 2 and is discussed in Section 6. Occupancy and handling data are presented by location and are categorised by intertidal occupancy (over all substrates), handling beach materials, handling sediment and handling fishing gear.

Secondly, collective data are presented to assist in assessing the total probability of encountering a particle. It should be noted that the collective data provided in this report are presented to give an indication of the relative occupancies and handling rates at each location in the survey area, they are not an estimate of absolute levels. Collective occupancy and collective handling rates are shown in Tables 2 and 3, respectively, and are discussed in Section 7. Collective occupancy was calculated by summing the total number of hours spent on each beach by all interviewees, and collective handling was calculated by summing the total number of hours spent handling beach materials, beach sediments and fishing gear at each beach.

Thirdly, data are presented for individual exposure in Annexes 3 to 6, are summarised in Tables 4 to 7 and discussed in Section 8. Interview data are grouped into intertidal occupancy, handling of beach material, handling sediment and handling fishing gear for adults and children. The intertidal occupancy rates are categorised by substrate. These data were analysed using the 'cut-off' method described by Hunt *et al.* (1982). With the 'cut-off' method, the appropriate high rate was calculated by taking the arithmetic mean of the maximum observed rate and all observed rates within a factor of 3 of the maximum value (termed the lower threshold value). It accords with the principle expressed by ICRP (ICRP, 1984) that the critical group should be small enough to be reasonably homogeneous with respect to age, diet and those aspects of behaviour that affect the doses received. In this report, the term critical group rate is used to represent the data derived by the 'cut-off' method for ease of presentation.

For individual exposure, data are structured into age groups. These age groups are from 0 - 1.0 y of age (called 3-month-old); > 1.0 y - 2.0 y (called 1-year-old); > 2.0 y - 7.0 y (called 5-year-old); > 7.0 y - 12.0 y (called 10-year-old); > 12.0 y - 17.0 y (called 15-year-old). Individuals over 17 years old are treated as adults. These age groupings are consistent with those used in ICRP 72 (ICRP, 1996).

In addition to occupancy and handling data, the inadvertent ingestion and inhalation of particles is discussed in Section 9. Variability associated with the fieldwork and uncertainties in data collection and data analysis are discussed in Section 10.

4. Survey area

The survey area covers the coastline from St Bees beach where it meets St Bees Head, to Ravenglass (Map 1), a distance of approximately 21 km. This corresponded with the main area that had been monitored and on which particles had been found.

Map 1. The Sellafield beach occupancy survey area

4.1 Overview of survey area

The particle find rate to date has varied over the different beaches within the survey area. Beach occupancy is also likely to vary between the beaches. Therefore, the potential to encounter particles will also vary accordingly.

Beach occupancy in the survey area was to a large extent governed by access limitations to the beaches. Vehicular access to parts of the coast were restricted by the coastal railway track, the Sellafield nuclear site and the Ravenglass Estuary. The beaches at St Bees, Seamill, Seascale, Drigg and Ravenglass all had easy access by foot and by car and large public parking areas. Access to the beaches at Coulderton, Nethertown, Braystones and Saltcoats was more restricted due to either the railway track running parallel to the shore, limited parking, narrow access roads or roads which were in poor condition.

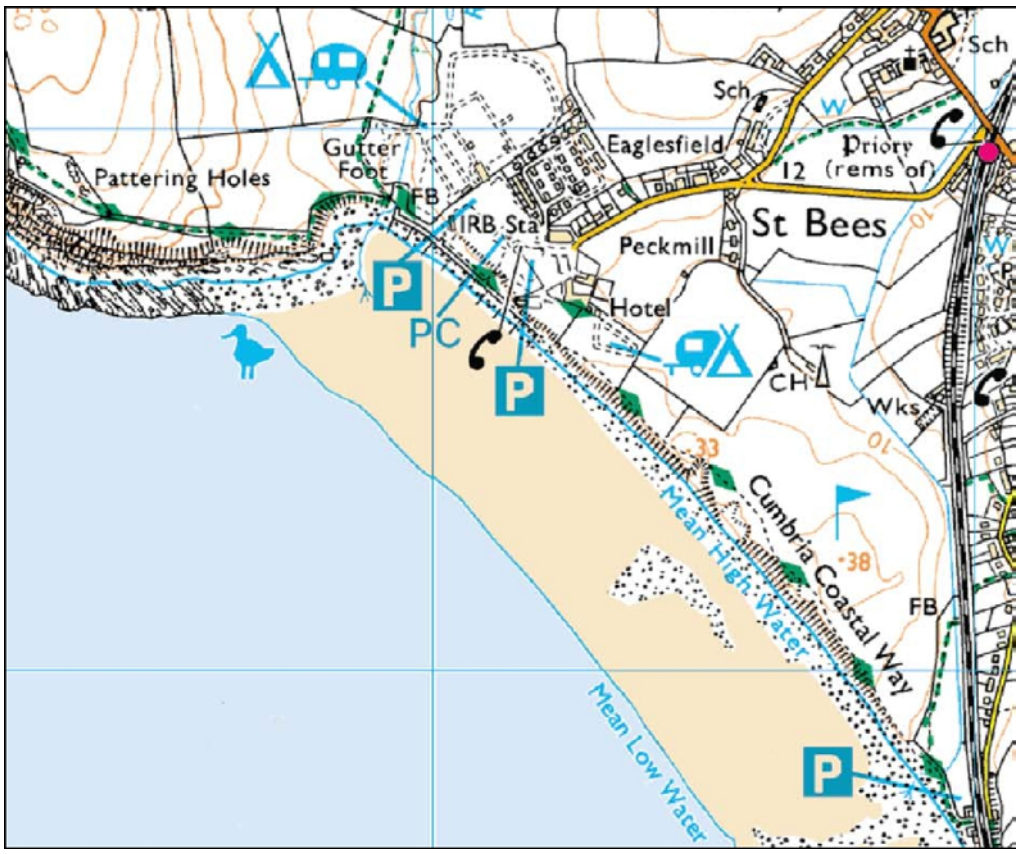
At high water, the majority of the locations in the survey area were stone beaches backed either by low shale cliffs, concrete sea defences or sand dunes. At low tide, many beaches were a mixture of sand, mud and rock.

Beach activities were to some extent constrained by the state of the tide. At high tide, activities were predominantly dog walking, walking, beach fishing and water sports. At low tide a wider range of activities were possible such as bait digging, shellfish collecting, beach games and rock pooling.

A description of the beaches within the survey area is provided and for ease of presentation the survey area has been divided into eight sections. For each section, where possible, the description includes the physical appearance of the beaches, vehicular or footpath access, activities occurring on the beaches, a relevant Ordnance Survey map and a photograph.

4.2 St Bees to Seamill

This section covers the area from the southern end of St Bees Head (NX 956 117) to Seamill Lane (NX 968 108), a distance of approximately 2 km (Map 2).



Map 2. St Bees to Seamill Lane © Crown copyright

4.2.1 Beach description

St Bees is a popular seaside resort with a large sandy beach (Photograph 1). To the north of the beach is St Bees Head, a rocky headland with a nature reserve for seabirds. The southern end of the beach is called Seamill. The beach itself is approximately 2 km long and is predominantly sand on the mid to lower foreshore. There are rock pools below the headland, midway along the beach and at the south end at Seamill. The upper foreshore along the high water mark is stones and is backed by soft glacial moraines.

Both St Bees and Seamill had good access with plenty of parking, and St Bees had good local amenities. There was one access road at St Bees and one at Seamill. There was a concrete slipway where the lifeboat station was based; the public used the slipway to launch boats and jet-skis.

Photograph 1. St Bees beach

4.2.2 Activities

St Bees was the busiest beach in the survey area. The stretch of beach towards Seamill and including Seamill was also popular. Many local people used the beach daily for activities such as dog walking and jogging, often with high occupancy rates. St Bees was very popular with holidaymakers either staying at the caravan park or visiting the area. In the summer months, especially at weekends, it was reported that the beach was often packed with people. The number of people observed on St Bees beach during the survey fieldwork ranged from 1 – 75 and from 0 – 30 at Seamill. On several occasions during the fieldwork 20 –30 people were observed between St Bees and Seamill.

Activities undertaken regularly in this area were; dog walking, walking, jogging and angling over sand and stones; bait digging and collecting peeler crabs over mud and sand at low tide, and winkle collecting from below the Head on rock and sand. Activities undertaken by locals and tourists, particularly in the summer months, were sunbathing, building sandcastles, rock pooling, picnicking and playing games on sand. People were walking and playing barefoot in warm weather. Children collected seaweed, shells and stones. These activities were often undertaken at low occupancy and handling rates but by a large number of adults and children. On several occasions, people were observed canoeing, kite boarding, windsurfing, paddling, swimming and floating on inflatables at sea. In the past, fixed nets had occasionally been worked at the low water mark at both ends of the beach. However, this was not observed during the survey.

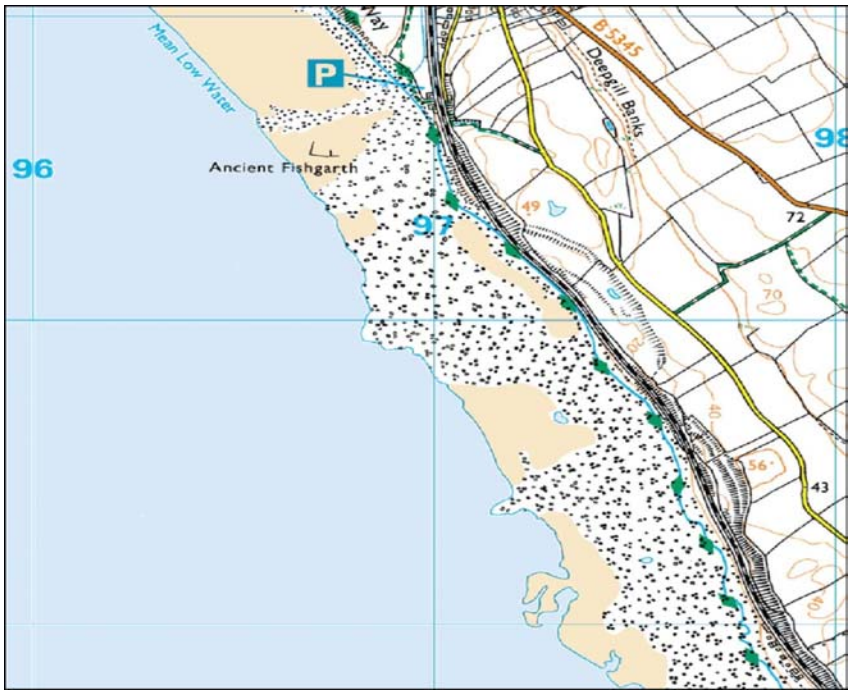
Several groups of people were identified at St Bees during the survey. The beach was a popular location for visiting groups of school children. Four local schools were identified that arranged trips to St Bees beach. Activities undertaken during these trips included general beach studies and rock pooling. One school party took shells and stones back to their school to create a rock pool in their classroom.

The Cumbria Art Festival attracted many visitors to the beach in September 2007. An artist arranged for 3500 sandcastles to be built on St Bees beach; these were built by 43 people and covered an area of 200 metres by 20 metres (Photograph 2).

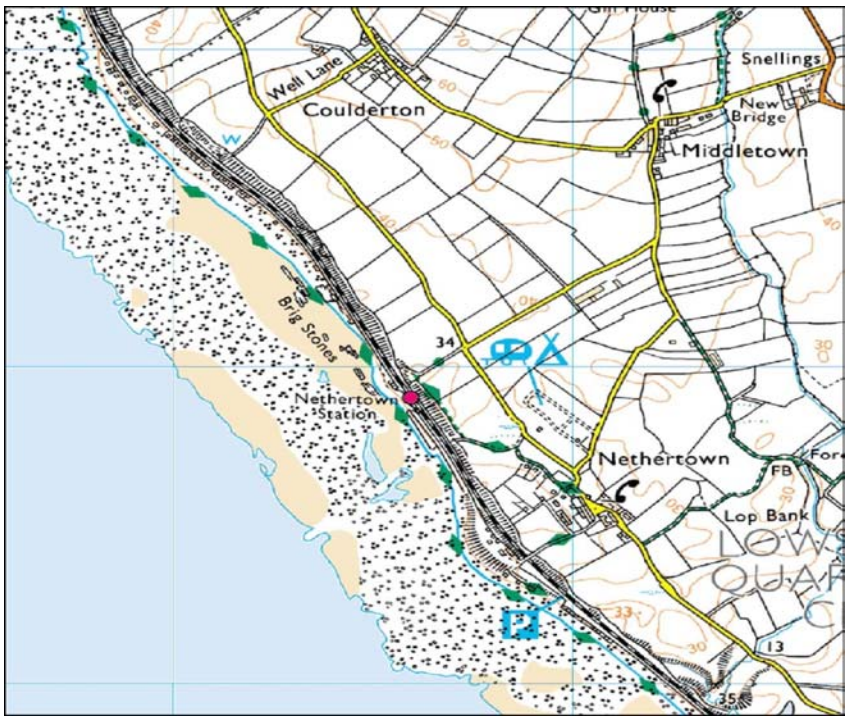
Photograph 2. 'Beached' by Steve Messam. St Bees. FRED 2007 © Tony West 2007

4.3 Seamill Lane to Coulderton and Nethertown

This section covers the area from Seamill Lane (NX 968 108) to the first chalet south of Nethertown promenade (NX 992 070), a distance of approximately 5 km (Maps 3 and 4).



Map 3. Seamill Lane to Coulderton © Crown copyright



Map 4. Coulderton to Nethertown © Crown copyright

4.3.1 Beach description

South of Seamill Lane, the upper foreshore was a continuation of stones. The substrate on the mid to lower foreshore changed from predominantly sand to a mixture of stones, rocks and “reefs” of honeycomb worm colonies with occasional sandy patches and lagoons (Photograph 3).

A railway track ran parallel to the shore, which prevented access to the beaches in the area except at Coulderton, Nethertown Station and Nethertown. The promenade car park at Nethertown was a well-used access point for beach activities. There was an access road leading to the chalets at Coulderton, however, there was no public parking. There were a number of beach residences at Coulderton with a mix of full-time occupancy, holiday homes to-let and second homes. There were also a few beach chalets at Nethertown promenade.

Photograph 3. Coulderton beach

4.3.2 Activities

The area was popular for collecting molluscs, mainly winkles and mussels. Peeler crabs were also collected for fishing bait in season. Seaweed was collected from the beach by one individual and used as a garden fertiliser.

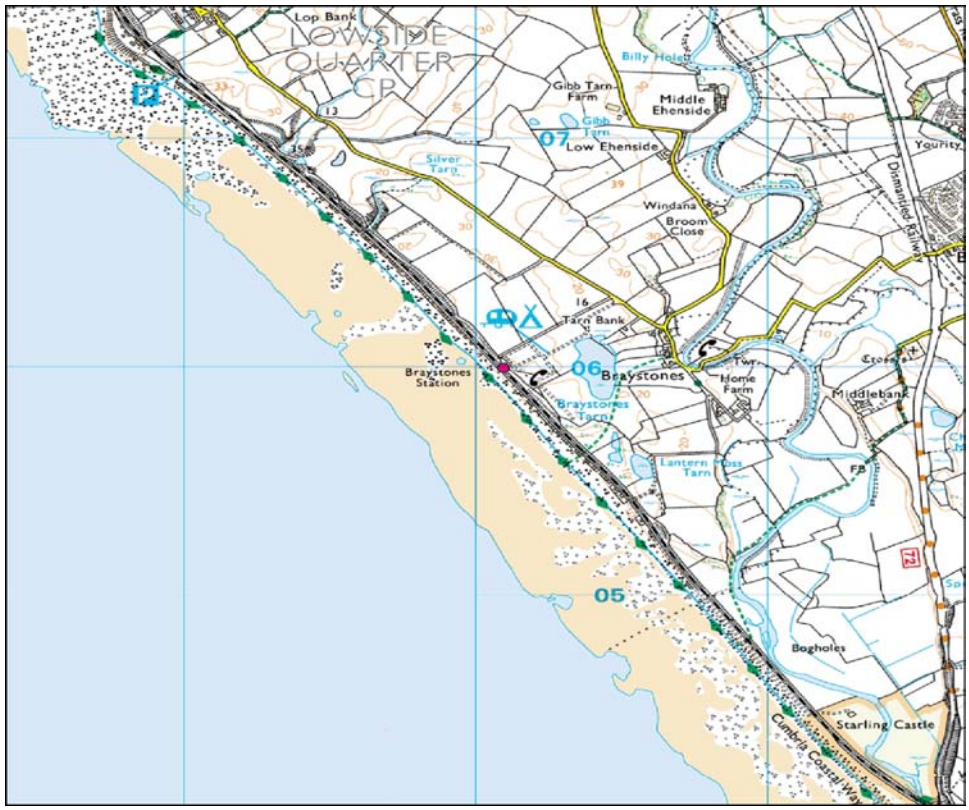
Both beach angling and boat angling were popular in this area. Netting and long-lining from the shore and potting off shore were also taking place. Local residents at Coulderton regularly collected driftwood for wood-burning stoves and collected stones from the beach to repair potholes in the roads. Activities undertaken regularly were beachcombing, beach clearing, dog walking and angling. Children played a variety of beach games, went rock pooling,

crabbing and building sandcastles. People were reported to be swimming and sunbathing in this area.

The number of people observed using the beach during the fieldwork at Coulderton ranged from 0 - 8 and at Nethertown ranged from 0 - 7. Local people that lived in the beach chalets used the beach regularly and holidaymakers also spent time on the beaches. There were fewer people using these beaches than St Bees, however, many of the beach residents were undertaking a range of activities and had high occupancy rates.

4.4 Nethertown to South Braystones

This section covers the area from the first chalet south of Nethertown promenade (NX 992 070) to the sewage treatment plant at South Braystones (NY 008 046), a distance of approximately 2 km (Map 5).



Map 5. Nethertown to South Braystones © Crown copyright

4.4.1 Beach description

South of Nethertown promenade the substrate reverted from stones to predominantly sand with occasional small rocky scars. The lower foreshore was a large expanse of mud and sand at low tide and the strip of upper foreshore that backed onto the railway comprised stones and boulders (Photograph 4). This section also had beach chalets, which were accessed by road from Braystones station. There were two caravan parks situated just inland of the railway line, one at Braystones Tarn and the other at South Braystones (Lantern Moss). The beach chalets were a mixture of full-time residency, holiday lets and second homes.

There was one access road to the beach in this area situated at Braystones station. The road was less well protected from tidal incursion than the one at Coulderton and was frequently being washed away. The road was in a poor state and was more suitable for four-wheel drive vehicles or tractors; this could deter people from visiting the area.

Photograph 4. Nethertown beach

4.2.1 Activities

Shore activities were very much the same as at Coulderton and Nethertown, such as winkle and mussel collection, beach angling, netting for shrimps, long-lining and set netting. Bait digging was more prevalent at Braystones because of large exposed areas of mud and sand at low tide.

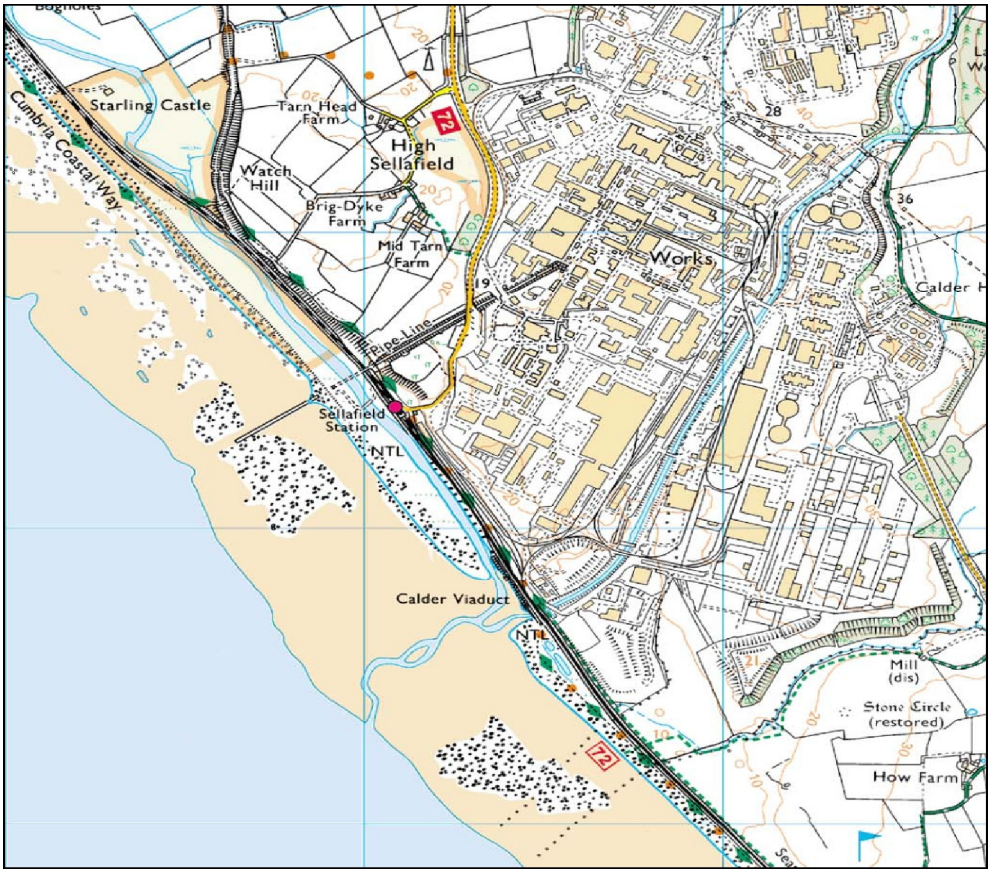
Local beach residents spent considerable amounts of time beach clearing, reinforcing sea defences, keeping the road clear of rubbish and filling potholes. Both beach and household rubbish was burned on the foreshore. Local families worked together in setting and servicing static fishing gear over the winter months; this was subject to byelaws set by the Cumbria Sea Fisheries Committee.

Holidaymakers from the caravan parks undertook beach activities such as playing ball games, kite flying, rock pooling, building sandcastles, paddling barefoot in summer, collecting shells, sunbathing, beachcombing and swimming. South of Braystones Station the general beach occupancy decreased and was predominantly residents of the caravan parks and beach chalets. Once past Lantern Moss it was mostly dog walkers from the caravan site.

The number of people observed using the beach at Braystones ranged from 0 - 15. The beach was predominantly used by local beach residents, many of which had high occupancy rates, and people staying at the caravan parks for long periods of time. There were more people using this beach than at Coulderton and Nethertown.

4.2 South Braystones to Sellafield and the mouth of the River Calder

This section covers the area from the sewage treatment plant at South Braystones (NY 008 046) to the public footpath approximately half a kilometre south of the mouth of the River Calder (NY 026 022), a distance of approximately 3 km (Map 6).



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Map 6. South Braystones to Sellafield and the mouth of the River Calder

4.2.1 Beach description

The River Ehen flows from the north of this section and runs parallel with the beach, past High Sellafield, the Sellafield site, and into the sea at the Calder Viaduct. The dunes between the River Ehen and the beach are known as the Ehen Spit. The River Calder flows through the Sellafield site and feeds into the sea at the southern end of the Ehen Spit alongside the River Ehen.

The beach at Sellafield is backed by sand dunes at the extreme high tide level, with a band of pebbles below this and principally sand down to the extreme low water mark. There are areas of stones, rocks and honeycomb worm colonies, with two main colonies either side of the confluence of the rivers Ehen and Calder. The Sellafield nuclear site liquid discharge pipes enter the Irish Sea at the northern end of the Ehen Spit with an on-site "sewer" pipe discharging at the confluence of the two rivers. There was an access road to Sellafield station, but there was no public access on foot from

Sellafield station to the beach. There was an access point to the beach across a footbridge, however, at the time of the survey, permission was needed to cross the footbridge due to work being carried out by the Sellafield site. The only way to access this section of beach was a relatively demanding long walk either from Braystones to the north of the Sellafield site or from Seascale or Drigg to the south (Photograph 5).

Photograph 5. Drigg beach towards Sellafield

4.2.1 Activities

Sellafield was visited less frequently by the survey team than other locations due to the difficulties in accessing the beach. On three occasions no one was observed on the beach and on one occasion two people were observed walking in the area near the mouth of the River Calder. On several occasions, fresh footprints and dog paw tracks were observed at Sellafield and around the mouth of the River Calder. People were observed walking dogs from Seascale and Braystones in the direction of Sellafield.

Six people were interviewed at other locations that undertook activities at Sellafield, which included angling, bait digging and dog walking. One person collected oyster shells. Three commercial lobster potters were identified with pots offshore of Sellafield beach. Local angling clubs were reported to be fishing the tidal stretches of the River Ehen. No children were identified spending time on Sellafield beach.

4.6 The mouth of the River Calder to Seascale and Carl Crag

This section covers the area from the public footpath approximately half a kilometre south of the mouth of the River Calder (NY 026 022) to Seascale and Carl Crag (SD 044 996), a distance of approximately 3 km (Map 7).

Map 7. The mouth of the River Calder to Seascale and Carl Crag © Crown copyright

4.6.1 Beach description

Seascale is a popular seaside town with a large sand and stone beach. The beach was predominantly sand with a narrow stretch of stones (Photograph 6) and a small rocky scar (Whitriggs Scar) on the upper foreshore. There was one access road from Seascale and footpath access at Carl Crag. Seascale was a popular beach with locals and holidaymakers due to its easy access, plenty of car parking and local amenities. There was a secure boat compound in Seascale near the beach car park, with a public slipway for launching boats.

Photograph 6. Seascale beach

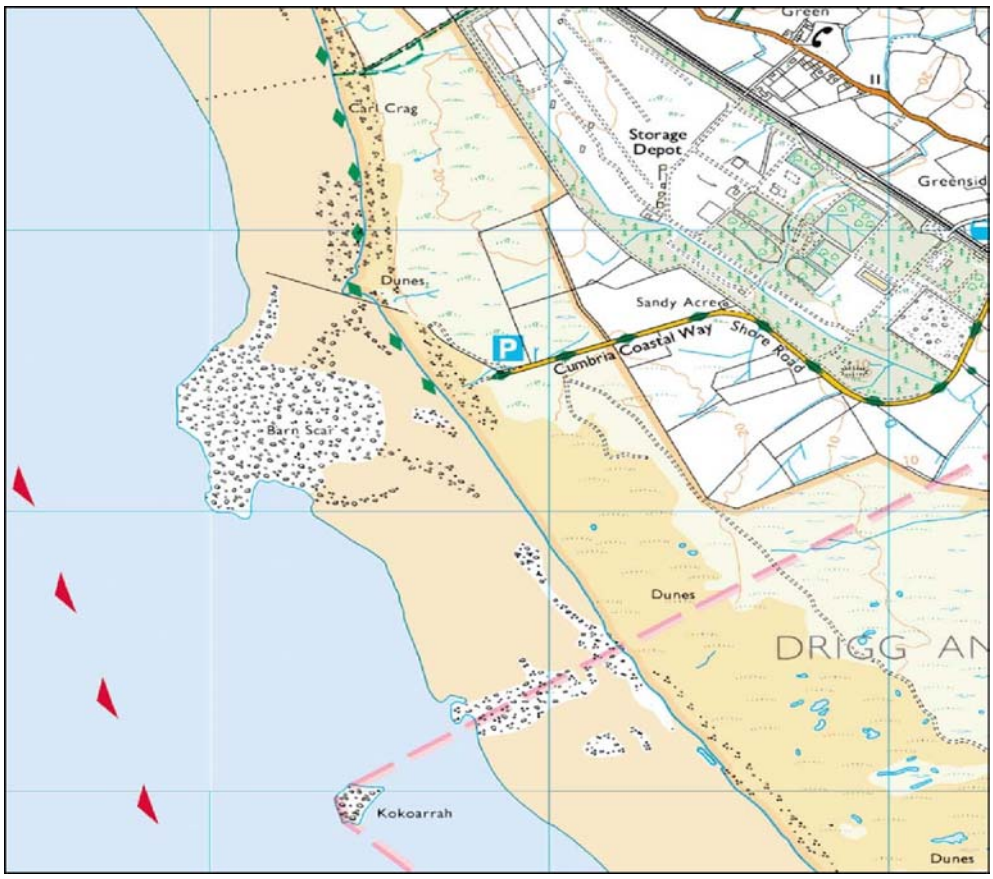
4.6.2 Activities

At high tide the beach was predominantly stone and activities were mostly dog walking, walking and boat launching. At low tide, activities at Seascale included sand yachting, dog walking, walking, angling, playing on sand, rock pooling, paddling, beachcombing and swimming. Shellfish collecting was especially popular on the rocks at Whitriggs Scar and commercial fishermen were potting offshore. People were observed walking towards Sellafield.

The number of people observed on Seascale beach during the fieldwork ranged from 0 - 31. These were a mixture of locals undertaking activities daily such as dog walking and tourists using the beach for small amounts of time.

4.7 Carl Crag to Drigg and Kokoarrah Scar

This section covers the area from Carl Crag (SD 044 996) to Kokoarrah Scar (SD 055 970), a distance of approximately 2 km (Map 8).



Map 8. Carl Crag to Drigg and Kokoarrah Scar © Crown copyright

4.7.1 Beach description

Drigg beach was sand and stones, which was predominantly stones at high tide (Photograph 7). Sand dunes covered a large part of the upper beach. Below the dunes was a narrow stretch of stones, then sand on the mid to lower foreshore and mud and sand on the lower foreshore. There were two scars; Drigg Barn Scar, on the lower foreshore of Drigg beach, and Kokoarrah Scar, 1 km further south. Drigg Barn Scar was easily accessed from the beach, however, Kokoarrah Scar could only be accessed on foot on extreme spring tides because it was beyond the low water mark. There was one access road at Drigg and there was footpath access at Carl Crag to the north.

Photograph 7. Drigg beach

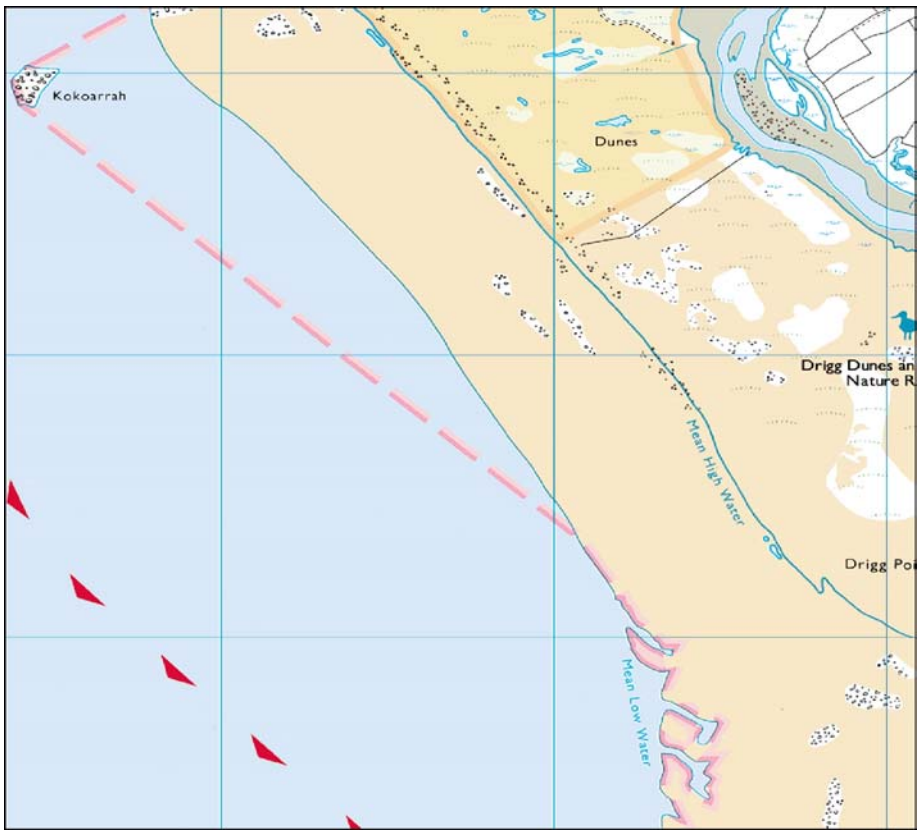
4.7.2 Activities

At high tide, activities were predominantly dog walking and walking on stones, sand and sand dunes. There were areas of possible seaweed collection, however, this activity was not recorded during the survey. At low tide, shore angling, bait digging and dog walking were popular activities on mud and sand; children were playing on the beach naked, rolling in sand, paddling, playing beach games, building sand castles and picnicking. One person was collecting oyster shells. One person on a kite board was observed on the beach. Staff and students from a local field centre visited the area regularly to survey the sand dunes. Drigg Barn Scar and, to a lesser degree, Kokoarrah Scar were popular areas for both mollusc and crustacean collection.

The number of people observed on Drigg beach ranged from 0 – 60. Both locals and holidaymakers used the beach.

4.8 Kokoarrah Scar to Drigg Dunes and Drigg Point

This section covers the area from Kokoarrah Scar (SD 055 970) to Drigg Point (SD 070 950), a distance of approximately 2 km (Map 9).



Map 9. Kokoarrah Scar to Drigg Dunes and Drigg Point© Crown copyright

4.8.1 Beach description

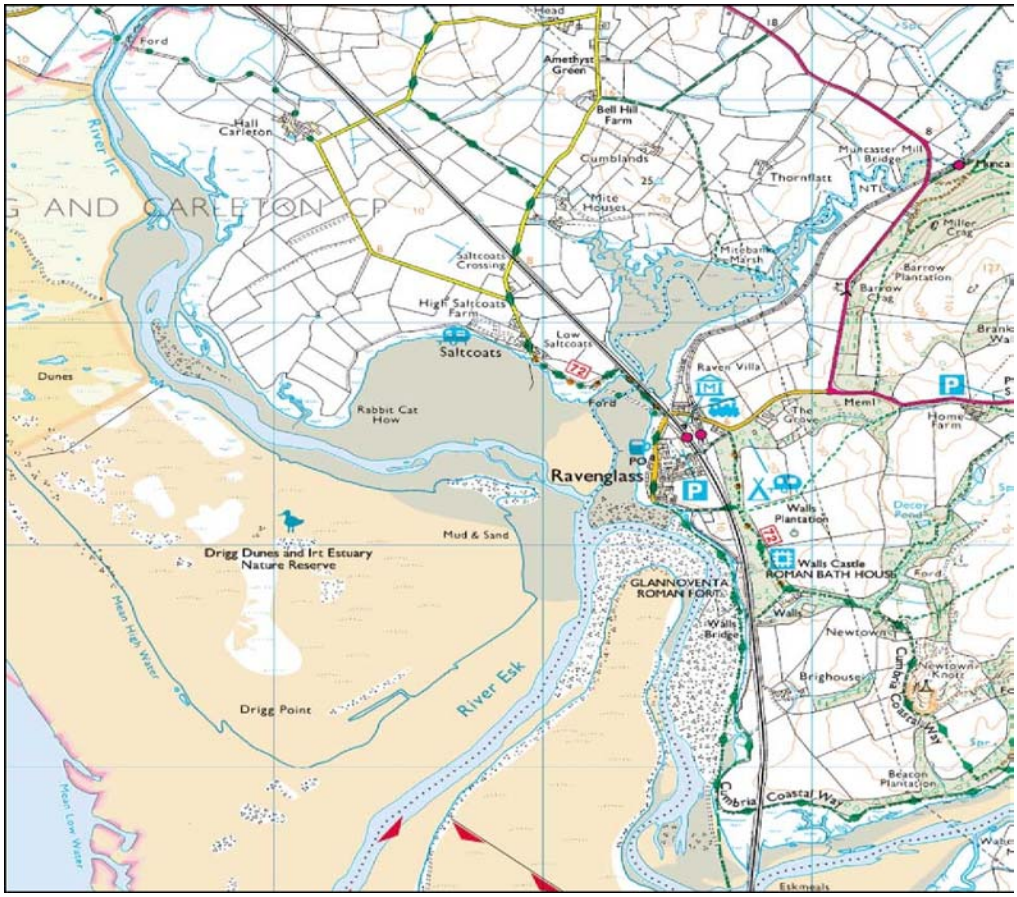
The area from Kokoarrah Scar to Drigg Point is the Irt Estuary Nature Reserve. This area is almost all sand with a few small stony patches. It was less frequently visited than the rest of Drigg beach simply because of the distance involved in reaching it. There was no road access in this area, only footpaths through the Nature Reserve; the nearest road access was at Drigg to the north.

4.8.2 Activities

Activities on the Drigg Dunes and nature reserve beach were sparse. Tourists and locals who were walking and dog walking on the nature reserve, were interviewed at Drigg. Groups of local volunteers were reported to be collecting litter from the beaches within the nature reserve.

4.9 Drigg Point along the Irt Estuary to Drigg Ford, and Saltcoats to Ravenglass along the Esk Estuary

This section covers the area from Drigg Point (SD 070 950) to Ravenglass (SD 088 956) (Map 10). It includes the Irt Estuary to Drigg Ford, and Saltcoats to Ravenglass along the Esk Estuary.



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Map 10. Drigg Point along the Irt Estuary to Drigg Ford, and Saltcoats to Ravenglass along the Esk Estuary

4.9.1 Beach description

Drigg Point is characterised by sand dunes on the upper part of the beach and sand on the mid and lower foreshore. The substrate around the Irt and Esk estuaries was sand, firm mud and salt marsh. The Esk Estuary near Ravenglass was mainly sand and mud with a rock and shingle area on the upper half of the beach (Photograph 8).

There is road access at both Saltcoats and Ravenglass. A ford linked Saltcoats to Ravenglass; this was not well used by the public but was used by farmers and fishermen. At low tide when the rivers were not in spate it was possible to wade across from Saltcoats to Ravenglass.

Photograph 8. Ravenglass beach

4.9.2 Activities

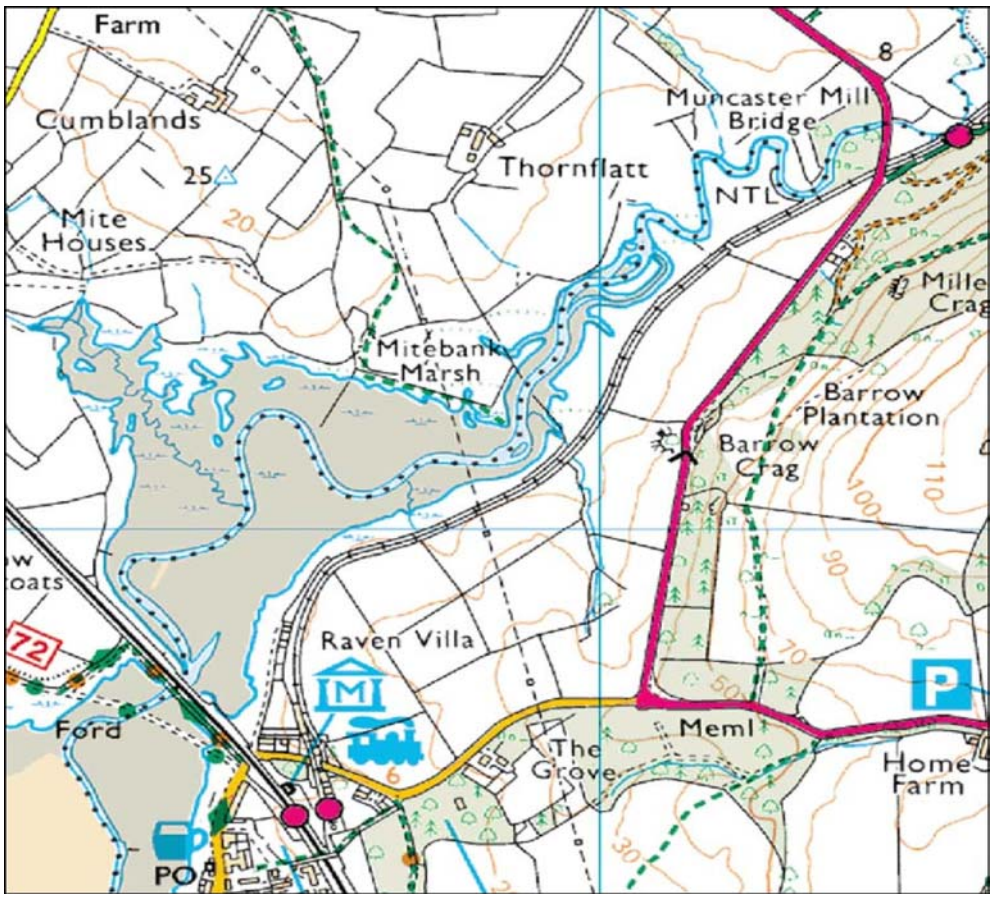
During the period of this survey no one was observed between Drigg Point and Drigg Ford. From previous experience it is known that nature reserve wardens, naturalists, birdwatchers, farmers and members of the general public access this area.

A caravan park at Saltcoats had 64 privately owned vans, the majority of which were occupied by families although there were no full time residents. People from the caravan park use the beach very infrequently. During the period of this survey only a few individuals, mainly from the caravan site, were observed on this stretch of coastline. Previous experience suggests that occupancy is fairly limited, predominantly farmers and wildfowlers although it is known that both samphire and fungi are collected in this area. On the one occasion that Saltcoats was visited during the survey, 15 people were observed on the beach.

Ravenglass is a major tourist destination in west Cumbria; however, there were many attractions in the area other than the beach. Tourists predominantly accessed the upper part of the beach. Some houses backed onto the beach and it was often used as an extension of the back gardens. There were a small number of both commercial fishing vessels and pleasure boats moored in the channel and on the beach. Access in and out of the channel was tide dependent and boat maintenance was carried out at low tide. Mussels, cockles and a few oysters are collected from the rocky area to the south of Ravenglass. The number of people observed on Ravenglass beach during the fieldwork ranged from 1 – 20. It was mainly tourists using the beach for short periods of time and a few locals with high occupancy rates.

4.10 The Mite Estuary

The Mite Estuary is the tidal area stretching inland from the railway bridge at Ravenglass to Muncaster Mill (Map 11).



Map 11. The Mite Estuary © Crown copyright

This section of the survey area received little attention due to the limited access and the low number of people that use the area. The substrate was predominantly mud at low tide and salt marsh or grazing land at high water. As the area around the shore was farmland, access to the shore was limited to footpaths or access by boat.

From previous experience it is known that occupancy is mainly by farmers, wildfowlers and boat owners maintaining their vessels over the salt marsh areas at Raven Villa.

5. Headcount

A headcount was taken of all the people observed and interviewed each time a beach was visited. The fieldwork headcount is presented in full in Annex 1. This gives details of the activities of interviewees and activities of people observed, people that were encountered more than once during the survey and the weather conditions during the fieldwork. A summary of the headcount for each fieldwork day at each location is shown in Table 1.

Table 1. Number of people observed and interviewed on the beaches during the fieldwork

	St Bees	Seamill	Coulderton	Nethertown	Braystones	Sellafield	Seascale	Drigg	Drigg Point and Drigg Ford	Saltcoats	Ravenglass
Thursday 17th May	6										
Wednesday 23rd May	75										
Wednesday 30th May		10	0	0	5		5	5			14
Thursday 31st May	10		0	0				0			0
Friday 1st June		16	4	1	0						
Thursday 7th June		5	4	2	6		24	4			
Tuesday 26th June	26			3							
Friday 29th June	13	20					0	2			3
Saturday 30th June		8									
Wednesday 4th July	17										
Thursday 5th July				2	0						
Friday 6th July				4	0						
Monday 9th July											20
Friday 13th July	2										
Wednesday 18th July		9	6	3							
Thursday 19th July					0	0					
Tuesday 24th July	8	7	4	2	7	0	19	12			
Thursday 26th July	3			0	15						
Monday 30th July				0	0			2			
Tuesday 31st July	10	2		2			0				
Thursday 2nd August				5							
Thursday 9th August							20	20	0	15	0
Tuesday 14th August	6	0	8	7							
Wednesday 15th August					0	0	31				
Monday 20th August		7		2							
Tuesday 21st August	5							14			4
Wednesday 22nd August		30									
Thursday 23rd August	15-20			3			6	30			
Friday 24th August	10-20				6			10			
Monday 27th August (Bank Holiday Monday)	26	6	5	3	11						
Friday 31st August	10			0			4	7			
Friday 7th September	5			0	0		3				
Tuesday 11th September	1	6	1	3			3	63	0		7
Wednesday 12th September				1							5
Friday 14th September	3	0	0	1	1		0				
Tuesday 18th September	8			0	4	2	5				
Thursday 20th September	4	7	1	0	0						

The headcount only applies to people observed and interviewed on beaches. In some instances people were interviewed in their homes, these people have not been included in the headcount. The busiest beaches were St Bees, Seamill, Seascale, Drigg and Ravenglass. Sellafield and Drigg Point were the most infrequently used beaches.

It should be noted that the number of people in Table 1 does not directly correlate with the number of people undertaking activities on beaches in the interview data. In many cases people were undertaking activities at several locations or were interviewed in their homes. For example, in the case of Sellafield beach, only two people are noted in Table 1 but the occupancy data shows that six people were undertaking activities on Sellafield beach.

6. Data for probabilistic assessments

Interview data for use in probabilistic assessments are presented in Annex 2. In order to assess the probability of encountering a particle, data are required on activities at each beach location within the survey area, the duration and frequency of these activities and the time of year they are undertaken.

Interview data in Annex 2 are grouped by location. For each location, data are grouped in the following categories, intertidal occupancy, handling beach materials, handling sediment and handling fishing gear. These categories are ordered by observation number, this is irrespective of age. The total hours per year and the activity undertaken by each interviewee are provided. Information is also provided on the frequency of visits to the locations and the time of year in which the activities were undertaken if this was specified by the interviewee. Some interviewees were unable to provide a breakdown of hours per year and frequency per activity if they undertook several activities during one or many visits to the beach. For example, if an individual was playing, building sand castles, being buried in sand and walking during one visit to the beach. Also, it has been noted whether the individual is local to the area, a visitor or a holidaymaker.

Interview data was collected for adults and children undertaking activities at St Bees, the beach between St Bees and Seamill, Coulderton, Nethertown, Braystones, Seascale, Drigg, and Ravenglass, and for adults undertaking activities at Seamill, Sellafield and Saltcoats. Children were observed on the beaches at Seamill and Saltcoats but interviews were not undertaken. Children were not observed on Sellafield beach. Interviewees were undertaking activities at varying frequencies ranging from daily to once per year. Many local people were using the beaches daily, there were also locals using the beaches infrequently. The frequency of visitors and holidaymakers varied from people staying in caravans and chalets using the beaches often, to those visiting for one day or several hours. Certain activities such as dog walking and angling were undertaken throughout the year and other activities such as children playing and rock pooling were more popular in the summer months.

Assumptions were made when analysing the interview data for Annex 2, these were:

- If an interviewee gave a total occupancy or handling rate for one activity that was being undertaken at several locations in the survey area, the total rate was split equally between those locations. Where this occurs it has been noted in Annex 2 under frequency of visits.
- If an interviewee gave occupancy rates per week in the summer months, this has been assumed to cover a period of four months.
- School summer holidays were assumed to cover a period of six weeks.

Observations have not been prescribed rates for activities relating to inadvertent ingestion or inhalation.

7. Collective data

Collective data may be required to assist in assessing the total probability of encountering a particle.

For each beach location, collective occupancy and collective handling are presented in Tables 2 and 3, respectively. These data give a crude indication of the relative occupancies and handling at each location in the survey area for the period of fieldwork. In order to undertake an assessment on the total probability of encountering a particle, an estimate would have to be made of absolute occupancy. This would be a total estimate of annual occupancy for the survey area. The absolute occupancy levels have not been estimated in this report as it is outside the remit of the survey.

Further work could be undertaken to estimate absolute occupancies, this would need to account for people that were not interviewed during fieldwork, and people using the beaches at all other times such as evenings, weekends and other times of the year. There are many resources that can be used to obtain data to estimate absolute occupancies, the following could be considered:

- Statistics from the local tourist board and local councils on the number of visitors to the area and information about local events.
- Occupancies of people in caravan parks and beach chalets in the area.
- Local groups of regular beach users such as fishermen, anglers, watersports enthusiasts.
- Contacting regular beach users, such as dog walkers, to estimate numbers of people using the beach and occupancies.
- Conducting more fieldwork to account for temporal and seasonal variability.
- Analysing meteorological data for the survey area.

There would be difficulties in estimating absolute occupancies. The fieldwork has highlighted that there is great variability in the occupancies of locals, visitors and tourists using the beaches. It may be achievable to obtain a reasonable headcount but more problematic to estimate occupancies. The occupancies of certain activities might be easier to estimate, such as dog

walking or angling, than others. Survey data may be useful to estimate the time spent undertaking certain activities. The resulting uncertainties of estimating absolute occupancies would be significant.

7.1 Collective occupancy

Collective occupancy for each beach in the survey area was calculated by summing the occupancy rates for each location. Intertidal occupancy over all substrate types were combined (such as sand, mud and sand, rock and sand) for each location, handling rates were not included. Table 2 shows the collective occupancy (h/y) for interviewees at 12 locations in the survey area. This is also represented in Map 12.

Table 2. Collective occupancy for all interviewees at each location

Location	Collective occupancy (h/y)	Number of interviewees
St Bees	9274	70
St Bees to Seamill	1190	8
Seamill	2365	10
Coulderton	4210	19
Nethertown	3457	23
Braystones	9433	44
Sellafield	470	6
Seascale	11932	44
Whitriggs Scar (Seascale)	750	2
Drigg	6094	39
Saltcoats	270	1
Ravenglass	570	7

St Bees beach had the highest number of interviewees but had a lower collective occupancy rate compared with other beaches with less interviewees. This was because, along with the locals that regularly used the beach, there were many holidaymakers using the beach for short periods of time. Seascale had the highest collective occupancy rate. At Braystones and Seascale there were fewer people using the beach than St Bees, but both these beaches had high collective occupancy rates because people were using the beach for longer periods of time.

7.2 Generic data

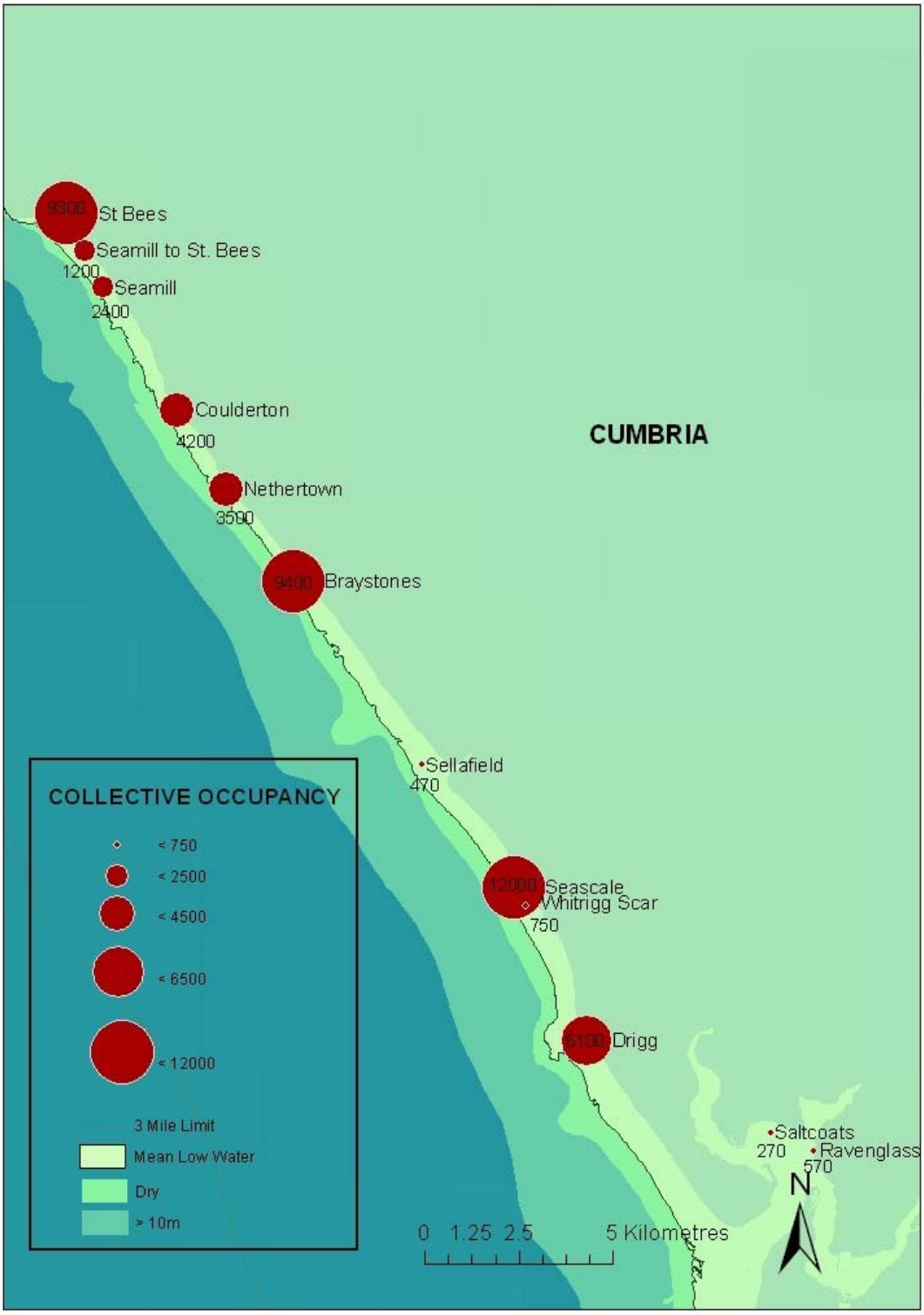
Generic data were collected for several groups of people undertaking activities on beaches. These data have not been included in the tables in this report.

Four local schools, which conducted trips to St Bees beach as part of their school curriculum, were identified. These schools organised one visit to the beach per year for groups of 25 – 30 pupils. The ages ranged from 4 – 18 years. The ages of the pupils varied each year depending on the school

curriculum. The trips were for half a day and activities included general beach studies, walking along the beach and rock pooling. One school party took shells and stones back to their school to create a rock pool in their classroom.

As part of the Cumbria Art Festival in September 2007, an artist arranged for 3500 sandcastles to be built in one day on St Bees beach, near St Bees Head. The sandcastles were built by 43 people over four hours and covered an area of 200 metres by 20 metres.

Several litter collecting groups who volunteered to collect litter at Drigg and Ravenglass were identified. At Drigg beach, one group visited for approximately 20 h/y. Volunteers wore gloves while collecting debris such as plastic items and fishing line in the area. The debris was collected between the dunes and the beach, mainly along the strandline. Bagged litter was collected and disposed of by the council.



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Map 12. Map of collective occupancy (h/y)

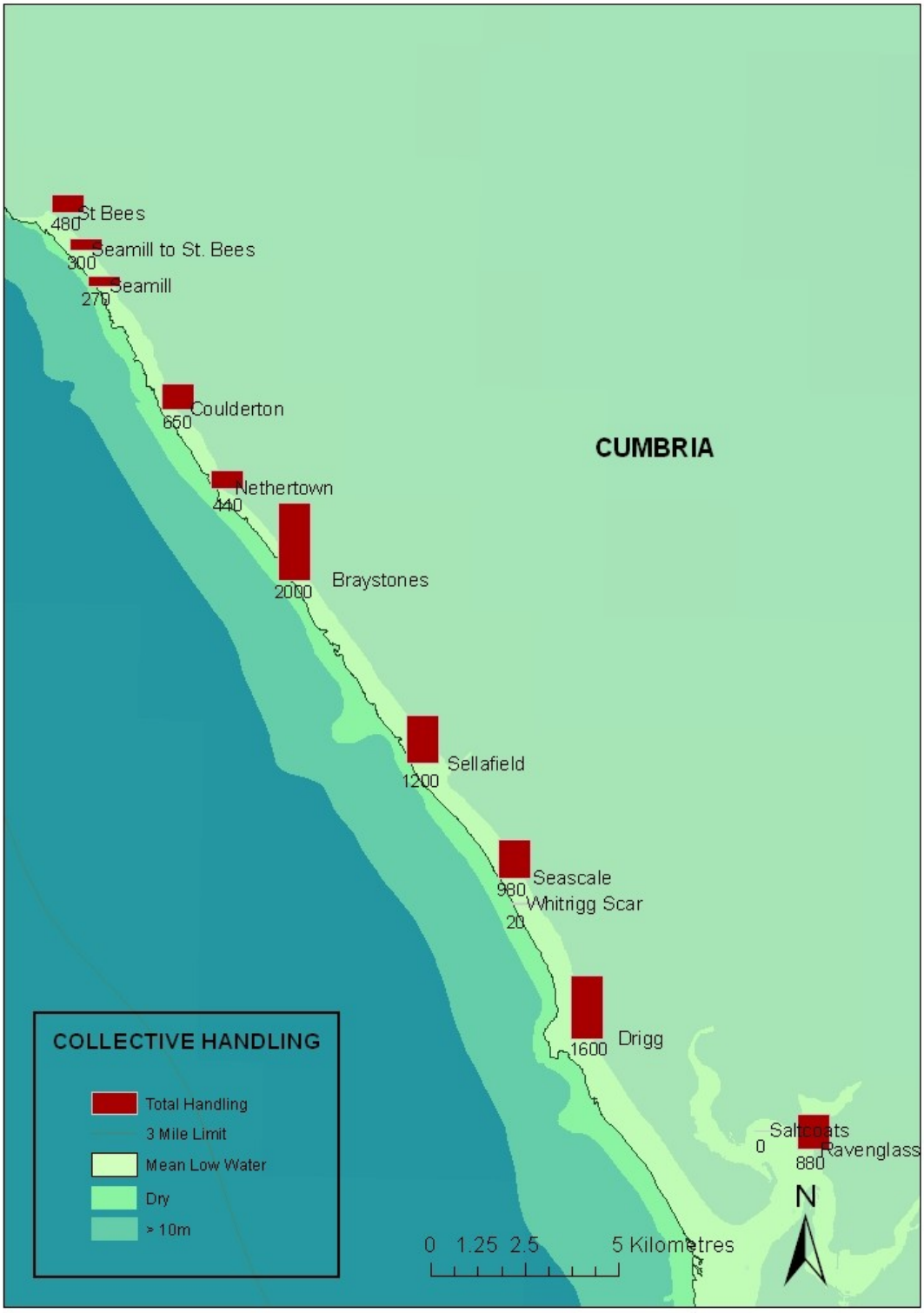
7.3 Collective handling

Collective handling was calculated by summing the rates for handling beach materials, beach sediments and fishing gear for each beach location. It should be noted that some commercial fishermen and winkle collectors wore gloves while handling fishing gear and sediment. Table 3 shows the collective handling (h/y) for interviewees at 11 locations in the survey area. This is also represented in Map 13.

Table 3. Collective handling for all interviewees each location

Location	Collective handling (h/y)	Number of interviewees
St Bees	483	17
St Bees to Seamill	295	5
Seamill	273	3
Coulderton	653	9
Nethertown	444	13
Braystones	1961	19
Sellafield	1228	7
Seascale	981	14
Whitriggs Scar (Seascale)	20	1
Drigg	1593	10
Ravenglass	884	6

Braystones had the highest number of interviewees and highest collective handling rate. This was mainly due to people bait digging, shellfish collecting and netting from the shore. St Bees had a high number of people, mainly tourists spending small amounts of time handling. Handling rates for Sellafield, Seascale, Drigg and Ravenglass include three commercial lobster potters who were potting offshore.



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Map 13. Map of collective handling (h/y)

8. Individual exposure

Intertidal occupancy and handling rates for adults and children were analysed using the cut-off method (Hunt *et al.,* 1982). These rates are summarised below. The complete data set for adults' intertidal occupancy and handling rates are shown in Annex 3 and 5, respectively. The complete data set for children's intertidal occupancy and handling rates are shown in Annex 4 and 6, respectively.

8.1 Intertidal occupancy

Intertidal occupancy data were categorised by substrate. Six different types of substrate were identified; mud and sand; rock; rock and sand; sand; sand dunes; and stones. Tables 4 and 5 show the number of high rate individuals, the activity of the individual(s) with the maximum rate, the maximum occupancy rate and the mean critical group rate for adults and children, respectively.

Adults

Table 4. Summary of adults' intertidal occupancy rates

Substrate	Number of high rate individuals	Activity of individual(s) with maximum rate	Maximum occupancy rate (h/y)	Mean critical group rate (h/y)
Mud and Sand	1	Bait digging and angling	1248	1248
Rock	5	Winkle collecting	700	442
Rock and sand	5	Mollusc collecting	300	175
Sand	24	Setting nets, collecting cockles and winkles	1051	593
Sand dunes	1	Dog walking	547	547
Stones	14	Dog walking	730	378

Other activities of adults with high intertidal occupancy rates included; collecting winkles and mussels, hooking crab and lobster, angling and dog walking over rock; collecting winkles, mussels and peeler crabs and rock pooling over rock and sand; dog walking, set lining, angling, walking and playing over sand; dog walking, angling, and walking over stones.

Children

Table 5. Summary of children's intertidal occupancy rates

Age	Substrate	Number of high rate individuals	Activity of individual(s) with maximum rate	Maximum occupancy rate (h/y)	Mean critical group rate (h/y)
15	Sand	2	Playing	100	68
	Stones	1	Dog walking and angling	35	35
10	Rock	1	Winkle collecting	220	220
	Rock and sand	2	Rock pooling	39	39
	Sand	4	Playing	258	219
	Stones	2	Collecting stones	38	38
5	Rock and sand	6	Rock pooling	122	72
	Sand	16	Walking	280	162
	Stones	3	Dog walking	122	81
1	Sand	1	Playing	5	5

Activities of children with high intertidal occupancy rates included; dog walking and angling over sand; playing barefoot and rock pooling over rock and sand; building sandcastles, crabbing, playing beach games, eating picnics and dog walking over sand; walking over sand and stones.

8.2 Handling

Handling data were categorised by handling beach materials (such as driftwood, shells, stones), handling sediment (such as mud or sand) and handling fishing gear (such as nets or pots).

Tables 6 and 7 show the number of high rate individuals, the activity of the individual(s) with the maximum handling rate, maximum handling rate and the mean critical group rate and for adults and children, respectively.

Adults

Table 6. Summary of adults' handling rates

Handling	Number of high rate individuals	Activity of individual(s) with maximum rate	Maximum handling rate (h/y)	Mean critical group rate (h/y)
Beach materials	4	Beachcomber collecting driftwood, stones and shells	312	177
Sediment	3	Collecting winkles and bait digging	907	716
Fishing gear	3	Commercial lobster potter	1436	1112

Activities of adults with high handling rates included; beachcombing; handling crabs, seaweed and stones; collecting driftwood, cockles, mussels and winkles; and bait digging.

Children

Table 7. Summary of children's handling rates

Age	Handling	Number of high rate individuals	Activity of individual(s) with maximum rate	Maximum handling rate (h/y)	Mean critical group rate (h/y)
10	Beach materials	2	Collecting stones and rock pooling, handling stones and shells	60	60
	Sediment	1	Collecting winkles	110	110
5	Beach materials	5	Handling crabs, seaweed and stones	140	74

Activities of children with high handling rates included; rock pooling, collecting stones, crabs and seaweed, and collecting winkles.

9. Inadvertent ingestion and inhalation

Certain beach activities could potentially lead to the inadvertent ingestion and inhalation of radioactive particles. Such activities noted during the survey included; eating picnics on the beach, playing beach games, building sandcastles, paddling, getting buried in sand, sunbathing and sand yachting. Observations have not been prescribed rates for inadvertent ingestion and inhalation. Occupancy rates for individuals undertaking these activities are discussed in Sections 6 and 8.

10. Variability and uncertainty

The Sellafield beach occupancy survey was subject to variability and uncertainty relating to the fieldwork, data collection and data analysis, these have been listed below. It may be important to consider this variability and uncertainty for radiological assessments.

10.1 Variability

Variability arising during the survey fieldwork includes the following:

- Meteorological variability - the weather during the summer of 2007 was unusually wet and cold which affected the number of people seen on the beaches compared with previous years. Even on sunny days, the survey team noted that there were not the usual numbers of people that would be expected in the summer months.
- Temporal variability - fieldwork was predominantly carried out during the week rather than at weekends. Also, the fieldwork was carried out in the day rather than in the evening, therefore, people using the beaches solely at weekends and evenings are under represented.
- Seasonality – the fieldwork was limited to 5 months of the year so activities taking place at other times of the year have not been accounted for.
- Geographical variability – due to the size of the survey area, it was not possible to visit all locations on each day of fieldwork. Activities at these remote locations may be under represented.

10.2 Uncertainty

Uncertainty arising from the collection of data includes the following:

- Data provided by interviewees could be an under estimate or over estimate of their actual time.
- It was easier for interviewees to think about activities retrospectively rather than prospectively. However, certain people such as dog walkers and anglers were able to predict what they will be doing as they tended to have routine times.
- Some interviewees were less able to provide precise data than others. Some people could only give rough estimates of their occupancy time. This was particularly the case for holidaymakers.
- If activities were undertaken over several locations and substrates, it was difficult for interviewees to split their occupancy times between

locations and substrates. In these cases a total occupancy rate per year over all locations and substrates was given.
- Handling rates for beach materials and sediments for some activities were difficult to quantify. Where possible, interviewees provided an estimate of the amount of time spent handling.
- Certain activities were difficult to quantify such as playing barefoot, building sandcastles and being buried in sand.
- Commercial lobster potters and winkle collectors may wear gloves when handling fishing gear and sediment, this may vary with the seasons and activities.

Uncertainties arising from data analysis include the following:
- In some cases interviewees gave a total occupancy rate for all time spent on beaches. This may have included time spent undertaking several activities on more than one beach. When analysing these data, the total rate has been equally split between the number of locations, activities or substrates.
- It was assumed that activities occurring in periods of good weather in the summer months covered a period of four months.
- It was assumed that summer holidays cover a period of six weeks.

11. Conclusions

The survey investigated beach occupancy and handling pathways relating to potential public exposure to radioactive particles in the vicinity of the Sellafield nuclear site. Observations for 202 individuals were recorded. Ten main locations in the survey area were identified; St Bees, Seamill, Coulderton, Nethertown, Braystones, Sellafield, Seascale (including Whitriggs Scar), Drigg (including Drigg Point), Saltcoats and Ravenglass.

Beach occupancy in the survey area was to a large extent governed by access limitations to the beaches. The beaches at St Bees, Seamill, Seascale, Drigg and Ravenglass all had easy access by foot or by car and large public parking areas, therefore were popular beaches with locals and tourists. Access to the beaches at Coulderton, Nethertown, Braystones and Saltcoats was more restricted and were used predominantly by local people. There was no public access at Sellafield either by road or footpath, it could only be reached by walking from Braystones or Seascale.

There were a number of beach chalets at Coulderton, Nethertown and Braystones, which were permanently inhabited or used as holiday homes. Individuals who lived in these chalets carried out a variety of activities daily. There were caravan parks at St Bees, Braystones and Saltcoats occupied by locals and holidaymakers.

A headcount of people observed and interviewed on the beaches was taken throughout the fieldwork. St Bees beach was the most frequently used beach in the survey area. Seamill, Seascale, Drigg and Ravenglass were also popular beaches. Sellafield and Drigg Point were identified as the most infrequently used beach areas.

Interview data were collected for adults and children undertaking activities at St Bees, the beach between St Bees and Seamill, Coulderton, Nethertown, Braystones, Seascale, Drigg, and Ravenglass, and for adults undertaking activities at Seamill, Sellafield and Saltcoats. Children were also observed on the beaches at Seamill and Saltcoats but interviews were not undertaken. Children were not observed on Sellafield beach. Local people, visitors and holidaymakers were undertaking activities at varying frequencies ranging from daily to once per year. Certain activities such as dog walking and angling were undertaken throughout the year and other activities such as children playing and rock pooling were more popular in the summer months.

Collective data presented in this report provides an indication of the relative occupancies and handling, they are not an estimate of absolute levels. St Bees beach had the highest number of interviewees but had a lower collective occupancy rate compared with other beaches with less interviewees. This was because along with the locals that regularly used the beach, there were many holidaymakers using the beach for short periods of time. Seascale had the highest collective occupancy rate. At Braystones and Seascale there were fewer people using the beach than St Bees, but both these beaches had high collective occupancy rates because people were using the beach for longer periods of time. Braystones had the highest number of people handling sediment, beach materials and fishing gear. This was mainly due to people bait digging, shellfish collecting and netting from the shore. Handling data for Sellafield, Seascale, Drigg and Ravenglass included three commercial fishermen handling pots offshore.

For individual exposure, activities were identified occurring over six different types of substrate. These were; mud and sand; rock; rock and sand; sand; sand dunes; and stones. High occupancy and handling rates were recorded for adults undertaking the following activities; dog walking, angling, beachcombing, bait digging, shellfish collecting, setting nets and lobster potting. High occupancy and handling rates were recorded for children undertaking the following activities; playing, dog walking, walking, angling, winkle collecting, rock pooling and collecting stones.

Overall, the fieldwork has provided a representative overview of activities undertaken by locals and holidaymakers in the survey area during the survey period in 2007. However, the fieldwork and data analysis was subject to variability and uncertainty, which may be important to consider if these data are used in radiological assessments. This included meteorological, temporal, seasonal and geographical variability, and uncertainty arising from the collection of data and data analysis.

Further work may be required in order to fulfil requirements for radiological assessments. This will only become evident once the assessment methodology to determine the probability of encountering particles has been developed, and it may necessitate further fieldwork or data analysis. If an assessment on the total probability of encountering a particle were needed, work would be required to estimate absolute occupancy to account for all people that were not considered in this survey.

12. Acknowledgements

Gratitude is expressed to members of the public and representatives of local authorities, groups and agencies who offered helpful advice and information during the survey. This survey was undertaken on behalf of the Environment Agency, the project officer and other Environment Agency staff gave considerable help during the survey. Maps 2 – 11 in this report are copyright of Ordnance Survey. Gratitude is expressed to Steve Messam, the artist, and Tony West, the photographer, for the use of a photograph from the 'Beached' sandcastle piece, which was part of the Cumbria FRED festival 2007.

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Annex 1. Number of people observed on the beaches during the survey fieldwork

Location	Weather	Total headcount	Breakdown of headcount		
			People for whom data were obtained	Insufficient data obtained	People interviewed previously during the survey
Thursday 17th May 2007					
St.Bees	Cloudy/raining (drizzle)	**6**	3 dog walkers	2 dog walkers, 1 fisherman observed fishing off St Bees Head	
Wednesday 23rd May 2007					
St.Bees	Light rain	**Approx 75**	2 dog walkers, 1 male crabbing	BNG monitoring on beach; 2 school groups 1 x approximately 30 6-7-year-olds crabbing with nets, 1 x approximately 40 8-10-year-olds, 1 kite boarder	
Wednesday 30th May 2007					
Drigg	Sunny	**5**	1 dog walker	4 holidaymakers walking along the beach	
Ravenglass	Sunny	**14**		13 visitors waiting for the 'Ratty' train 1 young girl playing on the beach	
Seascale	Sunny	**5**	1 dog walker	4 employees of the Sellafield site	
Braystones	Sunny	**5**		Family of 5, one female (50's) 4 males (teens) live in beach chalet clearing rubbish, beach repair and reinforcing sea defences	
Nethertown	Sunny	**0**			
Coulderton	Sunny	**0**			
Seamill	Sunny	**10**		3 boys (11-13) playing in rock pools, 7 people observed in the distance	
Thursday 31st May 2007					
St Bees	Cloudy	**7**		4 children playing on the rocks, 2 dog walkers, 1 other person on the beach	
Nethertown	Cloudy	**0**			
Ravenglass	Cloudy	**0**			
Drigg	Cloudy	**0**			
Coulderton	Cloudy	**0**			
St Bees (2nd visit)	Cloudy	**3**	1 dog walker, 1 angler/dog walker, 1 sunbather		

Annex 1. Number of people observed on the beaches during the survey fieldwork

Location	Weather	Total headcount	Breakdown of headcount		
			People for whom data were obtained	Insufficient data obtained	People interviewed previously during the survey
Friday 1st June 2007					
Seamill	Very hot/sunny	**16**	2 adults and 3 children playing (often barefoot) and dog walking, and 1 angler, 1 adult and 2 children walking	Mother (40's) and son (15) on holiday, first visit. 4 girls (early teens) walking on beach. 1 male helping the angler.	
Coulderton	Very hot/sunny	**4**	2 people dog walking	2 boys (10-12) crabbing	
Nethertown	Very hot/sunny	**1**	1 dog walker		
Braystones	Very hot/sunny	**0**			
Thursday 7th June 2007					
Seamill	Warm/dry/calm	**5**			2 dog walkers and 3 children
Coulderton	Warm/dry/calm	**4**	2 dog walkers/beachcombers, 1 winkle collector	1 person with a holiday home, minimal time on the beach	
Nethertown	Warm/dry/calm	**2**	1 angler	1 dog walker	
Braystones	Warm/dry/calm	**6**	3 anglers/shellfish collectors, 2 anglers	1 female holidaymaker (20's) walking on the beach	
Seascale	Warm/dry/calm	**24**	1 walker, 1 winkle collector, 1 dog walker, 2 adults and 2 toddlers playing	6 dog walkers, 2 women with 2 toddlers playing, 4 men at waters edge, 1 male holidaymaker (20's) flying a kite, 2 people walking in the distance	
Drigg	Warm/dry/calm	**4**		Holidaymakers, 2 adults and 2 children (4-6) playing rounders, first visit	
Tuesday 26th June 2007					
Nethertown	Cloudy	**1**	1 seaweed collector		
St.Bees	Sunny	**26**	1 dog walker	Family of 3 holidaymakers having a picnic and building sand castles, 1 school group of approximately 20 16-year-olds , 2 dog walkers	
Nethertown (2nd visit)	Sunny	**2**		2 males on the rocks	

Annex 1. Number of people observed on the beaches during the survey fieldwork

Location	Weather	Total headcount	Breakdown of headcount		
			People for whom data were obtained	Insufficient data obtained	People interviewed previously during the survey
Friday 29th June 2007					
Seamill	Cloudy	**20**		5 holidaymakers dog walking, 15 other people observed on the beach	
St Bees	Cloudy	**13**	1 dog walker	1 school group of 10 children, 2 people on the rocks	
Drigg	Sunny	**2**		1 dog walker, takes grandchildren rock pooling	1 dog walker/beachcomber
Ravenglass	Sunny/windy/ cold	**3**		2 males working on a boat, 1 dog walker	
Seascale	Raining	**0**			
Saturday 30th June 2007					
Seamill	Light rain	**8**		3 dog walkers, 1 windsurfer, 1 family of 3 and 1 male on the rocks	
Wednesday 4th July 2007					
St Bees/Seamill	Cloudy	**17**		10 dog walkers, 5 people visible in the distance	1 bait digger, 1 dog walker
Thursday 5th July 2007					
Nethertown	Dry/mostly sunny	**2**	1 winkle collector		1 bait digger
Braystones	Dry/mostly sunny	**0**			
Friday 6th July 2007					
Nethertown	Cloudy/windy	**4**		2 dog walkers, 1 walker	1 winkle collector
Braystones	Cloudy/windy	**0**			
Monday 9th July 2007					
Ravenglass	Light rain	**20**		9 dog walkers, 7 holidaymakers and 4 locals, walking on the beach	
Friday 13th July 2007					
St Bees	Light rain	**2**	1 dog walker	1 dog walker	
Wednesday 18th July 2007					
Seamill	Hot/sunny	**9**		7 dog walkers, 1 winkle collector	1 male collecting peeler crabs

Annex 1. Number of people observed on the beaches during the survey fieldwork

Location	Weather	Total headcount	Breakdown of headcount		
			People for whom data were obtained	Insufficient data obtained	People interviewed previously during the survey
Nethertown	Hot/sunny	**3**	1 angler/bait digger	1 male walking along the beach, 1 dog walker	
Coulderton	Hot/sunny	**6**	2 dog walkers	1 dog walker, 2 children playing near the beach chalets	1 dog walker/beachcomber
Thursday 19th July 2007					
Sellafield	Sunny	**0**			
Braystones	Sunny	**0**			
Tuesday 24th July 2007					
St Bees	Sunny periods	**8**		Family on holiday at caravan park (couple 30's, son 6) first visit, 3 coast-to-coast walkers	2 dog walkers
Seamill	Sunny periods	**7**	1 jogger	3 boys (6-8) playing on the beach, 1 dog walker	2 dog walkers
Coulderton	Sunny periods	**4**	1 dog walker		3 dog walkers
Nethertown	Sunny periods	**2**	1 dog walker/winkle collector		1 dog walker
Braystones	Sunny periods	**7**	Family of 5 playing on the beach		1 angler/shellfish collector, 1 beach resident
Sellafield	Sunny periods	**0**			
Seascale	Sunny periods	**19**	Family of 4 playing on the beach, 7 dog walkers	2 people walking in the distance, 3 holidaymakers (couple 30-40 and son 12) playing boules, 3 boys playing football	
Drigg	Sunny periods	**12**	Family of 3 playing, 1 angler	1 horse rider, 6 dog walkers	1 dog walker
Thursday 26th July 2007					
St.Bees	Heavy rain	**3**		1 dog walker, 2 people walking down from St Bees Head	
Nethertown	Heavy rain	**0**			

Annex 1. Number of people observed on the beaches during the survey fieldwork

Location	Weather	Total headcount	Breakdown of headcount		
			People for whom data were obtained	Insufficient data obtained	People interviewed previously during the survey
Braystones	Light rain	**15**		3 adults and 6 children on holiday, building sandcastles, sunbathing, collecting shells, 1 adult and 3 children in the rock pools, 2 people on the rocks	
Monday 30th July 2007					
Drigg	Sunny	**2**		2 dog walkers	
Nethertown	Sunny	**0**			
Braystones	Sunny	**0**			
Tuesday 31st July 2007					
St.Bees	Sunny	**10**	2 holidaymakers, 3 dog walkers	1 horse rider, 4 other people on the beach	
Nethertown	Sunny	**2**	2 locals dog walking/playing on the beach		
Seamill	Raining	**2**		2 people observed in the distance	
Nethertown (2nd visit)	Sunny	**0**			
Seascale	Sunny	**0**			
Thursday 2nd August 2007					
Nethertown	Warm/dry/calm	**5**		5 bait diggers	
Thursday 9th August 2007					
Ravenglass	Sunny	**0**			
Saltcoats	Sunny	**9**	2 dog walkers	7 holidaymakers dog walking	
Drigg Ford	Sunny	**0**			
Saltcoats (2nd visit)	Sunny	**6**	1 commercial fisherman	1 family of 4 going to 'Ratty' train, 1 dog walker	
Drigg	Sunny	**20**	1 family of 5 (holidaymakers), 1 family of 4 (local), 1 dog walker	2 couples on holiday first visit, 4 people walking on beach, 2 males kite surfing	

Annex 1. Number of people observed on the beaches during the survey fieldwork

Location	Weather	Total headcount	Breakdown of headcount		
			People for whom data were obtained	Insufficient data obtained	People interviewed previously during the survey
Seascale	Sunny	**20**		Approximately 20 adults and children playing beach games, paddling and swimming	
Tuesday 14th August 2007					
St Bees	Warm/sunny	**6**	Family of 4 playing and walking	Couple first visit, no particular activities	
Seamill	Warm/sunny	**0**			
Coulderton	Warm/sunny	**8**	Family of 5 playing on the beach	1 beach resident, 2 teenage girls playing at the waters edge	
Nethertown	Warm/sunny	**7**	Family of 2 dog walking and angling, 1 angler	Grandfather and grandson (1 year old) sitting on the beach	1 dog walker, 1 angler
Wednesday 15th August 2007					
Seascale	Sunny	**16**	3 dog walkers	13 dog walkers	
River Calder	Sunny	**0**			
Braystones	Sunny	**0**			
Seascale (2nd visit)	Sunny	**15**	4 dog walkers, 1 family of 5 and 2 families of 3 playing on the beach		
Monday 20th August 2007					
Seamill	Sunny	**7**	3 dog walkers	2 children on bikes on the beach, 2 other people observed on the beach	
Nethertown	Sunny	**2**		2 people walking on the sand	
Tuesday 21st August 2007					
Drigg	Sunny	**7**		1 male on kite buggy on sand, 6 other people on the beach	
St.Bees	Sunny	**5**	1 walker, 2 dog walkers	2 people observed on the beach	
Ravenglass	Sunny	**4**	1 holidaymaker	3 people observed on the beach	
Drigg (2nd visit)	Sunny	**7**	2 holidaymakers playing on the beach, building sandcastles	5 people observed on the beach	

Annex 1. Number of people observed on the beaches during the survey fieldwork

Location	Weather	Total headcount	Breakdown of headcount		
			People for whom data were obtained	Insufficient data obtained	People interviewed previously during the survey
Wednesday 22nd August 2007					
Seamill	Sunny	**30**	2 walkers, 1 dog walker, 10 holidaymakers	17 people observed on the beach, swimming and on inflatables in the sea	
Thursday 23rd August 2007					
Nethertown	Sunny	**3**		3 dog walkers	
Seascale	Sunny	**6**	1 dog walker	5 dog walkers	
St.Bees	Sunny	**15-20**	1 winkle collector, 3 holidaymakers	11-16 people in the beach - walking, having picnics, paddling	
Drigg	Sunny	**30**	1 dog walker, 4 visitors playing football, walking barefoot and rock pooling	25 people observed on the beach	
Friday 24th August 2007					
Braystones	Sunny	**6**	Family of 4, have a caravan at the caravan park, 1 angler	1 other person on the beach	
Drigg	Sunny	**10**	1 local on the beach	Group of 7 holidaymakers and 2 people having a picnic	
St.Bees	Sunny	**10-20**		10 -20 people canoeing, windsurfing and sunbathing	
Monday 27th August 2007 (Bank Holiday Monday)					
Nethertown	Overcast, light breeze	**1**	1 dog walker		
Coulderton	Overcast, light breeze	**0**			
Braystones	Overcast, light breeze	**11**	8 holidaymakers, 1 dog walker	1 couple staying in a holiday chalet	
Nethertown (2nd visit)	Overcast, light breeze	**2**	2 beach residents		
Coulderton (2nd visit)	Overcast, light breeze	**5**	Family of 5 staying in a beach chalet		

Annex 1. Number of people observed on the beaches during the survey fieldwork

Location	Weather	Total headcount	Breakdown of headcount		
			People for whom data were obtained	Insufficient data obtained	People interviewed previously during the survey
Seamill	Overcast, light breeze	**6**		2 holidaymakers, first visit	4 dog walkers
St Bees	Overcast, light breeze	**26**		10 people sitting on the sea wall, 16 people on the beach	
Friday 31st August 2007					
Drigg	Cloudy	**7**		2 dog walkers, 4 people on the rocks	1 dog walker
Seascale	Cloudy	**4**	1 dog walker	3 dog walkers	
St Bees	Cloudy	**10**	2 locals playing on the beach	2 adults and 2 children playing on the beach, 4 people observed on the beach	
Nethertown	Cloudy	**0**			
Friday 7th September 2007					
Nethertown	Cloudy	**0**			
Braystones	Cloudy	**0**			
Seascale	Cloudy	**3**	1 person sand yachting, 1 person beachcombing	1 person on the beach	
St Bees	Cloudy	**5**		1 person walking, 3 people dog walking, 1 person collecting sandstone	
Tuesday 11th September 2007					
St Bees	Sunny	**1**		1 male doing the coast-to-coast walk	
Seamill	Sunny	**6**			6 dog walkers
Coulderton	Sunny	**1**			1 beach resident
Nethertown	Sunny	**2**	1 dog walker		1 dog walker
Seascale	Sunny	**2**			2 dog walkers
Drigg	Sunny	**Approx 60**		4 student fieldtrip groups	
Drigg Point	Sunny	**0**			
Seascale (2nd visit)	Sunny	**1**	1 dog walker		
Drigg (2nd visit)	Sunny	**3**			3 dog walkers
Ravenglass	Sunny	**7**		7 holidaymakers (5 elderly)	
Seascale (3rd visit)	Sunny	**0**			
Nethertown (2nd visit)	Sunny	**1**			1 angler

Annex 1. Number of people observed on the beaches during the survey fieldwork

Location	Weather	Total headcount	Breakdown of headcount		
			People for whom data were obtained	Insufficient data obtained	People interviewed previously during the survey
Wednesday 12th September 2007					
Nethertown	Fine and dry	**1**			1 dog walker
Ravenglass	Fine and dry	**5**			3 fishermen, 2 dog walkers
Friday 14th September 2007					
St Bees	Sunny spells/cold strong wind	**3**		2 coast-to-coast walkers	1 dog walker
Seamill	Sunny spells/cold strong wind	**0**			
Coulderton	Sunny spells/cold strong wind	**0**			
Nethertown	Sunny spells/cold strong wind	**1**	1 angler/bait digger		
Braystones	Sunny spells/cold strong wind	**1**	1 dog walker		
Seascale	Sunny spells/cold strong wind	**0**			
Tuesday 18th September 2007					
St Bees	Sunny	**8**		3 dog walkers and 5 coast-to-coast walkers	
Nethertown	Sunny	**0**			
Ehen Split (mouth of the River Calder and River Ehen)	Sunny	**2**		2 people seen in the distance	
Braystones	Sunny	**4**	2 visitors to the caravan site		2 dog walkers
Seascale	Raining	**5**		Father and son on holiday, dog walking	3 dog walkers

Annex 1. Number of people observed on the beaches during the survey fieldwork

Location	Weather	Total headcount	Breakdown of headcount		
			People for whom data were obtained	Insufficient data obtained	People interviewed previously during the survey
Thursday 20th September 2007					
St Bees	Sunny/strong wind	**4**			4 dog walkers
Seamill	Sunny/strong wind	**7**			7 dog walkers
Coulderton	Sunny/strong wind	**1**			1 beachcomber
Nethertown	Sunny/strong wind	**0**			
Braystones	Sunny/strong wind	**0**			

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
St Bees	Intertidal occupancy	1	M	U	Collecting mussels and angling	9	9 x per year in summer	Local
St Bees	Intertidal occupancy	2	M	U	Walking	20	2 x per week all year - split between 5 locations	Local
St Bees	Intertidal occupancy	10	M	20's	Angling	300	2 x per week, all year - split between 2 locations	Local, regularly use the beach
St Bees	Intertidal occupancy	20	M	20's	Angling	310	2 x per week all year	Local, regularly use the beach
St Bees	Intertidal occupancy	24	M	20's	Angling and collecting peeler crabs	180	1 x per week all year - split between 2 locations	Local, regularly use the beach
St Bees	Intertidal occupancy	28	F	20's	Playing barefoot	26	20 x per year - barefoot in warm weather	Visit the area throughout the year
St Bees	Intertidal occupancy	29	F	20's	Playing barefoot	26	20 x per year - barefoot in warm weather	Visit the area throughout the year
St Bees	Intertidal occupancy	30	U	2	Playing barefoot	26	20 x per year - barefoot in warm weather	Visit the area throughout the year
St Bees	Intertidal occupancy	31	U	3	Playing barefoot	26	20 x per year - barefoot in warm weather	Visit the area throughout the year
St Bees	Intertidal occupancy	32	M	20's	Angling	70	3 x per week April - October - split between 3 locations	Local, regularly use the beach
St Bees	Intertidal occupancy	33	M	60's	Dog walking	122	Daily, all year - split between 3 locations	Local, regularly use the beach
St Bees	Intertidal occupancy	34	F	60's	Dog walking	122	Daily, all year - split between 3 locations	Local, regularly use the beach
St Bees	Intertidal occupancy	57	M	20's	Angling	94	3 x per week all year - split between 4 locations	Local, regularly use the beach
St Bees	Intertidal occupancy	71	M	40's	Rock pooling, beach games and walking	25	1 week per year in summer	Holidaymaker staying at local caravan park
St Bees	Intertidal occupancy	72	F	40's	Rock pooling, beach games and walking	25	1 week per year in summer	Holidaymaker staying at local caravan park

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
St Bees	Intertidal occupancy	73	M	11	Rock pooling, beach games and walking	25	1 week per year in summer	Holidaymaker staying at local caravan park
St Bees	Intertidal occupancy	74	F	12	Rock pooling, beach games and walking	25	1 week per year in summer	Holidaymaker staying at local caravan park
St Bees	Intertidal occupancy	111	M	42	Dog walking	243	Dog walking daily all year - split between 3 locations	Local, own a beach chalet
St Bees	Intertidal occupancy	112	F	30's	Dog walking	243	Daily, all year - split between 2 locations	Local, own a beach chalet
St Bees	Intertidal occupancy	113	M	40's	Playing	32	Daily for 2 weeks in August - split between 2 locations	Holidaymakers staying at a beach chalet
St Bees	Intertidal occupancy	114	F	40's	Playing	35	Daily for 2 weeks in August - split between 2 locations	Holidaymakers staying at a beach chalet
St Bees	Intertidal occupancy	115	F	12	Playing	32	Daily for 2 weeks in August - split between 2 locations	Holidaymakers staying at a beach chalet
St Bees	Intertidal occupancy	116	F	7	Playing	32	Daily for 2 weeks in August - split between 2 locations	Holidaymakers staying at a beach chalet
St Bees	Intertidal occupancy	119	M	50's	Angling	195	3-4 x per week all year - split between 2 locations	Local, regularly use the beach
St Bees	Intertidal occupancy	123	M	20's	Dog walking	365	Daily, all year	Local, regularly use the beach
St Bees	Intertidal occupancy	124	F	30's	Dog walking	14	Daily for 2 weeks in summer	Holidaymaker
St Bees	Intertidal occupancy	125	F	60's	Dog walking	550	Daily, all year	Local, regularly use the beach
St Bees	Intertidal occupancy	126	F	65	Dog walking	245	Daily, all year	Local, regularly use the beach
St Bees	Intertidal occupancy	127	M	60's	Dog walking	245	Daily, all year	Local, regularly use the beach

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
St Bees	Intertidal occupancy	128	M	50	Crabbing and bait digging	15	1 x per fortnight all year - split between 2 locations	Local
St Bees	Intertidal occupancy	129	F	47	Dog walking	100	2 x per week, all year	Local
St Bees	Intertidal occupancy	130	F	19	Sunbathing, paddling and playing cricket	210	Daily in summer	Local, regularly use the beach in summer
St Bees	Intertidal occupancy	131	M	53	Angling and dog walking	310	Dog walking 2 x per week; angling 1 x per week, both all year round	Local
St Bees	Intertidal occupancy	133	M	50's	Dog walking	275	Daily, all year	Local, regularly use the beach
St Bees	Intertidal occupancy	134	F	50	Dog walking	325	2-3 x per week, all year	Local, regularly use the beach
St Bees	Intertidal occupancy	135	F	50's	Dog walking	275	Daily, all year	Local, regularly use the beach
St Bees	Intertidal occupancy	136	F	40's	Walking, paddling barefoot and building sandcastles	14	Daily for 1 week in the summer	Holidaymaker
St Bees	Intertidal occupancy	137	F	8	Walking, paddling barefoot and building sandcastles	14	Daily for 1 week in the summer	Holidaymaker
St Bees	Intertidal occupancy	138	F	U	Dog walking	200	Weekends and school holidays	Local
St Bees	Intertidal occupancy	139	M	U	Dog walking	200	Weekends and school holidays	Local
St Bees	Intertidal occupancy	140	F	50's	Dog walking	180	Daily, all year	Local, regularly use the beach
St Bees	Intertidal occupancy	143	M	50's	Dog walking	730	Daily, all year	Local, regularly use the beach
St Bees	Intertidal occupancy	146	M	U	Walking	240	5 days per week, nearly all year	Local, regularly use the beach

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
St Bees	Intertidal occupancy	147	F	U	Dog walking	50	2 x per fortnight, most of the year	Owns a caravan at a local caravan park
St Bees	Intertidal occupancy	148	M	U	Dog walking	365	Daily, all year	Local, regularly use the beach
St Bees	Intertidal occupancy	153	F	U	Walking	36	1-2 x per month, all year	Local
St Bees	Intertidal occupancy	154	F	U	Paddling, building sandcastles and collecting shells	50	12 x per year, in summer	Holidaymaker
St Bees	Intertidal occupancy	155	U	Under 7	Paddling, building sandcastles and collecting shells	50	12 x per year, in summer	Holidaymaker
St Bees	Intertidal occupancy	156	U	Under 7	Paddling, building sandcastles and collecting shells	50	12 x per year, in summer	Holidaymaker
St Bees	Intertidal occupancy	157	M	U	Playing, paddling and eating picnics	48	1 x per month, all year; paddling if weather permits	Holidaymaker
St Bees	Intertidal occupancy	158	F	U	Playing, paddling and eating picnics	48	1 x per month, all year; paddling if weather permits	Holidaymaker
St Bees	Intertidal occupancy	159	U	Under 5	Playing, paddling and eating picnics	48	1 x per month, all year; paddling if weather permits	Holidaymaker
St Bees	Intertidal occupancy	160	U	Under 5	Playing, paddling and eating picnics	48	1 x per month, all year; paddling if weather permits	Holidaymaker
St Bees	Intertidal occupancy	161	U	Under 5	Playing, paddling and eating picnics	48	1 x per month, all year; paddling if weather permits	Holidaymaker
St Bees	Intertidal occupancy	162	M	U	Walking	12	6 x per year	Holidaymaker
St Bees	Intertidal occupancy	163	F	U	Walking	12	6 x per year	Holidaymaker
St Bees	Intertidal occupancy	164	F	30's	Dog walking	210	4 x per week, all year	Local, regularly use the beach

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
St Bees	Intertidal occupancy	166	M	U	Winkle collecting	233	Most days, all year, split between 3 locations	Local, regularly use the beach
St Bees	Intertidal occupancy	167	M	60's	Walking, eating picnics and paddling barefoot	3	1st visit, in August	Holidaymaker
St Bees	Intertidal occupancy	168	F	60's	Walking, eating picnics and paddling barefoot	3	1st visit, in August	Holidaymaker
St Bees	Intertidal occupancy	169	F	Under 5	Walking, eating picnics and paddling barefoot	3	1st visit, in August	Holidaymaker
St Bees	Intertidal occupancy	180	F	U	Walking, eating picnic, paddling and sunbathing	365	Daily, all year - activities dependent on weather	Local
St Bees	Intertidal occupancy	182	F	40's	Rock pooling and building sandcastles	150	3 times per week, all year - activities are weather dependant	Local, regularly use the beach
St Bees	Intertidal occupancy	183	M	Under 5	Rock pooling and building sandcastles	150	3 times per week, all year - activities are weather dependant	Local, regularly use the beach
St Bees	Intertidal occupancy	184	F	40's	Beachcombing	6	2-3 x per month, 10 minutes per time	Local
St Bees	Intertidal occupancy	195	M	U	Angling	35	Angling 4 hours per week for 43 weeks of the year - split between 5 locations	Local, regularly use the beach
St Bees	Intertidal occupancy	196	F	U	Angling	17	1 x per week for 43 weeks - split between 5 locations	Local, regularly use the beach
St Bees	Intertidal occupancy	200	M	8	Collecting winkles	45	Most weekends and school holidays	Local, regularly use the beach
St Bees	Intertidal occupancy	201	M	U	Beachcombing	39	6 hours per week all year - split between 8 locations	Local, regularly use the beach
St Bees	Intertidal occupancy	202	M	U	Angling	400	Angling 1-2 x per week, all year	Local, regularly use the beach
St Bees	Handling beach materials	71	M	40's	Handling stones and shells	8	1 week per year in summer	Holidaymaker staying at local caravan park

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
St Bees	Handling beach materials	72	F	40's	Handling stones and shells	8	1 week per year in summer	Holidaymaker staying at local caravan park
St Bees	Handling beach materials	73	M	11	Handling stones and shells	8	1 week per year in summer	Holidaymaker staying at local caravan park
St Bees	Handling beach materials	74	F	12	Handling stones and shells	8	1 week per year in summer	Holidaymaker staying at local caravan park
St Bees	Handling beach materials	154	F	U	Handling shells	5	Part of general beach occupancy 12 x per year, in summer	Holidaymaker
St Bees	Handling beach materials	155	U	Under 7	Handling shells	5	Part of general beach occupancy 12 x per year, in summer	Holidaymaker
St Bees	Handling beach materials	156	U	Under 7	Handling shells	5	Part of general beach occupancy 12 x per year, in summer	Holidaymaker
St Bees	Handling beach materials	182	F	40's	Handling stones and shells	5	Part of general beach occupancy, 3 times per week, all year - activities are weather dependant	Local, regularly use the beach
St Bees	Handling beach materials	183	M	Under 5	Handling stones and shells	5	Part of general beach occupancy, 3 times per week, all year - activities are weather dependant	Local, regularly use the beach
St Bees	Handling beach materials	184	F	40's	Handling shells and wood	6	2-3 x per month, 10 minutes per time	Local
St Bees	Handling beach materials	201	M	U	Handling driftwood, stones and shells	39	Handling while beachcombing for 6 hours per week all year - split between 8 locations	Local, regularly use the beach
St Bees	Handling sediment	1	M	U	Collecting mussels	9	9 x per year in summer	Local

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
St Bees	Handling sediment	10	M	20's	Bait digging	50	1 x per week, all year	Local, regularly use the beach
St Bees	Handling sediment	24	M	20's	Collecting peeler crabs	50	1 x per week for 3 months in the summer	Local, regularly use the beach
St Bees	Handling sediment	128	M	50	Crabbing and bait digging	15	1 x per fortnight all year - split between 2 locations	Local
St Bees	Handling sediment	166	M	U	Collecting winkles	233	Most days, all year	Local, regularly use the beach
St Bees	Handling sediment	200	M	8	Collecting winkles	22	Most weekends and school holidays	Local, regularly use the beach
St Bees to Seamill	Intertidal occupancy	5	F	U	Walking	280	Several times per week for 4 months in summer and once per week in for 8 months in winter	Local, regularly use the beach
St Bees to Seamill	Intertidal occupancy	6	F	2	Walking	280	Several times per week for 4 months in summer and once per week in for 8 months in winter	Local, regularly use the beach
St Bees to Seamill	Intertidal occupancy	7	M	60's	Dog walking	170	Several times per week in summer	Local, regularly use the beach in summer
St Bees to Seamill	Intertidal occupancy	8	U	3	Dog walking	170	Several times per week in summer	Local, regularly use the beach in summer
St Bees to Seamill	Intertidal occupancy	9	U	5	Dog walking	170	Several times per week in summer	Local, regularly use the beach in summer
St Bees to Seamill	Intertidal occupancy	11	F	20's	Walking	40	1 x per week in summer	Local, regularly use the beach in summer
St Bees to Seamill	Intertidal occupancy	12	F	3	Walking	40	1 x per week in summer	Local, regularly use the beach in summer
St Bees to Seamill	Intertidal occupancy	13	M	5	Walking	40	1 x per week in summer	Local, regularly use the beach in summer

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
St Bees to Seamill	Handling beach materials	5	F	U	Handling crabs, seaweed and stones	140	Several times per week for 4 months around summer and once per week for remainder of the year	Local, regularly use the beach
St Bees to Seamill	Handling beach materials	6	F	2	Handling crabs, seaweed and stones	140	Several times per week for 4 months in summer and once per week in for 8 months in winter	Local, regularly use the beach
St Bees to Seamill	Handling beach materials	7	M	60's	Throwing stones	5	Several times per week in summer	Local, regularly use the beach in summer
St Bees to Seamill	Handling beach materials	8	U	3	Throwing stones	5	Several times per week in summer	Local, regularly use the beach in summer
St Bees to Seamill	Handling beach materials	9	U	5	Throwing stones	5	Not specified	Local, regularly use the beach in summer
Seamill	Intertidal occupancy	16	M	50's	Dog walking	365	Daily, all year	Local, regularly use the beach
Seamill	Intertidal occupancy	35	F	40's	Jogging	400	Most days, all year	Local, regularly use the beach
Seamill	Intertidal occupancy	111	M	42	Dog walking	243	Dog walking daily all year - split between 3 locations	Local, own a beach chalet
Seamill	Intertidal occupancy	112	F	30's	Dog walking	243	Daily, all year - split between 2 locations	Local, own a beach chalet
Seamill	Intertidal occupancy	144	M	60's	Dog walking and paddling	390	Dog walking 3 x per week, all year; paddling weather permitting	Local, regularly use the beach
Seamill	Intertidal occupancy	145	F	60's	Dog walking and paddling	390	Dog walking 3 x per week, all year; paddling weather permitting	Local, regularly use the beach
Seamill	Intertidal occupancy	152	F	U	Walking	50	1 x per week, all year	Local
Seamill	Intertidal occupancy	166	M	U	Winkle collecting	233	Most days, all year, split between 3 locations	Local, regularly use the beach

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Seamill	Intertidal occupancy	201	M	U	Beachcombing	39	6 hours per week all year - split between 8 locations	Local, regularly use the beach
Seamill	Intertidal occupancy	202	M	U	Hooking crab and lobster	12	Hooking 1 x per month all year	Local, regularly use the beach
Seamill	Handling beach materials	16	M	50's	Throwing stones	1.3	Not specified	Local, regularly use the beach
Seamill	Handling beach materials	201	M	U	Handling driftwood, stones and shells	39	Handling while beachcombing for 6 hours per week all year - split between 8 locations	Local, regularly use the beach
Seamill	Handling sediment	166	M	U	Collecting winkles	233	Most days, all year	Local, regularly use the beach
Coulderton	Intertidal occupancy	2	M	U	Walking	20	2 x per week all year - split between 5 locations	Local
Coulderton	Intertidal occupancy	14	M	40's	Dog walking	100	50 x per year	Has holiday home in the area
Coulderton	Intertidal occupancy	15	F	40's	Dog walking	100	50 x per year	Has holiday home in the area
Coulderton	Intertidal occupancy	17	M	30's	Dog walking	730	Daily, all year	Local, live in a beach chalet
Coulderton	Intertidal occupancy	18	F	30's	Dog walking	730	Daily, all year	Local, live in a beach chalet
Coulderton	Intertidal occupancy	19	M	50's	Crabbing, dog walking and angling	900	Daily, all year	Local, live in a beach chalet
Coulderton	Intertidal occupancy	36	M	30's	Dog walking	500	Daily, all year	Local, live in a beach chalet
Coulderton	Intertidal occupancy	75	M	70's	Supervising children	113	Daily in summer holidays if good weather	Local, regularly use the beach
Coulderton	Intertidal occupancy	76	F	70's	Supervising children	113	Daily in summer holidays if good weather	Local, regularly use the beach
Coulderton	Intertidal occupancy	77	F	10	Rock pooling, playing and collecting stones	115	Daily in summer holidays if good weather	Visitors - stay with relatives 6-7 weeks every year

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Coulderton	Intertidal occupancy	78	M	8	Rock pooling, playing and collecting stones	115	Daily in summer holidays if good weather	Visitors - stay with relatives 6-7 weeks every year
Coulderton	Intertidal occupancy	79	M	6	Rock pooling, playing and collecting stones	115	Daily in summer holidays if good weather	Visitors - stay with relatives 6-7 weeks every year
Coulderton	Intertidal occupancy	113	M	40's	Playing	35	Daily for 2 weeks in August - split between 2 locations	Holidaymakers staying at a beach chalet
Coulderton	Intertidal occupancy	114	F	40's	Playing	32	Daily for 2 weeks in August - split between 2 locations	Holidaymakers staying at a beach chalet
Coulderton	Intertidal occupancy	115	F	12	Playing	35	Daily for 2 weeks in August - split between 2 locations	Holidaymakers staying at a beach chalet
Coulderton	Intertidal occupancy	116	F	7	Playing	35	Daily for 2 weeks in August - split between 2 locations	Holidaymakers staying at a beach chalet
Coulderton	Intertidal occupancy	117	F	40's	Dog walking	150	Daily, all year - split between 3 locations	Local, regularly use the beach
Coulderton	Intertidal occupancy	166	M	U	Winkle collecting	233	Most days, all year, split between 3 locations	Local, regularly use the beach
Coulderton	Intertidal occupancy	201	M	U	Beachcombing	39	6 hours per week all year - split between 8 locations	Local, regularly use the beach
Coulderton	Handling beach materials	16	M	50's	Throwing stones	1.3	Daily, all year	Local, regularly use the beach
Coulderton	Handling beach materials	17	M	30's	Handling driftwood	50	Part of dog walking activity, daily, all year	Local, live in a beach chalet
Coulderton	Handling beach materials	18	F	30's	Handling driftwood	50	Part of dog walking activity, daily, all year	Local, live in a beach chalet
Coulderton	Handling beach materials	77	F	10	Handling stones and shells	60	Daily in summer holidays if good weather	Visitors - stay with relatives 6-7 weeks every year
Coulderton	Handling beach materials	78	M	8	Handling stones and shells	60	Daily in summer holidays if good weather	Visitors - stay with relatives 6-7 weeks every year

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Coulderton	Handling beach materials	79	M	6	Handling stones and shells	60	Daily in summer holidays if good weather	Visitors - stay with relatives 6-7 weeks every year
Coulderton	Handling beach materials	201	M	U	Handling driftwood, stones and shells	39	Handling while beachcombing for 6 hours per week all year - split between 8 locations	Local, regularly use the beach
Coulderton	Handling sediment	19	M	50's	Collecting winkles	100	Not specified	Local, live in a beach chalet
Coulderton	Handling sediment	166	M	U	Collecting winkles	233	Most days, all year	Local, regularly use the beach
Nethertown	Intertidal occupancy	2	M	U	Walking	20	2 x per week all year - split between 5 locations	Local
Nethertown	Intertidal occupancy	20	M	20's	Collecting peeler crabs at low water mark	50	2 x per week in summer - split between 2 locations	Local, regularly use the beach in summer
Nethertown	Intertidal occupancy	32	M	20's	Angling	70	3 x per week April - October - split between 3 locations	Local, regularly use the beach
Nethertown	Intertidal occupancy	33	M	60's	Dog walking	122	Daily, all year - split between 3 locations	Local, regularly use the beach
Nethertown	Intertidal occupancy	34	F	60's	Dog walking	122	Daily, all year - split between 3 locations	Local, regularly use the beach
Nethertown	Intertidal occupancy	37	M	60's	Dog walking and collecting winkles	429	2 x per week (alternate weeks), March - October	Local, regularly use the beach
Nethertown	Intertidal occupancy	57	M	20's	Angling	94	3 x per week all year - split between 4 locations	Local, regularly use the beach
Nethertown	Intertidal occupancy	80	M	30's	Dog walking and angling	70	Dog walking 1 x per week all year; angling 6 x per year	Local, regularly use the beach
Nethertown	Intertidal occupancy	81	M	15	Dog walking and angling	70	Dog walking 1 x per week all year; angling 6 x per year	Local, regularly use the beach

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Nethertown	Intertidal occupancy	82	M	U	Angling	375	3 x per week most of the year	Local, regularly use the beach
Nethertown	Intertidal occupancy	96	M	40's	Dog walking	130	2-3 x per week, all year - split between 2 locations	Local, regularly use the beach
Nethertown	Intertidal occupancy	111	M	42	Dog walking and collecting winkles	255	Dog walking daily all year - split between 3 locations; and collecting winkles 12 x per year	Local, own a beach chalet
Nethertown	Intertidal occupancy	112	F	30's	Dog walking and collecting winkles	255	Dog walking daily all year - split between 2 locations; and collecting winkles 12 x per year	Local, own a beach chalet
Nethertown	Intertidal occupancy	117	F	40's	Dog walking	150	Daily, all year - split between 3 locations	Local, regularly use the beach
Nethertown	Intertidal occupancy	119	M	50's	Dog walking	130	1 x per week, all year	Local, regularly use the beach
Nethertown	Intertidal occupancy	132	M	60's	Collecting seaweed	10	3-4 x per year	Local
Nethertown	Intertidal occupancy	141	F	30's	Dog walking, rock pooling, crabbing and building sandcastles	365	Dog walking daily, all year; other activities weather permitting	Local, regularly use the beach
Nethertown	Intertidal occupancy	142	M	5	Dog walking, rock pooling, crabbing and building sandcastles	365	Dog walking daily, all year; other activities weather permitting	Local, regularly use the beach
Nethertown	Intertidal occupancy	194	M	U	Collecting winkles	24	2 x per month, all year	Local, regularly use the beach
Nethertown	Intertidal occupancy	195	M	U	Collecting winkles and angling	250	Collecting winkles for 20 h/w for 43 weeks - split between 4 locations; angling 4 h/w for 43 weeks of the year - split between 5 locations	Local, regularly use the beach

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Nethertown	Intertidal occupancy	196	F	U	Angling	17	1 x per week for 43 weeks - split between 5 locations	Local, regularly use the beach
Nethertown	Intertidal occupancy	200	M	8	Collecting winkles	45	Most weekends and school holidays	Local, regularly use the beach
Nethertown	Intertidal occupancy	201	M	U	Beachcombing	39	6 hours per week all year - split between 8 locations	Local, regularly use the beach
Nethertown	Handling beach materials	16	M	50's	Throwing stones	1.3	Daily, all year	Local, regularly use the beach
Nethertown	Handling beach materials	96	M	40's	Throwing stones	2.5	Part of dog walking activity, - 3 x per week, all year - split between 2 locations	Local, regularly use the beach
Nethertown	Handling beach materials	132	M	60's	Handling seaweed	10	3-4 x per year	Local
Nethertown	Handling beach materials	141	F	30's	Handling stones, shells and crabs	50	Part of general beach occupancy daily, all year; other activities weather permitting	Local, regularly use the beach
Nethertown	Handling beach materials	142	M	5	Handling stones, shells and crabs	50	Part of general beach occupancy daily, all year; other activities weather permitting	Local, regularly use the beach
Nethertown	Handling beach materials	201	M	U	Handling driftwood, stones and shells	39	Handling while beachcombing for 6 hours per week all year - split between 8 locations	Local, regularly use the beach
Nethertown	Handling sediment	20	M	20's	Collecting peeler crabs	50	2 x per week in summer - split between 2 locations	Local, regularly use the beach in summer
Nethertown	Handling sediment	37	M	60's	Collecting winkles	64	2 x per week alternate weeks, March - October	Local, regularly use the beach
Nethertown	Handling sediment	111	M	42	Collecting winkles	12	12 x per year	Local, own a beach chalet

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Nethertown	Handling sediment	112	F	30's	Collecting winkles	12	12 x per year	Local, own a beach chalet
Nethertown	Handling sediment	194	M	U	Collecting winkles	24	2 x per month, all year	Local, regularly use the beach
Nethertown	Handling sediment	195	M	U	Collecting winkles (wearing gloves)	107	Collecting winkles for 20 h/w for 43 weeks - split between 4 locations; handling assumed 50% of occupancy time	Local, regularly use the beach
Nethertown	Handling sediment	200	M	8	Collecting winkles	22	Most weekends and school holidays	Local, regularly use the beach
Braystones	Intertidal occupancy	16	M	50's	Dog walking	365	Daily, all year	Local, regularly use the beach
Braystones	Intertidal occupancy	21	M	U	Shrimping, winkle and mussel collection, angling	900	Daily, all year	Local, regularly use the beach
Braystones	Intertidal occupancy	22	F	U	Shrimping, winkle and mussel collection, angling	450	Daily, all year	Local, regularly use the beach
Braystones	Intertidal occupancy	23	M	50's	Shrimping, winkle and mussel collection, angling	366	Daily, all year	Local, regularly use the beach
Braystones	Intertidal occupancy	25	M	76	Bait digging, long-lining, beachcombing and angling	349	Bait digging 1 x per month October - March; long-lining 5 x per week October to March; beachcombing 12 x per year; angling 1 x per week all year	Local, regularly use the beach
Braystones	Intertidal occupancy	32	M	20's	Angling and bait digging	98	Angling 3 x per week April - October - split between 3 locations; bait digging 1 x per week April - October - split between 2 locations	Local, regularly use the beach

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Braystones	Intertidal occupancy	33	M	60's	Dog walking	122	Daily, all year - split between 3 locations	Local, regularly use the beach
Braystones	Intertidal occupancy	34	F	60's	Dog walking	122	Daily, all year - split between 3 locations	Local, regularly use the beach
Braystones	Intertidal occupancy	38	M	40's	Playing	100	Holidays and weekends in good weather	Local, live in a beach chalet
Braystones	Intertidal occupancy	39	F	40's	Playing	100	Holidays and weekends in good weather	Local, live in a beach chalet
Braystones	Intertidal occupancy	40	U	6	Playing	100	Holidays and weekends in good weather	Local, live in a beach chalet
Braystones	Intertidal occupancy	41	U	10	Playing	100	Holidays and weekends in good weather	Local, live in a beach chalet
Braystones	Intertidal occupancy	42	U	13	Playing	100	Holidays and weekends in good weather	Local, live in a beach chalet
Braystones	Intertidal occupancy	57	M	20's	Bait digging and angling	144	Angling, 3 x per week all year - split between 4 locations; bait digging, 1 x per week all year - split between 2 locations	Local, regularly use the beach
Braystones	Intertidal occupancy	96	M	40's	Dog walking	130	2-3 x per week, all year - split between 2 locations	Local, regularly use the beach
Braystones	Intertidal occupancy	97	M	U	Kite flying	25	Daily for 1 week in summer	Holidaymakers staying at a caravan park for 1 week
Braystones	Intertidal occupancy	98	M	16	Kite flying	25	Daily for 1 week in summer	Holidaymakers staying at a caravan park for 1 week
Braystones	Intertidal occupancy	99	M	50's	Dog walking	100	Every fortnight, all year	Visitor - stays with relations every other weekend
Braystones	Intertidal occupancy	100	M	50's	Dog walking	28	Daily for 2 weeks in summer	Holidaymaker at a local caravan park
Braystones	Intertidal occupancy	101	F	50's	Dog walking	28	Daily for 2 weeks in summer	Holidaymaker at a local caravan park

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Braystones	Intertidal occupancy	102	M	60's	Beachcombing	105	Daily for 6 weeks in the summer	Has holiday home in the area
Braystones	Intertidal occupancy	103	U	Under 5	Rock pooling, building sandcastles and paddling barefoot	60	Daily for 2 weeks in summer holidays	Stays at holiday home in the area
Braystones	Intertidal occupancy	104	U	Under 5	Rock pooling, building sandcastles and paddling barefoot	60	Daily for 2 weeks in summer holidays	Stays at holiday home in the area
Braystones	Intertidal occupancy	105	F	50's	Dog walking	730	Daily, all year	Local, regularly use the beach
Braystones	Intertidal occupancy	117	F	40's	Dog walking	150	Daily, all year - split between 3 locations	Local, regularly use the beach
Braystones	Intertidal occupancy	119	M	50's	Bait digging	36	1 x per fortnight all year	Local, regularly use the beach
Braystones	Intertidal occupancy	120	M	60's	Dog walking	730	Daily, all year	Local, regularly use the beach
Braystones	Intertidal occupancy	121	F	60's	Dog walking	60	30 x per year	Own a caravan at a local caravan park
Braystones	Intertidal occupancy	122	M	60's	Dog walking and angling	75	Dog walking 30 x per year in good weather; and angling 5 x per year	Own a caravan at a local caravan park
Braystones	Intertidal occupancy	175	M	U	Build sandcastles, walk barefoot and collecting plastic bottles	120	1 x per month - activities are weather dependant	Owns a caravan at a local caravan park
Braystones	Intertidal occupancy	176	F	U	Build sandcastles and walking barefoot	120	1 x per month - activities are weather dependant	Owns a caravan at a local caravan park
Braystones	Intertidal occupancy	177	U	Under 5	Build sandcastles and walking barefoot	120	1 x per month - activities are weather dependant	Family own a caravan at a local caravan park
Braystones	Intertidal occupancy	178	U	Under 5	Build sandcastles and walking barefoot	120	1 x per month - activities are weather dependant	Family own a caravan at a local caravan park
Braystones	Intertidal occupancy	179	M	60's	Angling and walking	100	Not specified	Local

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Braystones	Intertidal occupancy	186	M	U	Angling	36	2 x per month all year	Local
Braystones	Intertidal occupancy	187	M	U	Angling	36	2 x per month all year	Local
Braystones	Intertidal occupancy	194	M	U	Bait digging and angling	624	6 x per week all year - split between 2 locations	Local, regularly use the beach
Braystones	Intertidal occupancy	195	M	U	Bait digging, set netting, winkle collecting and angling	855	Bait digging 2 h/w for 43 weeks per year; set netting 20 h/w for 26 weeks per year; collecting winkles for 20 h/w for 43 weeks - split between 4 locations; angling 4 h/w for 43 weeks of the year - split between 5 locations	Local, regularly use the beach
Braystones	Intertidal occupancy	196	F	U	Set nets, walking, playing and angling	431	Set nets 6 h/w December to June; angling 1 x per week for 43 weeks; walking and playing over 43 weeks, mainly weekends and school holidays	Local, regularly use the beach
Braystones	Intertidal occupancy	197	M	11	Playing, building sandcastles and getting buried in sand	258	Most weekends and school holidays	Visiting grandparents
Braystones	Intertidal occupancy	198	M	9	Playing, building sandcastles and getting buried in sand	258	Most weekends and school holidays	Visiting grandparents
Braystones	Intertidal occupancy	199	F	4	Playing, building sandcastles and getting buried in sand	258	Most weekends and school holidays	Visiting grandparents

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Braystones	Intertidal occupancy	200	M	8	Playing, building sandcastles and getting buried in sand, collecting winkles	300	Most weekends and school holidays	Visiting grandparents
Braystones	Intertidal occupancy	201	M	U	Beachcombing	39	6 hours per week all year - split between 8 locations	Local, regularly use the beach
Braystones	Handling beach materials	16	M	50's	Throwing stones	1.3	Daily, all year	Local, regularly use the beach
Braystones	Handling beach materials	25	M	76	Beachcombing for driftwood	24	12 x per year	Local, regularly use the beach
Braystones	Handling beach materials	96	M	40's	Throwing stones	2.5	Part of dog walking activity, - 3 x per week, all year - split between 2 locations	Local, regularly use the beach
Braystones	Handling beach materials	102	M	60's	Handling driftwood	105	Daily for 6 weeks in the summer	Has holiday home in the area
Braystones	Handling beach materials	103	U	Under 5	Handling stones and shells	60	Daily for 2 weeks in summer holidays	Stays at holiday home in the area
Braystones	Handling beach materials	104	U	Under 5	Handling stones and shells	60	Daily for 2 weeks in summer holidays	Stays at holiday home in the area
Braystones	Handling beach materials	175	M	U	Handling plastic bottles	10	Part of general beach occupancy, 1 x per month - activities are weather dependant	Owns a caravan at a local caravan park
Braystones	Handling beach materials	201	M	U	Handling driftwood, stones and shells	39	Handling while beachcombing for 6 hours per week all year - split between 8 locations	Local, regularly use the beach
Braystones	Handling sediment	25	M	76	Bait digging	15	1 x per month from October - March	Local, regularly use the beach

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Braystones	Handling sediment	32	M	20's	Bait digging	28	1 x per week April - October - split between 2 locations	Local, regularly use the beach
Braystones	Handling sediment	57	M	20's	Bait digging	50	1 x per week all year - split between 2 locations	Local, regularly use the beach
Braystones	Handling sediment	119	M	50's	Bait digging	36	1 x per fortnight all year	Local, regularly use the beach
Braystones	Handling sediment	194	M	U	Bait digging	442	6 x per week all year - split between 2 locations	Local, regularly use the beach
Braystones	Handling sediment	195	M	U	Bait digging and winkle collecting	193	Bait digging 2 h/w for 43 weeks per year; collecting winkles for 20 h/w for 43 weeks - split between 4 locations; handling assumed 50% of occupancy time	Local, regularly use the beach
Braystones	Handling sediment	200	M	8	Collecting winkles	22	Most weekends and school holidays	Local, regularly use the beach
Braystones	Handling gear	25	M	76	Handling long-lines	195	5 x per week October to March	Local, regularly use the beach
Braystones	Handling gear	122	M	60's	Handling fixed nets	2	2 x per year	Own a caravan at a local caravan park
Braystones	Handling gear	195	M	U	Handling set nets	520	20 h/w December to June	Local, regularly use the beach
Braystones	Handling gear	196	F	U	Handling set nets	156	6 h/w December to June	Local, regularly use the beach
Sellafield	Intertidal occupancy	1	M	U	Collecting empty oyster shells	1.5	Once per year	Local
Sellafield	Intertidal occupancy	24	M	20's	Angling and collecting peeler crabs	180	1 x per week all year - split between 2 locations	Local, regularly use the beach
Sellafield	Intertidal occupancy	32	M	20's	Bait digging	28	1 x per week April - October - split between 2 locations	Local, regularly use the beach

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Sellafield	Intertidal occupancy	57	M	20's	Bait digging	50	1 x per week all year - split between 2 locations	Local, regularly use the beach
Sellafield	Intertidal occupancy	119	M	50's	Angling	195	3-4 x per week all year - split between 2 locations	Local, regularly use the beach
Sellafield	Intertidal occupancy	128	M	50	Crabbing and bait digging	15	1 x per fortnight all year - split between 2 locations	Local
Sellafield	Handling beach materials	1	M	U	Handling oyster shells	1.5	Once per year	Local
Sellafield	Handling sediment	32	M	20's	Bait digging	28	1 x per week April - October - split between 2 locations	Local, regularly use the beach
Sellafield	Handling sediment	57	M	20's	Bait digging	50	1 x per week all year - split between 2 locations	Local, regularly use the beach
Sellafield	Handling sediment	128	M	50	Crabbing and bait digging	15	1 x per fortnight all year - split between 2 locations	Local
Sellafield	Handling gear	60	M	U	Handling lobster pots off shore and repair time on shore	345	7 x per week in July and August, 3 x per fortnight for 6 months in winter, 5 x per fortnight for remaining 4 months - split between 4 locations	Local, regularly use the beach
Sellafield	Handling gear	188	M	U	Handling lobster pots off shore and repair time on shore	429	3 x per week, all year	Local, regularly use the beach
Sellafield	Handling gear	189	M	U	Handling lobster pots off shore and repair time on shore	359	7 x per week July - August, 3 x per week in winter, 5 x per fortnight the rest of the year - split between 4 locations	Local, regularly use the beach
Seascale	Intertidal occupancy	4	F	60's	Dog walking	365	2 x per day, all year	Local, regularly use the beach

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Seascale	Intertidal occupancy	26	M	U	Walking	70	3 x per week all year	Local, regularly use the beach
Seascale	Intertidal occupancy	28	F	20's	Playing barefoot	26	20 x per year - barefoot in warm weather	Visit the area throughout the year
Seascale	Intertidal occupancy	29	F	20's	Playing barefoot	26	20 x per year - barefoot in warm weather	Visit the area throughout the year
Seascale	Intertidal occupancy	30	U	2	Playing barefoot	26	20 x per year - barefoot in warm weather	Visit the area throughout the year
Seascale	Intertidal occupancy	31	U	3	Playing barefoot	26	20 x per year - barefoot in warm weather	Visit the area throughout the year
Seascale	Intertidal occupancy	43	F	70's	Playing barefoot	120	2-3 x per week in summer	Local, regularly use the beach in summer
Seascale	Intertidal occupancy	44	M	70's	Playing barefoot	120	2-3 x per week in summer	Local, regularly use the beach in summer
Seascale	Intertidal occupancy	45	M	6	Playing barefoot	120	2-3 x per week in summer	Local, regularly use the beach in summer
Seascale	Intertidal occupancy	46	F	4	Playing barefoot	120	2-3 x per week in summer	Local, regularly use the beach in summer
Seascale	Intertidal occupancy	47	U	U	Dog walking	910	Daily, all year	Local, regularly use the beach
Seascale	Intertidal occupancy	48	U	U	Dog walking	910	Daily, all year	Local, regularly use the beach
Seascale	Intertidal occupancy	49	U	U	Dog walking	910	Daily, all year	Local, regularly use the beach
Seascale	Intertidal occupancy	50	U	U	Dog walking	910	Daily, all year	Local, regularly use the beach
Seascale	Intertidal occupancy	51	U	U	Dog walking	910	Daily, all year	Local, regularly use the beach
Seascale	Intertidal occupancy	52	M	40's	Dog walking	730	Daily, all year	Local, regularly use the beach
Seascale	Intertidal occupancy	53	F	40's	Dog walking	730	Daily, all year	Local, regularly use the beach

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Seascale	Intertidal occupancy	83	M	40's	Dog walking	730	Daily, all year	Local, regularly use the beach
Seascale	Intertidal occupancy	84	F	70's	Dog walking	275	Daily, all year	Local, regularly use the beach
Seascale	Intertidal occupancy	85	M	70's	Dog walking	275	Daily, all year	Local, regularly use the beach
Seascale	Intertidal occupancy	86	M	30's	Dog walking	365	Daily, all year	Local, regularly use the beach
Seascale	Intertidal occupancy	87	M	60's	Dog walking	366	Daily, all year	Local, regularly use the beach
Seascale	Intertidal occupancy	88	F	30's	Playing	150	3 x per month, all year	Visitor - stays with relatives a few days per month all year
Seascale	Intertidal occupancy	89	F	30's	Playing	150	3 x per month, all year	Visitor - stays with relatives a few days per month all year
Seascale	Intertidal occupancy	90	U	Under 4	Playing (barefoot in summer)	150	3 x per month, all year	Visitor - stays with relatives a few days per month all year
Seascale	Intertidal occupancy	91	U	Under 4	Playing (barefoot in summer)	150	3 x per month, all year	Visitor - stays with relatives a few days per month all year
Seascale	Intertidal occupancy	92	U	Under 4	Playing (barefoot in summer)	150	3 x per month, all year	Visitor - stays with relatives a few days per month all year
Seascale	Intertidal occupancy	93	U	Under 4	Playing (barefoot in summer)	150	3 x per month, all year	Visitor - stays with relatives a few days per month all year
Seascale	Intertidal occupancy	94	M	18	Dog walking	250	Daily in college holidays	Local, regularly use the beach
Seascale	Intertidal occupancy	95	M	60's	Dog walking	365	Daily, all year	Local, regularly use the beach
Seascale	Intertidal occupancy	106	M	30's	Rock pooling and playing in sand barefoot	4	First visit in August	Holidaymaker
Seascale	Intertidal occupancy	107	F	30's	Rock pooling and playing in sand barefoot	4	First visit in August	Holidaymaker
Seascale	Intertidal occupancy	108	F	5	Rock pooling and playing in sand barefoot	4	First visit in August	Holidaymaker

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Seascale	Intertidal occupancy	109	F	12	Rock pooling and playing in sand barefoot	4	First visit in August	Holidaymaker
Seascale	Intertidal occupancy	110	M	10	Rock pooling and playing in sand barefoot	4	First visit in August	Holidaymaker
Seascale	Intertidal occupancy	118	F	50's	Dog walking	52	Daily for 6 weeks in spring/summer school holidays - split between 2 locations	Owns a caravan at a local caravan park
Seascale	Intertidal occupancy	165	F	50's	Dog walking	160	2-3 x per week, all year	Local, regularly use the beach
Seascale	Intertidal occupancy	181	F	60's	Dog walking	183	Daily, all year	Local, regularly use the beach
Seascale	Intertidal occupancy	185	M	74	Sand yachting	40	2 weeks per year in September	Holidaymaker
Seascale	Intertidal occupancy	193	M	45	Bait digging, dog walking, set lining and angling	571	Angling/bait digging 1-2 x per week September to March and May to August. Set lines 4 x per week December to February . Dog walking 3-4 x per week all year	Local, regularly use the beach
Seascale	Intertidal occupancy	195	M	U	Collecting winkles and angling	250	Collecting winkles for 20 h/w for 43 weeks - split between 4 locations; angling 4 h/w for 43 weeks of the year - split between 5 locations	Local, regularly use the beach
Seascale	Intertidal occupancy	196	F	U	Angling	17	1 x per week for 43 weeks - split between 5 locations	Local, regularly use the beach
Seascale	Intertidal occupancy	200	M	8	Collecting winkles	45	Most weekends and school holidays	Local, regularly use the beach

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Seascale	Intertidal occupancy	201	M	U	Beachcombing	39	6 hours per week all year - split between 8 locations	Local, regularly use the beach
Seascale	Handling beach materials	84	F	70's	Throwing ball for dog	5	As part of dog walking activity, daily, all year	Local, regularly use the beach
Seascale	Handling beach materials	85	M	70's	Throwing ball for dog	5	As part of dog walking activity, daily, all year	Local, regularly use the beach
Seascale	Handling beach materials	106	M	30's	Handling stones and shells	4	First visit in August	Holidaymaker
Seascale	Handling beach materials	107	F	30's	Handling stones and shells	4	First visit in August	Holidaymaker
Seascale	Handling beach materials	108	F	5	Handling stones and shells	4	First visit in August	Holidaymaker
Seascale	Handling beach materials	109	F	12	Handling stones and shells	4	First visit in August	Holidaymaker
Seascale	Handling beach materials	110	M	10	Handling stones and shells	4	First visit in August	Holidaymaker
Seascale	Handling beach materials	201	M	U	Handling driftwood, stones and shells	39	Handling while beachcombing for 6 hours per week all year - split between 8 locations	Local, regularly use the beach
Seascale	Handling sediment	193	M	45	Bait digging	31	Bait digging 1-2 x per week September to March and May to August. Set lines December to February .	Local, regularly use the beach
Seascale	Handling sediment	195	M	U	Collecting winkles (wearing gloves)	107	Collecting winkles for 20 h/w for 43 weeks - split between 4 locations; handling assumed 50% of occupancy time	Local, regularly use the beach
Seascale	Handling sediment	200	M	8	Collecting winkles	22	Most weekends and school holidays	Local, regularly use the beach

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Seascale	Handling gear	60	M	U	Handling lobster pots off shore and repair time on shore	345	7 x per week in July and August, 3 x per fortnight for 6 months in winter, 5 x per fortnight for remaining 4 months - split between 4 locations	Local, regularly use the beach
Seascale	Handling gear	189	M	U	Handling lobster pots off shore and repair time on shore	359	7 x per week July - August, 3 x per week in winter, 5 x per fortnight the rest of the year - split between 4 locations	Local, regularly use the beach
Seascale	Handling gear	193	M	45	Handling set lines	48	1 x per week, December to February	Local, regularly use the beach
Whitriggs Scar	Intertidal occupancy	27	M	40's	Dog walking	730	Daily, all year	Local, regularly use the beach
Whitriggs Scar	Intertidal occupancy	201	M	U	Collecting winkles	20	A couple of hours per month all year	Local, regularly use the beach
Whitriggs Scar	Handling sediment	201	M	U	Collecting winkles	20	A couple of hours per month all year	Local, regularly use the beach
Drigg	Intertidal occupancy	2	M	U	Walking	20	2 x per week all year - split between 5 locations	Local
Drigg	Intertidal occupancy	3	M	U	Dog walking and beach combing	1095	Daily, all year	Local, regularly use the beach
Drigg	Intertidal occupancy	10	M	20's	Angling	300	2 x per week, all year - split between 2 locations	Local, regularly use the beach
Drigg	Intertidal occupancy	28	F	20's	Playing barefoot	26	20 x per year - barefoot in warm weather	Visit the area throughout the year
Drigg	Intertidal occupancy	29	F	20's	Playing barefoot	26	20 x per year - barefoot in warm weather	Visit the area throughout the year
Drigg	Intertidal occupancy	30	U	2	Playing barefoot	26	20 x per year - barefoot in warm weather	Visit the area throughout the year

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Drigg	Intertidal occupancy	31	U	3	Playing barefoot	26	20 x per year - barefoot in warm weather	Visit the area throughout the year
Drigg	Intertidal occupancy	54	F	70	Playing frisbee	37	2-3 x per week for 6 weeks in summer holidays	Local, regularly use the beach in summer
Drigg	Intertidal occupancy	55	F	3	Playing frisbee	37	2-3 x per week for 6 weeks in summer holidays	Local, regularly use the beach in summer
Drigg	Intertidal occupancy	56	F	10	Playing frisbee	37	2-3 x per week for 6 weeks in summer holidays	Local, regularly use the beach in summer
Drigg	Intertidal occupancy	57	M	20's	Angling	94	3 x per week all year - split between 4 locations	Local, regularly use the beach
Drigg	Intertidal occupancy	61	M	30's	Playing and paddling	5	First visit in August	Holidaymaker
Drigg	Intertidal occupancy	62	F	30's	Playing and paddling	5	First visit in August	Holidaymaker
Drigg	Intertidal occupancy	63	F	4	Playing (naked) and paddling	5	First visit in August	Holidaymaker
Drigg	Intertidal occupancy	64	F	7	Playing (naked) and paddling	5	First visit in August	Holidaymaker
Drigg	Intertidal occupancy	65	M	1	Playing (naked) and paddling	5	First visit in August	Holidaymaker
Drigg	Intertidal occupancy	66	F	40's	Dog walking	730	Daily, all year	Local, regular
Drigg	Intertidal occupancy	67	F	30's	Supervising children	170	3-4 x per week in summer in good weather	Local, regularly use the beach in summer
Drigg	Intertidal occupancy	68	M	Under 5	Beach games and eating picnics	170	3-4 x per week in summer in good weather	Local, regularly use the beach in summer
Drigg	Intertidal occupancy	69	M	Under 5	Beach games and eating picnics	170	3-4 x per week in summer in good weather	Local, regularly use the beach in summer
Drigg	Intertidal occupancy	70	M	Under 5	Beach games and eating picnics	170	3-4 x per week in summer in good weather	Local, regularly use the beach in summer

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Drigg	Intertidal occupancy	118	F	50's	Dog walking	53	Daily for 6 weeks in spring/summer school holidays - split between 2 locations	Owns a caravan at a local caravan park
Drigg	Intertidal occupancy	150	F	U	Building sandcastles	2	1st visit, in summer	Holidaymaker
Drigg	Intertidal occupancy	151	M	Under 7	Building sandcastles	2	1st visit, in summer	Holidaymaker
Drigg	Intertidal occupancy	170	F	60's	Dog walking	235	4-5 x per week, all year	Local, regularly use the beach
Drigg	Intertidal occupancy	171	M	U	Rock pooling, walking barefoot and playing football	210	1 x per week all year; walking barefoot and rock pooling in good weather	Local
Drigg	Intertidal occupancy	172	F	U	Rock pooling, walking barefoot and playing football	210	1 x per week all year; walking barefoot and rock pooling in good weather	Local
Drigg	Intertidal occupancy	173	U	Under 7	Rock pooling, walking barefoot and playing football	210	1 x per week all year; walking barefoot and rock pooling in good weather	Local
Drigg	Intertidal occupancy	174	U	Under 7	Rock pooling, walking barefoot and playing football	210	1 x per week all year; walking barefoot and rock pooling in good weather	Local
Drigg	Intertidal occupancy	181	F	60's	Dog walking	182	Daily, all year	Local, regularly use the beach
Drigg	Intertidal occupancy	190	M	41	Angling	520	1-2 x per week, all year	Local, regularly use the beach
Drigg	Intertidal occupancy	191	M	35	Walking and shell collecting	60	Not specified	Local, regularly use the beach
Drigg	Intertidal occupancy	192	F	35	Walking and shell collecting	60	Not specified	Local, regularly use the beach
Drigg	Intertidal occupancy	194	M	U	Bait digging and angling	624	6 x per week all year - split between 2 locations	Local, regularly use the beach

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Drigg	Intertidal occupancy	195	M	U	Collecting winkles and mussels, and angling	254	Collecting winkles for 20 h/w for 43 weeks - split between 4 locations; angling 4 h/w for 43 weeks of the year - split between 5 locations; collecting mussels 1/2 hour per week for 22 weeks of the year - split between 2 locations	Local, regularly use the beach
Drigg	Intertidal occupancy	196	F	U	Angling	17	1 x per week for 43 weeks - split between 5 locations	Local, regularly use the beach
Drigg	Intertidal occupancy	200	M	8	Collecting winkles	45	Most weekends and school holidays	Local, regularly use the beach
Drigg	Intertidal occupancy	201	M	U	Beachcombing	39	6 hours per week all year - split between 8 locations	Local, regularly use the beach
Drigg	Handling beach materials	3	M	U	Handling cans and fish boxes found on the beach	150	Daily, all year	Local, regularly use the beach
Drigg	Handling beach materials	191	M	35	Handling shells	60	Not specified	Local, regularly use the beach
Drigg	Handling beach materials	192	F	35	Handling shells	60	Not specified	Local, regularly use the beach
Drigg	Handling beach materials	201	M	U	Handling driftwood, stones and shells	39	Handling while beachcombing for 6 hours per week all year - split between 8 locations	Local, regularly use the beach
Drigg	Handling sediment	194	M	U	Bait digging	442	6 x per week all year - split between 2 locations	Local, regularly use the beach

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Drigg	Handling sediment	195	M	U	Collecting winkles and mussels	114	Collecting mussels 1/2 hour per week for 22 weeks of the year - split between 2 locations; collecting winkles for 20 h/w for 43 weeks - split between 4 locations; handling assumed 50% of occupancy time	Local, regularly use the beach
Drigg	Handling sediment	200	M	8	Collecting winkles	22	Most weekends and school holidays	Local, regularly use the beach
Drigg	Handling gear	60	M	U	Handling lobster pots off shore and repair time on shore	345	7 x per week in July and August, 3 x per fortnight for 6 months in winter, 5 x per fortnight for remaining 4 months - split between 4 locations	Local, regularly use the beach
Drigg	Handling gear	189	M	U	Handling lobster pots off shore and repair time on shore	359	7 x per week July - August, 3 x per week in winter, 5 x per fortnight the rest of the year - split between 4 locations	Local, regularly use the beach
Drigg Barn Scar	Intertidal occupancy	1	M	U	Collecting empty oyster shells	1.5	Once per year	Local
Drigg Barn Scar	Handling beach materials	1	M	U	Handling oyster shells	1.5	Once per year	Local
Saltcoats	Intertidal occupancy	60	M	U	Cleaning lobster pots and walking to boat	270	Daily, all year	Local, regularly use the beach
Ravenglass	Intertidal occupancy	2	M	U	Walking	20	2 x per week all year - split between 5 locations	Local
Ravenglass	Intertidal occupancy	58	F	70's	Dog walking	180	Daily, all year	Local, regularly use the beach

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Ravenglass	Intertidal occupancy	59	F	70's	Dog walking	180	Daily, all year	Local, regularly use the beach
Ravenglass	Intertidal occupancy	149	M	40's	Walking	10	2 visits this year, in summer	Holidaymaker
Ravenglass	Intertidal occupancy	195	M	U	Collecting mussels and cockles	21	Collecting mussels 1/2 hour per week for 22 weeks of the year - split between 2 locations; collecting cockles 1 x per week for 10 weeks	Local, regularly use the beach
Ravenglass	Intertidal occupancy	201	M	U	Beachcombing	39	6 hours per week all year - split between 8 locations	Local, regularly use the beach
Ravenglass	Intertidal occupancy	201	M	U	Collecting cockles, oysters, mussels and clams, setting traps for prawns	120	Shellfish collecting 10 hrs per month all year - split between 2 locations; setting traps 1 x per fortnight all year	Local, regularly use the beach
Ravenglass	Handling beach materials	201	M	U	Handling driftwood, stones and shells	39	Handling while beachcombing for 6 hours per week all year - split between 8 locations	Local, regularly use the beach
Ravenglass	Handling sediment	195	M	U	Collecting cockles and mussels	21	Collecting cockles 1 x per week for 10 weeks; collecting mussels 1/2 hour per week for 22 weeks of the year - split between 2 locations	Local, regularly use the beach
Ravenglass	Handling sediment	201	M	U	Collecting cockles, oysters, mussels and clams	100	Shellfish collecting 10 hrs per month all year - split between 2 locations; setting traps 1 x per fortnight all year	Local, regularly use the beach

Annex 2. Data for probablistic assessments

Location	Category	Observation number	Sex	Age	Activity	H/y	Frequency of visits and time of year (if specified)	Local/tourist
Ravenglass	Handling gear	60	M	U	Handling lobster pots off shore and repair time on shore	345	7 x per week in July and August, 3 x per fortnight for 6 months in winter, 5 x per fortnight for remaining 4 months - split between 4 locations	Local, regularly use the beach
Ravenglass	Handling gear	189	M	U	Handling lobster pots off shore and repair time on shore	359	7 x per week July - August, 3 x per week in winter, 5 x per fortnight the rest of the year - split between 4 locations	Local, regularly use the beach
Ravenglass	Handling gear	201	M	U	Handling traps for prawns	20	1 x per fortnight all year	Local, regularly use the beach

Annex 3. Adults' intertidal occupancy rates (h/y)

Observation number	Sex	Age	Location	Activity	Mud and sand	Rock	Rock and sand	Sand	Sand dunes	Stones
194	**M**	**U**	**Drigg and Braystones/**Nethertown	**Bait digging and angling**/Collecting winkles	**1248**		24			
21	**M**	**U**	**Braystones**	Shrimping/**Winkle and mussel collection**/Angling	300		**300**	300		
22	**F**	**U**	**Braystones**	Shrimping/**Winkle and mussel collection**/Angling	150		**150**	150		
19	**M**	**50's**	**Coulderton**	Crabbing/Dog walking and angling/**Dog walking and angling**	300			300		**300**
23	**M**	**50's**	**Braystones**	Shrimping/**Winkle and mussel collection**/Angling	122		**122**	122		
201	M	U	Ravenglass /Whitriggs Scar/All along survey area	Collecting cockles, oysters, mussels and clams, setting traps for prawns/Collecting winkles/Beachcombing	120	20		144		144
57	M	20's	Braystones & Sellafield/Drigg to St Bees	Baitdigging/Angling	100			188		188
195	**M**	**U**	Braystones/**Drigg to St Bees and Ravenglass/Braystones, Drigg to St Bees and Ravenglass**	Bait digging/**Collecting mussels, winkles and angling/Set nets, collecting cockles and winkles**	86	**527**		**1051**		
32	M	20's	Sellafield and Braystones/Braystones,Nethertown and St Bees	Baitdigging/Angling	56			105		105
119	M	50's	Braystones	Bait digging	36					
			St Bees & Sellafield	Angling and dog walking				195		
			St Bees & Sellafield	Angling and dog walking						195
186	M	U	Braystones	Angling	36					
187	M	U	Braystones	Angling	36					

Annex 3. Adults' intertidal occupancy rates (h/y)

Observation number	Sex	Age	Location	Activity	Mud and sand	Rock	Rock and sand	Sand	Sand dunes	Stones
193	**M**	**45**	**Seascale**	Bait digging/**Dog walking, set lining and angling**	31			**540**		
25	M	76	Braystones	Bait digging/Long-lining Beachcombing/Angling	15			310		24
166	**M**	**U**	**St Bees to Coulderton**	**Winkle collecting**		**700**				
202	**M**	**U**	**St Bees**/Seamill	**Angling**/Hooking crab and lobster		**400**	12			
20	**M**	**20's**	**St Bees**/Nethertown	**Angling**/Collecting peeler crabs at low water mark		**310**	50			
125	**F**	**60's**	**St Bees**	**Dog walking**		**275**		275		
131	M	53	St Bees	Angling		210				
				Dog walking				50		50
10	M	20's	St Bees to Drigg	Angling		200		200		200
133	M	50's	St Bees	Dog walking		138		137		
135	F	50's	St Bees	Dog walking		138		137		
196	**F**	**U**	St Bees to Drigg**/Braystones**	Angling/**Set nets, walking and playing**		86		**414**		
37	M	60's	Nethertown	Collecting winkles		64				
				Dog walking				183		
				Dog walking						182
128	M	50	St Bees and Sellafield	Crabbing/bait digging		15	15			
111	**M**	**42**	Nethertown**/St Bees, Seamill and Nethertown**	Collecting winkles/**Dog walking**		12		**365**		**365**
112	**F**	**30's**	Nethertown**/St Bees, Seamill and Nethertown**	Collecting winkles/**Dog walking**		12		**365**		**365**
132	M	60's	Nethertown	Collecting seaweed		10				
1	M	U	St Bees/Sellafield and Drigg Barn Scar	Collecting mussels/Angling and collecting empty oyster shells		4.5		6		1.5
24	**M**	**20's**	**St Bees to Sellafield**	**Collecting peeler crabs**/Angling			**180**	180		

Annex 3. Adults' intertidal occupancy rates (h/y)

Observation number	Sex	Age	Location	Activity	Mud and sand	Rock	Rock and sand	Sand	Sand dunes	Stones
141	**F**	**30's**	**Nethertown**	**Rock pooling**/Crabbing and building sandcastles/Dog walking			**122**	121		122
171	M	U	Drigg	Rock pooling/Walking barefoot and playing football			70	140		
172	F	U	Drigg	Rock pooling/Walking barefoot and playing football			70	140		
43	F	70's	Seascale	Playing barefoot			60	60		
44	M	70's	Seascale	Playing barefoot			60	60		
182	F	40's	St Bees	Rock pooling/Building sandcastles			50	100		
71	M	40's	St Bees	Rock pooling/Beach games/walking			8	9		8
72	F	40's	St Bees	Rock pooling/Beach games/walking			8	9		8
106	M	30's	Seascale	Rock pooling/Playing in sand barefoot			2	2		
107	F	30's	Seascale	Rock pooling/Playing in sand barefoot			2	2		
47	**U**	**U**	**Seascale**	**Dogwalking**				**910**		
48	**U**	**U**	**Seascale**	**Dogwalking**				**910**		
49	**U**	**U**	**Seascale**	**Dogwalking**				**910**		
50	**U**	**U**	**Seascale**	**Dogwalking**				**910**		
51	**U**	**U**	**Seascale**	**Dogwalking**				**910**		
27	**M**	**40's**	**Whitriggs Scar**	**Dog walking**				**730**		
52	**M**	**40's**	**Seascale**	**Dogwalking**				**730**		
53	**F**	**40's**	**Seascale**	**Dogwalking**				**730**		
66	**F**	**40's**	**Drigg**	**Dog walking**				**730**		
3	**M**	**U**	**Drigg**	**Dog walking and beachcombing**				**548**	**547**	
190	**M**	**41**	**Drigg**	**Angling**				**520**		
35	**F**	**40's**	**Seamill**	**Jogging**				**400**		

Annex 3. Adults' intertidal occupancy rates (h/y)

Observation number	Sex	Age	Location	Activity	Mud and sand	Rock	Rock and sand	Sand	Sand dunes	Stones
17	**M**	**30's**	**Coulderton**	**Dog walking and collecting driftwood**				**365**		**365**
18	**F**	**30's**	**Coulderton**	**Dog walking**				**365**		**365**
83	**M**	**40's**	**Seascale**	**Dog walking**				**365**		**365**
105	**F**	**50's**	**Braystones**	**Dog walking**				**365**		**365**
120	**M**	**60's**	**Braystones**	**Dog walking**				**365**		**365**
143	**M**	**50's**	**St Bees**	**Dog walking**				**365**		**365**
4	**F**	**60's**	**Seascale**	**Dog walking**				**365**		
134	F	50	St Bees	Dog walking				325		
5	F	U	St Bees to Seamill	Walking				280		
60	M	U	Saltcoats	Cleaning lobster pots/walking to boat				270		
36	**M**	**30's**	**Coulderton**	**Dog walking**				250		**250**
126	F	65	St Bees	Dog walking				245		
127	M	60's	St Bees	Dog walking				245		
117	F	40's	Braystones to Coulderton	Dog walking				225		225
130	F	19	St Bees	Sunbathing, paddling, playing cricket				210		
144	M	60's	Seamill	Dog walking and paddling/Dog walking				195		195
145	F	60's	Seamill	Dog walking and paddling/Dog walking				195		195
82	M	U	Nethertown	Angling				187		188
87	M	60's	Seascale	Dog walking				183		183
86	M	30's	Seascale	Dog walking				183		182
123	M	20's	St Bees	Dog walking				183		182
148	M	U	St Bees	Dog walking				183		182

Annex 3. Adults' intertidal occupancy rates (h/y)

Observation number	Sex	Age	Location	Activity	Mud and sand	Rock	Rock and sand	Sand	Sand dunes	Stones
180	F	U	St Bees	Walking, eating picnic, paddling and sunbathing/Walking				183		182
181	F	60's	Seascale/Drigg	Dog walking				183		182
58	F	70's	Ravenglass	Dog walking				180		
59	F	70's	Ravenglass	Dog walking				180		
7	M	60's	St Bees to Seamill	Dog walking				170		
67	F	30's	Drigg	Supervising children				170		
165	F	50's	Seascale and Drigg	Dog walking				160		
88	F	30's	Seascale	Playing (often barefoot)				150		
89	F	30's	Seascale	Playing (often barefoot)				150		
171	M	U	Drigg	Rock pooling/Walking barefoot and playing football			70	140		
172	F	U	Drigg	Rock pooling/Walking barefoot and playing football			70	140		
85	M	70's	Seascale	Dog walking				138		138
84	F	70's	Seascale	Dog walking				138		138
96	M	40's	Nethertown to Braystones	Dog walking				130		130
94	M	18	Seascale	Dog walking				125		125
146	M	U	St Bees	Walking				120		120
175	M	U	Braystones	Build sandcastles, walk barefoot, collecting plastic bottles				120		
170	F	60's	Drigg	Dog walking				117		118
164	F	30's	St Bees	Dog walking				105		105
138	F	U	St Bees	Dog walking				100		100
139	M	U	St Bees	Dog walking				100		100
38	M	40's	Braystones	Playing				100		
39	F	40's	Braystones	Playing				100		
99	M	50's	Braystones	Dog walking				100		

Annex 3. Adults' intertidal occupancy rates (h/y)

Observation number	Sex	Age	Location	Activity	Mud and sand	Rock	Rock and sand	Sand	Sand dunes	Stones
129	F	47	St Bees	Dog walking				100		
140	F	50's	St Bees	Dog walking				90		90
28	F	20's	St Bees, Seascale & Drigg	Playing barefoot				78		
29	F	20's	St Bees, Seascale & Drigg	Playing barefoot				78		
26	M	U	Seascale	Walking				70		
113	M	40's	Coulderton & St Bees	Playing				67		
114	F	40's	Coulderton & St Bees	Playing				67		
176	F	U	Braystones	Build sandcastles/walking (barefoot)				60		60
191	M	35	Drigg	Walking/shell collecting				60		
192	F	35	Drigg	Walking/shell collecting				60		
75	M	70's	Coulderton	Supervising children				57		56
76	F	70's	Coulderton	Supervising children				57		56
102	M	60's	Braystones	Beachcombing, supervising children				53		52
118	F	50's	Seascale to Drigg	Dog walking				52	53	
2	M	U	St Bees to Seamill, Coulderton, Nethertown, Drigg, Ravenglass to Salmongarth	Walking				50		50
14	M	40's	Coulderton	Dog walking				50		50
15	F	40's	Coulderton	Dog walking				50		50
179	M	60's	Braystones	Angling and walking				50		50
147	F	U	St Bees	Dog walking				50		
154	F	U	St Bees	Paddling, building sandcastles, collecting shells				50		
157	M	U	St Bees	Playing, paddling, eating picnic				48		
158	F	U	St Bees	Playing, paddling, eating picnic				48		
11	F	20's	St Bees to Seamill	Walking				40		

Annex 3. Adults' intertidal occupancy rates (h/y)

Observation number	Sex	Age	Location	Activity	Mud and sand	Rock	Rock and sand	Sand	Sand dunes	Stones
185	M	74	Seascale	Sand yachting				40		
122	M	60's	Braystones	Dog walking and beach games/Angling				38		37
54	F	70	Drigg	Playing frisbee				37		
80	M	30's	Nethertown	Dog walking/angling				35		35
121	F	60's	Braystones	Dog walking				30		30
101	F	50's	Braystones	Dog walking				28		
100	M	50's	Braystones	Dog walking				28		
152	F	U	Seamill	Walking				25		25
97	M	U	Braystones	Kite flying				25		
153	F	U	St Bees	Walking				18		18
124	F	30's	St Bees	Dog walking				14		
162	M	U	St Bees	Walking				12		
163	F	U	St Bees	Walking				12		
149	M	40's	Ravenglass	Walking				10		
136	F	40's	St Bees	Walking/paddling barefoot/building sandcastles				7		7
61	M	30's	Drigg	Playing/paddling				5		
62	F	30's	Drigg	Playing/paddling				5		
167	M	60's	St Bees	Walking, eating picnic, paddling barefoot				3		
168	F	60's	St Bees	Walking, eating picnic, paddling barefoot				3		
150	F	U	Drigg	Building sandcastles				2		
16	**M**	**50's**	**Seamill to Braystones**	**Dog walking**						**730**
33	**M**	**60's**	**St Bees to Braystones**	**Dog walking**						**365**
34	**F**	**60's**	**St Bees to Braystones**	**Dog walking**						**365**

Annex 3. Adults' intertidal occupancy rates (h/y)

Observation number	Sex	Age	Location	Activity	Mud and sand	Rock	Rock and sand	Sand	Sand dunes	Stones
95	**M**	**60's**	**Seascale**	**Dog walking**						**365**
184	F	40's	St Bees	Beachcombing						6

Notes

Emboldened observations are the critical group members

The critical group intertidal occupancy rate over mud and sand based on 1 observation is 1248 h/y

The critical group intertidal occupancy rate over rock based on 5 observations is 442 h/y

The critical group intertidal occupancy rate over rock and sand based on 5 observations is 175 h/y

The critical group intertidal occupancy rate over sand based on 24 observations is 593 h/y

The critical group intertidal occupancy rate over sand dunes based on 1 observation is 547 h/y

The critical group intertidal occupancy rate over stones based on 14 observations is 378 h/y

Annex 4. Children's intertidal occupancy rates (h/y)

Observation number	Sex	Age	Location	Activity	Rock	Rock and sand	Sand	Stones
15-year-old age group								
42	**U**	**13**	**Braystones**	**Playing**			**100**	
81	**M**	**15**	**Nethertown**	**Angling/Dog walking**			**35**	**35**
98	M	16	Braystones	Kiteflying			25	
10-year-old age group								
41	**U**	**10**	**Braystones**	**Playing**			**100**	
56	F	10	Drigg	Playing frisbee			37	
64	F	7	Drigg	Playing (naked) and paddling			5	
73	M	11	St Bees	Rock pooling/Beach games/walking		8	9	8
74	F	12	St Bees	Rock pooling/Beach games/walking		8	9	8
77	**F**	**10**	**Coulderton**	**Rock pooling**/ Playing/**Collecting stones**		**39**	38	**38**
78	**M**	**8**	**Coulderton**	**Rock pooling**/ Playing/**Collecting stones**		**39**	38	**38**
109	F	12	Seascale	Playing in sand barefoot/rock pooling		2	2	
110	M	10	Seascale	Playing in sand barefoot/rock pooling		2	2	
115	F	12	Coulderton & St Bees	Playing			67	
116	F	7	Coulderton & St Bees	Playing			67	
137	F	8	St Bees	Walking/paddling barefoot/building sandcastles			7	7
197	**M**	**11**	**Braystones**	**Playing, building sandcastles, getting buried in sand**			**258**	
198	**M**	**9**	**Braystones**	**Playing, building sandcastles, getting buried in sand**			**258**	
200	**M**	**8**	**St Bees to Drigg/Braystones**	**Collecting winkles/Playing, building sandcastles, getting buried in sand, angling**	**220**		**258**	

Annex 4. Children's intertidal occupancy rates (h/y)

Observation number	Sex	Age	Location	Activity	Rock	Rock and sand	Sand	Stones
5-year-old age group								
6	**F**	**2**	**St Bees to Seamill**	**Walking**			**280**	
8	**U**	**3**	**St Bees to Seamill**	**Dog walking**			**170**	
9	**U**	**5**	**St Bees to Seamill**	**Dog walking**			**170**	
12	F	3	St Bees to Seamill	Walking			40	
13	M	5	St Bees to Seamill	Walking			40	
30	U	2	St Bees/Seascale/Drigg	Playing barefoot			78	
31	U	3	St Bees/Seascale/Drigg	Playing barefoot			78	
40	**U**	**6**	**Braystones**	**Playing**			**100**	
45	**M**	**6**	**Seascale**	**Playing barefoot**		**60**	60	
46	**F**	**4**	**Seascale**	**Playing barefoot**		**60**	60	
55	F	3	Drigg	Playing frisbee			37	
63	F	4	Drigg	Playing (naked) and paddling			5	
68	**M**	**Under 5**	**Drigg**	**Beach games and eating picnics**			**170**	
69	**M**	**Under 5**	**Drigg**	**Beach games and eating picnics**			**170**	
70	**M**	**Under 5**	**Drigg**	**Beach games and eating picnics**			**170**	
79	M	6	Coulderton	Rock pooling/ Playing/Collecting stones		39	38	38
90	**U**	**Under 4**	**Seascale**	**Playing barefoot**			**150**	
91	**U**	**Under 4**	**Seascale**	**Playing barefoot**			**150**	
92	**U**	**Under 4**	**Seascale**	**Playing barefoot**			**150**	
93	**U**	**Under 4**	**Seascale**	**Playing barefoot**			**150**	
103	U	Under 5	Braystones	Rock pooling/Building sandcastles/Paddling barefoot		20	20	20

Annex 4. Children's intertidal occupancy rates (h/y)

Observation number	Sex	Age	Location	Activity	Rock	Rock and sand	Sand	Stones
104	U	Under 5	Braystones	Rock pooling/Building sandcastles/Paddling barefoot		20	20	20
108	F	5	Seascale	Rock pooling/Playing in sand barefoot		2	2	
142	**M**	**5**	**Nethertown**	**Rock pooling/Building sandcastles and crabbing/Dog walking**		**122**	**121**	**122**
151	M	Under 7	Drigg	Building sandcastles			2	
155	U	Under 7	St Bees	Paddling, building sandcastles, collecting shells			50	
156	U	Under 7	St Bees	Paddling, building sandcastles, collecting shells			50	
159	U	Under 5	St Bees	Playing, paddling, eating picnic			48	
160	U	Under 5	St Bees	Playing, paddling, eating picnic			48	
161	U	Under 5	St Bees	Playing, paddling, eating picnic			48	
169	F	Under 5	St Bees	Walking, picnic, paddling barefoot			3	
173	**U**	**Under 7**	**Drigg**	**Rock pooling/Walking barefoot, playing football**		**70**	**140**	
174	**U**	**Under 7**	**Drigg**	**Rock pooling/Walking barefoot, playing football**		**70**	**140**	
177	**U**	**Under 5**	**Braystones**	Build sandcastles/**walking**			60	**60**
178	**U**	**Under 5**	**Braystones**	Build sandcastles/**walking**			60	**60**
183	**M**	**Under 5**	**St Bees**	**Rock pooling/Building sandcastles**		**50**	**100**	

Annex 4. Children's intertidal occupancy rates (h/y)

Observation number	Sex	Age	Location	Activity	Rock	Rock and sand	Sand	Stones
199	**F**	**4**	**Braystones**	**Playing/building sandcastles/getting buried in sand**			**258**	
1-year-old age group								
65	**M**	**1**	**Drigg**	**Playing (naked) and paddling**			**5**	

Notes

Emboldened observations are the critical group members

15-year-old age group

The critical group intertidal occupancy rate over sand based on 2 observations is 68 h/y

The critical group intertidal occupancy rate over stones based on 1 observation is 35 h/y

10-year-old age group

The critical group intertidal occupancy rate over rock based on 1 observations is 220 h/y

The critical group intertidal occupancy rate over rock and sand based on 2 observation is 39 h/y

The critical group intertidal occupancy rate over sand based on 4 observations is 219 h/y

The critical group intertidal occupancy rate over stones based on 2 observation is 38 h/y

5-year-old age group

The critical group intertidal occupancy rate over rock and sand based on 6 observations is 72 h/y

The critical group intertidal occupancy rate over sand based on 16 observations is 162 h/y

The critical group intertidal occupancy rate over stones based on 3 observations is 81 h/y

1-year-old age group

The critical group intertidal occupancy rate over sand based on 1 observations is 5 h/y

Annex 5. Adults' handling rates (h/y)

Adults' handling rates of beach materials (h/y)

Observation number	Sex	Age	Location	Activity	Material	Handling rate h/y
201	**M**	**U**	**All along coast**	**Beachcombing**	**Driftwood, stones and shells**	**312**
3	**M**	**U**	**Drigg**	**Beachcombing**	**Cans and fish boxes**	**150**
5	**F**	**U**	**St Bees to Seamill**	**Handling crabs, seaweed and stones**	**Crabs, seaweed, stones**	**140**
102	**M**	**60's**	**South Braystones**	**Collecting driftwood**	**Driftwood**	**105**
191	M	35	Drigg	Collecting shells	Shells	60
192	F	35	Drigg	Collecting shells	Shells	60
17	M	30's	Coulderton	Beachcombing	Driftwood	50
18	F	30's	Coulderton	Beachcombing	Driftwood	50
141	F	30's	Nethertown	Rock pooling and crabbing	Stones and shells	50
25	M	76	Braystones	Beachcombing	Driftwood	24
132	M	60's	Nethertown	Collecting seaweed	Seaweed	10
175	M	U	Braystones	Collecting plastic bottles	Plastic bottles	10
71	M	40's	St Bees	Rock pooling	Stones and shells	8
72	F	40's	St Bees	Rock pooling	Stones and shells	8
184	F	40's	St Bees	Beachcombing	Shells and wood	6
7	M	60's	St Bees to Seamill	Throwing stones	Stones	5
16	M	50's	Seamill to Braystones	Throwing stones	Stones	5
84	F	70's	Seascale	Throwing ball for dog	Sand covered ball	5
85	M	70's	Seascale	Throwing ball for dog	Sand covered ball	5
96	M	40's	Nethertown to Braystones	Throwing stones	Stones	5
154	F	U	St Bees	Collecting shells	Shells	5
182	F	40's	St Bees	Rock pooling	Sand, stones and shells	5
106	M	30's	Seascale	Rock pooling	Stones and shells	4
107	F	30's	Seascale	Rock pooling	Stones and shells	4
1	M	U	Drigg Barn Scar and Sellafield	Collecting empty oyster shells	Oyster shells	3

Notes

Emboldened observations are the critical group members

The critical group rate for handling beach materials based on 4 observations is 177 h/y

Annex 5. Adults' handling rates (h/y)

Adults' handling rates of sediment (h/y)

Observation number	Sex	Age	Location	Activity	Handling rate h/y
194	**M**	**U**	**Nethertown, Braystones and Drigg**	**Collecting winkles, bait digging**	**907**
166	**M**	**U**	**St Bees to Coulderton**	**Collecting winkles**	**700**
195	**M**	**U**	**Ravenglass and Drigg to St Bees**	**Collecting cockles, mussels, winkles (wearing gloves for collecting winkles) and bait digging**	**542**
201	M	U	Ravenglass and Whitriggs Scar	Collecting cockles, oysters, mussels and clams	120
57	M	20's	Sellafield and Braystones	Bait digging	100
19	M	50's	Coulderton	Collecting winkles	100
37	M	60's	Nethertown	Collecting winkles	64
32	M	20's	Sellafield and Braystones	Bait digging	56
24	M	20's	St Bees	Collecting peeler crabs	50
20	M	20's	Nethertown	Collecting peeler crabs	50
10	M	20's	St Bees	Bait digging	50
119	M	50's	Braystones	Bait digging	36
193	M	45	Seascale	Bait digging	31
128	M	50	St Bees and Sellafield	Crabbing and bait digging	30
25	M	76	Braystones	Bait digging	15
111	M	42	Nethertown	Collecting winkles	12
112	F	30's	Nethertown	Collecting winkles	12
1	M	U	St Bees	Collecting mussels	9

Notes

Emboldened observations are the critical group members

The critical group rate for handling sediment based on 3 observations is 716 h/y

Annex 5. Adults' handling rates (h/y)

Adults' handling rates of fishing gear (h/y)

Observation number	Sex	Age	Location	Activity	Gear	Handling rate h/y
189	**M**	**U**	**Ravenglass to Sellafield**	**Commercial potting off shore and repair time on shore**	**Lobster pots**	**1436**
60	**M**	**U**	**Ravenglass to Sellafield**	**Commercial potting off shore and repair time on shore**	**Lobster pots**	**1380**
195	**M**	**U**	**Braystones**	**Set nets from the shore**	**Nets**	**520**
188	M	U	Sellafield area	Commercial potting off shore and repair time on shore	Lobster pots	429
25	M	76	Braystones	Long-lining and pushnetting	Lines/Nets	195
196	F	U	Braystones	Set nets from the shore	Nets	156
193	M	45	Seascale	Set lining from the shore	Lines	48
201	M	U	Ravenglass	Setting traps for prawns	Pots	20
122	M	60's	Braystones	Set & haul fixed nets	Nets	2

Notes

Emboldened observations are the critical group members

The critical group rate for handling fishing gear based on 3 observations is 1112 h/y

Annex 6. Children's handling rates (h/y)

Children's handling rates of beach materials

Observation number	Sex	Age	Location	Activity	Material	Handling rate h/y
10-year-old age group						
77	**F**	**10**	**Coulderton**	**Collecting stones, rock pooling**	**Stones and shells**	**60**
78	**M**	**8**	**Coulderton**	**Collecting stones, rock pooling**	**Stones and shells**	**60**
73	M	11	St Bees	Rock pooling	Stones and shells	8
74	F	12	St Bees	Rock pooling	Stones and shells	8
109	F	12	Seascale	Rock pooling	Stones and shells	4
110	M	10	Seascale	Rock pooling	Stones and shells	4
5-year-old age group						
6	**F**	**2**	**St Bees to Seamill**	**Handling crabs, seaweed and stones**	**Crabs, seaweed and stones**	**140**
104	**U**	**Under 5**	**Braystones**	**Rock pooling**	**Stones and shells**	**60**
103	**U**	**Under 5**	**Braystones**	**Rock pooling**	**Stones and shells**	**60**
79	**M**	**6**	**Coulderton**	**Collecting stones, rock pooling**	**Stones and shells**	**60**
142	**M**	**5**	**Nethertown**	**Rock pooling and crabbing**	**Stones and shells**	**50**
9	U	5	St Bees to Seamill	Throwing stones	Stones	5
8	U	3	St Bees to Seamill	Throwing stones	Stones	5
108	F	5	Seascale	Rock pooling	Stones and shells	4
155	U	Under 7	St Bees	Collecting shells	Shells	5
156	U	Under 7	St Bees	Collecting shells	Shells	5
183	M	Under 5	St Bees	Rock pooling	Stones and shells	5

Notes

Emboldened observations are the critical group members

10-year-old age group

The critical group rate for the handling beach materials based on 2 observations is 60 h/y

5-year-old age group

The critical group rate for handling beach materials based on 5 observations is 74 h/y

Annex 6. Children's handling rates (h/y)

Children's handling rates of sediment

Observation number	Sex	Age	Location	Activity	Handling rate h/y
10-year-old age group					
200	**M**	**8**	**Drigg to St Bees**	**Collecting winkles**	**110**

Notes

Emboldened observations are the critical group members

10-year-old age group

The critical group rate for handling sediment based on 1 observation is 110 h/y

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