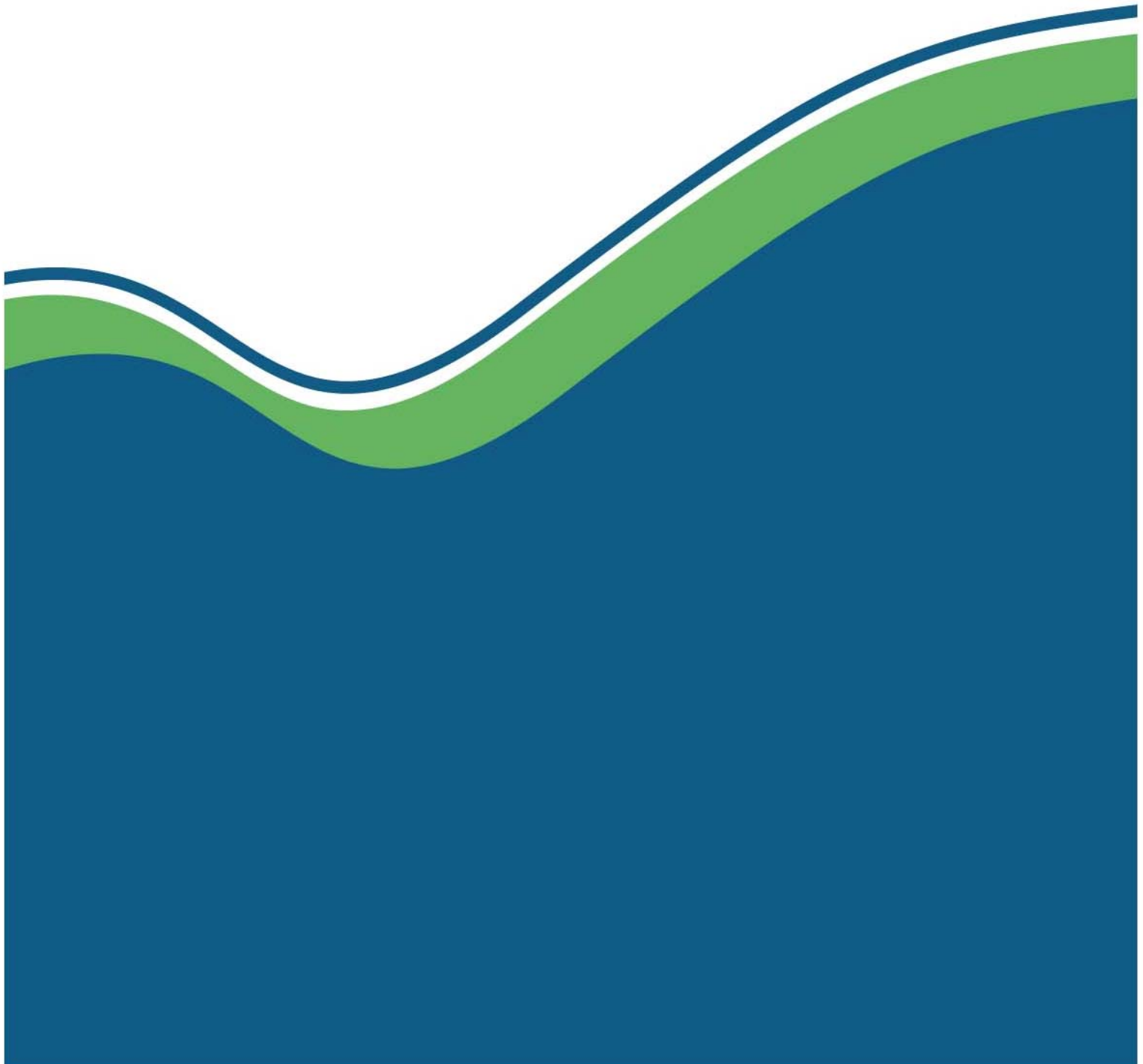




Radiological Habits Survey: Dalgety Bay, 2012



This page has been intentionally left blank

Environment Report RL 13/13

Final report

Radiological Habits Survey: Dalgety Bay, 2012

F.J. Clyne, C.J. Garrod and V.E. Ly

**Peer reviewed by G.J. Hunt
Approved for publication by W.C. Camplin**

2013

The work described in this report was carried out
under contract to the Scottish Environment Protection Agency
SEPA contract R90077PUR
Cefas contract C3745

This report should be cited as: Clyne, F.J., Garrod, C.J. and Ly, V.E., 2013. Radiological Habits Survey: Dalgety Bay, 2012. RL 13/13. Cefas, Lowestoft

A copy can be obtained by downloading from the Cefas website: www.cefas.defra.gov.uk

© Crown copyright, 2013

CONTENTS

SUMMARY	5
1 INTRODUCTION	6
2 THE SURVEY	7
2.1 Survey aim and objectives	7
2.2 Conduct of the survey	7
2.3 Survey area.....	8
<i>Figure 1. The location of the survey area</i>	9
<i>Figure 2. The survey area zones demarcations</i>	10
<i>Figure 3. The Fife Coastal Path where it passes close to the shore at the northern end of the Ross Plantation zone</i>	11
<i>Figure 4. One of the minor paths between the Fife Coastal Path and the shore in the Ross Plantation zone</i>	12
<i>Figure 5. The path by the Fenced Area zone</i>	13
<i>Figure 6. The Headland</i>	14
<i>Figure 7. The North End zone with the northern part of the Ross Plantation zone in the background</i>	15
<i>Figure 8. The northern part of the Ross Plantation zone with the North End zone in the background</i>	15
<i>Figure 9. The Ross Plantation zone, looking towards the north-west</i>	16
<i>Figure 10. The Ross Plantation zone, looking towards the south-east</i>	16
<i>Figure 11. The Boat Area zone and the Fenced Area zone</i>	17
<i>Figure 12. Extensive areas of shore exposed at low tide in front of the Fenced Area</i>	18
<i>Figure 13. The upper shore in the Slipways zone</i>	18
<i>Figure 14. The lower shore in the Slipways zone and reefs at the border with the Boat Area zone</i>	19
<i>Figure 15. The shore in front of The Headland zone</i>	20
<i>Figure 16. The New Harbour zone</i>	20
<i>Figure 17. The West End zone with the New Harbour zone in the background</i>	21
3 ACTIVITIES	22
3.1 Activities and weather conditions observed during the survey	22
3.2 Activities occurring in the survey area	22
3.3 Activities that have changed due to the radioactive materials	26
3.4 Clothing worn by people using the area.....	26
3.5 Inadvertent ingestion	27
3.6 The consumption of foods from the survey area.....	28
4 DATA ANALYSIS	29
4.1 Frequency of visits, and single visit and annual occupancy and handling rates	29
4.2 High-rate groups for occupancy and handling	29
<i>Table 1. Summary of adults' occupancy rates</i>	30
<i>Table 2. Summary of children's and infants' occupancy rates</i>	31
<i>Table 3. Summary of adults' handling rates of sediment or objects that may have had sediment adhering to them</i>	32
<i>Table 4. Summary of children's and infants' handling rates of sediment or objects that may have had sediment adhering to them</i>	33
4.3 Sum totals of all observations for occupancy and handling rates.....	33
<i>Table 5. Summary of the total of all occupancy rates for the zones and bands where people were spending time</i>	34
<i>Table 6. Summary of the total of all handling rates for the zones and bands where handling was taking place</i>	34
4.4 Water based activities	34
5 FUTURE HABITS	36
6 LIMITATIONS AND ASSUMPTIONS	38

7	ACKNOWLEDGEMENTS.....	40
8	REFERENCES.....	41

APPENDICIES

APPENDIX 1. DAILY RECORD OF THE NUMBER OF PEOPLE AND THE ACTIVITIES OBSERVED AT LOCATIONS WITHIN THE SURVEY AREA

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

APPENDIX 3. OCCUPANCY AND HANDLING RATES, WITH MEMBERS OF THE HIGH-RATE GROUPS IDENTIFIED

Table A3.1	Adults' occupancy rates on land and on the shore for the zones and bands where people were spending time
Table A3.2	Children's occupancy rates on land and on the shore for the zones and bands where people were spending time
Table A3.3	Infants' occupancy rates on land and on the shore for the zones and bands where people were spending time
Table A3.4	Adults' handling rates of sediment and objects that may have sediment adhering to them, for the zones and bands where people were spending time
Table A3.5	Children's handling rates of sediment and objects that may have sediment adhering to them, for the zones and bands where people were spending time
Table A3.6	Infants' handling rates of sediment and objects that may have sediment adhering to them, for the zones and bands where people were spending time

APPENDIX 4. OCCUPANCY RATES FOR ACTIVITIES ON THE WATER

Table A4.1	Adults' occupancy rates on the water
Table A4.2	Children's and infants' occupancy rates on the water

SUMMARY

A survey of the habits and activities of members of the public was undertaken in the Dalgety Bay area in October 2012 in order to collect information for use in determining the probability of people encountering radioactive material in the area.

The survey area extended approximately 1.1 km along the western shore of Dalgety Bay and was divided into zones and bands to aid the collection and analysis of data. Interviews were conducted with members of the public who were undertaking activities in the survey area. The interviewees provided information about the activities that they undertook throughout the year and the areas where they spent time. Single visit and annual occupancy rates, and handling rates of sediment and objects that might have sediment adhering to them, are presented. The physical characteristics of the survey area and the access points to the shore are described.

Dog walking and walking were the main activities taking place in the survey area. Many of the local dog walkers walked the length of the survey area daily, sometimes two or three times per day. Activities were recorded taking place in all of the zones and in most of the bands, with most activities taking place predominantly on the paths and grass areas above the shore. Activities were recorded taking place on the beach in the Ross Plantation zone, the Slipways zone, the New Harbour zone and the West End zone. One family was identified climbing on the rocks in the Headland zone and one person was checking moorings on the intertidal mud in the Slipways zone. Most of the people spending time on the beach in the Ross Plantation zone and the Slipways zone were passing through the area as part of a walk. Many families were playing on the beach in the West End zone and the New Harbour zone, particularly in the summer months. Sailing was a popular activity in the area. The Slipways zone was frequently used by people launching and landing their boats and most of the people that were interviewed reported that they remained on the concrete slipways during this time. However, they might occasionally go onto the beach beside the slipways. Activities were identified where people were handling sediment on the beach or picking up objects such as stones, shells or broken crockery. Some people took stones and shells home.

No consumption of foods from the marine or the terrestrial sections of the survey area were identified.

The changes in peoples' activities as a direct result of the public protection measures currently in place are described and an overview of whether activities undertaken in the survey area are likely to change in the future is provided.

1 INTRODUCTION

Radioactive material was first detected on a part of the foreshore at Dalgety Bay in 1990. It is thought that the contamination originates from the residue of radium coated instrument panels from military aircraft incinerated and land filled in the area at the end of World War II. Monitoring has been undertaken by both the Scottish Environment Protection Agency (SEPA) and the Ministry of Defence and periodically radioactive material has been removed. Since 1990 many surveys have been undertaken to determine the potential number of items present and the possible implications for human health (www.sepa.org.uk).

As part of their continuing investigations SEPA commissioned the Centre for Environment, Aquaculture and Fisheries Science (Cefas) to undertake a Radiological Habits Survey at Dalgety Bay in 2012. This report presents the findings of that survey. A Radiological Habits Survey is a study of the 'habits' and activities that people undertake that may influence their exposure to artificial sources of radioactivity. Cefas regularly carries out such surveys on behalf of SEPA as part of their routine monitoring programme around nuclear sites such as nuclear power stations. The survey at Dalgety Bay was specifically aimed at investigating people's habits that might expose them to the radioactive material in the area, for example, activities being undertaken on the shore or picking up any items from the beach.

At the time of the habits survey, a Food and Environment Protection Act (FEPA) Order restriction was in place which covered the main area of Dalgety Bay. This made it an offence to remove seafood and bait from the area (www.food.gov.uk).

2 THE SURVEY

2.1 Survey aim and objectives

The survey aim and objectives were provided by SEPA. The aim of the habits survey was to identify the activities being undertaken, and the foods consumed, from within a prescribed section of Dalgety Bay, in order to assist SEPA in assessing the potential for a member of the public to be exposed to radioactive material.

The objectives were to investigate the following:

- Activities and occupancy undertaken within specified zones and bands along the length and depth of the survey area.
- Activities and occupancy taking place on the water or in the water, such as sailing, paddling or swimming.
- Activities and occupancy being undertaken at the sailing club, for example, boat maintenance, barge maintenance and inspecting moorings.
- The collection of shells, stones or artefacts from the shore within the survey area.
- The collection and consumption of aquatic foods, including marine plants, from the survey area.
- The collection and use of seaweed as a fertiliser.
- The collection and consumption of terrestrial wild foods from the land in the survey area.
- Any changes in peoples' activities as a direct result of the public protection measures currently in place (for example, the fenced area or the FEPA Order) and if the activities would change again if the public protection measures were no longer in place.
- Whether activities undertaken in the survey area are likely to change in the future.
- The typical clothing worn by people undertaking activities in the survey area, in order to provide an indication of the area of skin exposed.

2.2 Conduct of the survey

Prior to undertaking the fieldwork, the survey aim and objectives were discussed with SEPA and the survey area was agreed. Information relating to activities occurring in the survey area and access to the shore was obtained from discussions with SEPA, from internet searches and from Ordnance Survey maps. The fieldwork was carried out from Saturday 13th October to Sunday 21st October 2012, which was during the local school half-term holiday. The survey team met with SEPA on the first day of the fieldwork to identify the demarcation of the survey area zones to be used. The survey area was very small and the survey team covered the area on foot, continuously walking along the various paths and shores in the area throughout the days during the period of fieldwork. Interviews were conducted with people who were encountered in the survey area, and where possible, people

were asked about their activities and occupancy in the survey area throughout the year, the collection or handling of objects from the shore in the survey area and the consumption of aquatic foods or terrestrial wild foods from the survey area. People were also asked if they had changed any of their normal activities because of the radioactive items that had been detected on the shore and if they were likely to change their activities in the future. Any other information of possible use to the survey was noted, particularly observations made by interviewees regarding activities that occur at other times of the year. Interviews were generally conducted between the hours of 9 am and 5 pm since information gained from people who regularly used the area confirmed that this was the main time that people used the area. It started getting dark shortly after 6 pm during the period that the survey was conducted. General information, such as a description of the survey area, access points to the shore, daily weather conditions, and observations of the number of people and the activities that were being undertaken was recorded. The survey team conducted timed walks through the survey area for use in estimating occupancy rates for interviewees who were unable to say how long they spent in the area.

2.3 Survey area

Dalgety Bay is a small inlet on the northern shore of the Firth of Forth; approximately 4 km east of the Forth Road Bridge (see Figure 1). The town to the west of the bay is also called Dalgety Bay. The survey area extended approximately 1.1 km along the western shore of the bay adjacent to the town and was divided into zones and bands to aid the collection and analysis of data. Eight zones, based on topography and prominent features, were demarcated along the length of the survey area (see Figure 2). From north to south the zones were named:

- North End
- Ross Plantation
- Fenced Area
- Boat Area
- Slipways
- Headland
- New Harbour
- West End

The shore, and the paths and grass areas immediately adjacent to the shore, were included in the survey area. Three bands were used to indicate where activities took place relative to the shoreline.

The bands were:

- The paths and grass areas on land close to the top of the shore
- The beaches and rocks of the upper shore
- The mud flats and rocks of the lower shore



Figure 1. The location of the survey area

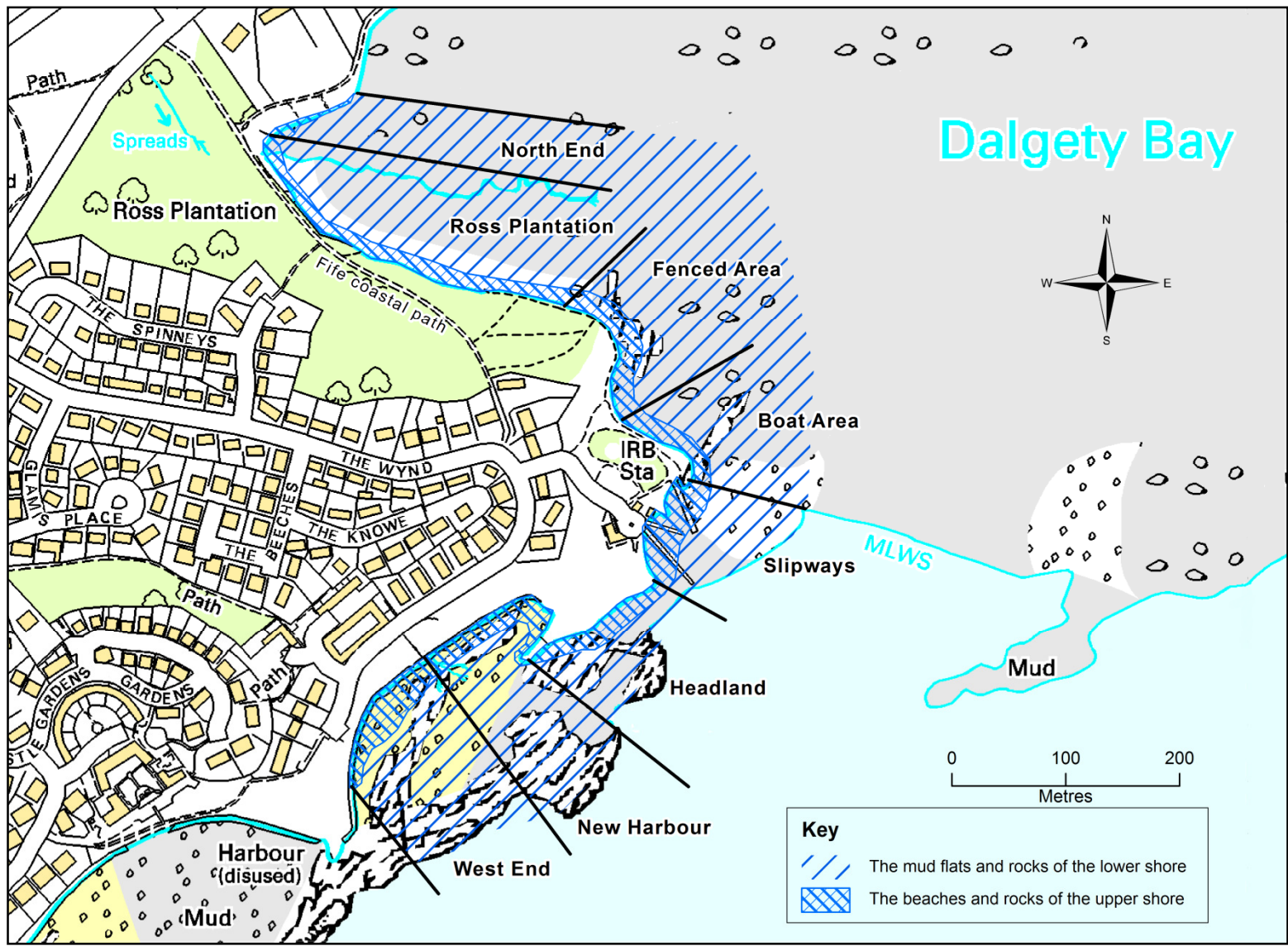


Figure 2. The survey area zones demarcations

Access Points

The main access points to the shore were via the Fife Coastal Path in the north of the survey area, via tracks through the grounds of a sailing club in the centre of the survey area and across grass lawns from a nearby road (The Wynd) in the south end of the survey area. The road entrance to the sailing club grounds was from The Wynd and the Fife Coastal Path also connected to The Wynd. The sailing club grounds were open to the general public. Areas of the sailing club grounds away from the shore, such as the car park, dinghy parking area and clubhouse were not included in the survey area.

The Fife Coastal Path, which had a surface of compacted crushed stone, entered the survey area from the east and passed close to the shore through the North End zone. It continued through the Ross Plantation zone (see Figure 3), gradually veering inland to join The Wynd. Other paths from the road at Moray Way South and from The Spinneys joined the Fife Coastal Path near the northern end of the Ross Plantation zone. For the most part the Fife Coastal Path was separated from the shore by a band of trees and undergrowth but there was a small area of open grass, just a few metres long, between the Fife Coastal Path and the shore, close to the point where the path from The Spinneys joined the coastal path. Several minor paths cut through the band of trees and undergrowth to allow access from the Fife Coastal Path to the shore in the North End and Ross Plantation zones (see Figure 4). Other minor paths passed through over 100 m of woodland between the part of the Fife Coastal Path near to The Wynd and the Fenced Area zone.



Figure 3. The Fife Coastal Path where it passes close to the shore at the northern end of the Ross Plantation zone



Figure 4. One of the minor paths between the Fife Coastal Path and the shore in the Ross Plantation zone

The Fenced Area zone was so called because a fence had been erected at the top of a low embankment at the top of the shore, preventing direct access to the shore in this area. The fence was erected due to the discovery of high activity particles in this area and signs were in place advising the public not to go onto the shore in his area. At the northern end of the fenced area a barrier extended down the shore perpendicular to the fence, but this was only a few metres long and, except at high tide, it was possible to gain easy access to the shore in front of the fenced area by walking along the shore from the Ross Plantation zone, below the barrier. It was also possible to access the shore at the south end of the fenced area by going around the end of the fence and down a low embankment. An earth path ran behind the fence, (see Figure 5) between the shore at the south end of the Ross Plantation zone and the track in the Boat Area zone.

The Boat Area zone could be accessed from The Wynd through the sailing club grounds. A track ran parallel to the shore through the Boat Area zone and boats on trailers were kept parked on either side of the track. There was no easy direct access from the track to the shore in this zone, owing to the parked boats and an embankment of rough boulders at the top of the shore. However, the area could be accessed by walking along the shore from the slipways area or the fenced area. The track led to the main slipway in the Slipways zone.

In the Slipways zone, easy access to the shore was possible via the main slipway, which had a concrete surface, and via a ramp slightly further south that led to both the old slipway and a jetty, both of which had concrete surfaces. Paths above the shore connected the tracks that led to the slipways.



Figure 5. The path by the Fenced Area zone

Immediately to the south of the Slipways zone, the Headland zone was a large area of cut grass (see Figure 6) that could be reached from paths and tracks through the sailing club grounds or across other grass areas from The Wynd. The seaward side of the headland was faced with a steep boulder embankment that prevented easy direct access to the shore, although towards the south-west end there was a rocky outcrop next to the embankment that allowed agile individuals to get down to the shore below. At low tide it was possible to walk along the shore to the headland from the slipways area.

At the south-west end of the Headland zone there was a small stone pier that demarcated the north-east end of the New Harbour zone. To the west of the pier there was a small cove with a sand beach and a concrete ramp near the pier provided access to the beach. A boulder embankment extended along the top of the shore south-westwards from the beach, through the rest of the New Harbour zone and all along the West End zone. The bank was steep and difficult to traverse in the New Harbour zone but lower in the West End zone. A small area of gently shelving bedrock rose through the embankment at one place in the West End zone creating a relatively easy access point to a small sand beach below. A large open grass area lay between the top of the embankment and The Wynd, which ran parallel to the shore through the New Harbour and West End zones. A path had been trodden into the grass along the top of the embankment and the path continued to follow the top of the shore outside the survey area, around a small headland to Donibristle Bay to the south.



Figure 6. The Headland

Description of the shore

The description of the shore presented below is as it was observed at the time of the survey. Shore substrates may change over time, particularly following periods of rough seas.

The North End zone, the Ross Plantation zone, the Fenced Area zone and the Boat Area zone

A bank of rough grass formed the upper shore in the North End zone (see Figure 7) and the northern part of the Ross Plantation zone (see Figure 8). The lower lying parts of the grass area were tide washed and at the time of the survey most of the grass area was waterlogged owing to a combination of high spring tides and recent rainfall. There were one or two small patches of sand, just a few metres across, along the edge of the grass in the North End zone. A drainage pipe discharged water into the corner of the bay at the western end of the North End zone and the water had cut a small channel out across the shore.



Figure 7. The North End zone with the northern part of the Ross Plantation zone in the background



Figure 8. The northern part of the Ross Plantation zone with the North End zone in the background

A beach, composed mainly of small stones with a little coarse sand, extended along the upper shore through most of the Ross Plantation Zone (see Figure 9 and 10), the Fenced Area zone and the Boat Area zone (see Figure 11). There were noticeable amounts of manmade materials such as bricks,

other building materials and wave worn pieces of broken glass and crockery mixed in with the natural materials of the beach. At the time of the survey, large amounts of loose seaweed had been washed up on the beach.



Figure 9. The Ross Plantation zone, looking towards the north-west



Figure 10. The Ross Plantation zone, looking towards the south-east



Figure 11. The Boat Area zone and the Fenced Area zone

The lower shore between the North End zone and the Boat Area zone was a large expanse of mud flats with scattered boulders and stones that stretched out into the bay. Extensive areas were exposed at low tide and many parts were covered with seaweed and algal mats. Small patches of bedrock were scattered across the upper and lower shore in the Fenced Area zone (see Figure 12) and larger outcrops of bedrock, interspersed with patches of mud, sand and stones, extended out across the shore at the eastern end of the Boat Area zone and into the northern part of the Slipways zone.

The Slipways zone

The upper shore in the Slipways zone was predominantly composed of small stones and coarse sand (see Figure 13). Further down the slipways the shore was a mix of larger stones and sandy mud. As on the beach further north there were many pieces of manmade materials such as bricks and broken crockery scattered across the shore. Sand flats and mud flats extended a little way offshore from the end of the slipways. Small amounts of sand and stones were observed on the concrete slipways at various times during the survey. Outcrops of bedrock formed a series of reefs at the border between the Boat Area zone and the Slipways zone (see Figure 14) and on the seaward side of the reefs a pair of partially sealed drainage pipes rose out of the sediment. Water issued from the pipes and a dense mussel bed covered the area around the pipes.



Figure 12. Extensive areas of shore exposed at low tide in front of the Fenced Area



Figure 13. The upper shore in the Slipways zone



Figure 14. The lower shore in the Slipways zone and reefs at the border with the Boat Area zone

The Headland zone

The upper shore below the embankment around the Headland zone was mainly large stones (see Figure 15) and these extended down to the low water mark. At the south-west end of the zone a rocky outcrop extended all the way across the shore and patches of sand and stones had settled in the depressions in the rock.

The New Harbour zone

On the landward side of the small stone pier in the New Harbour zone there was a small beach of golden sand on the upper shore (see Figure 16). Below the embankment to the south-west of the beach the upper shore was a mix of seaweed covered boulders and bedrock. The lower shore directly in front of the sand beach was muddy sand and the lower shore throughout the rest of the zone was a mix of patches of bedrock, boulders, stones, sand and mud. Most of the boulders and bedrock were covered with seaweed.



Figure 15. The shore in front of The Headland zone



Figure 16. The New Harbour zone

The West End zone

The upper shore of seaweed covered boulders and bedrock continued into the West End zone but there was a small golden sand beach along the upper shore in the centre of the zone (see Figure 17). The lower shore throughout the zone was similar to the New Harbour zone; a complex patchwork of bedrock, boulders, stones, sand and mud, with many areas overgrown with seaweed.



Figure 17. The West End zone with the New Harbour zone in the background

3 ACTIVITIES

3.1 Activities and weather conditions observed during the survey

Throughout the survey, a record was kept of the number of people observed and the activities that these people were undertaking. The results are presented in Appendix 1. This information provides an overview of the number of people using the zones in the survey area throughout the fieldwork. It includes the people that were interviewed and the people that were observed but not interviewed. Sometimes people were observed in the distance and the survey team were unable to reach them and sometimes the survey team were conducting interviews when other people were observed. Headcounts for the entire survey area are not given since it was not possible to observe the whole of the area from a single vantage point.

The main activities that were observed in the survey area were dog walking, walking, cycling, launching boats from the slipways and sailing. Many of the local dog walkers who used the area daily were observed repeatedly over the period of the fieldwork. The zone where most people were observed and interviewed was Ross Plantation, where people were using the Fife Coastal Path, other paths through the woods, or the shore.

The observed weather conditions were also recorded during the fieldwork and are also presented in Appendix 1. The weather was generally cold throughout the survey period with a mixture of sunny days and overcast days with light or heavy rain. Even on the days with heavy rainfall the dog walkers were not deterred from using the area by the poor weather conditions.

3.2 Activities occurring in the survey area

Details of the activities that interviewees were undertaking throughout the year are presented in Appendix 2. The activities of staff from the agencies engaged in investigating the radioactive materials, and their contractors, were not included in the survey.

Activities were recorded taking place in all zones and most activities took place predominantly on the paths and grass areas above the shore. Activities were recorded taking place on the beach in the Ross Plantation zone, the Slipways zone, the New Harbour zone and the West End zone; just one family was recorded carrying out activities on the rocks in the Headland zone. No activities were recorded taking place on the beach in the North End zone, the Fenced Area zone or the Boat Area zone during the survey. However, there is anecdotal evidence that limited occupancy of these areas takes place (SEPA pers. comm., 2013). The only activity identified on the intertidal mud during the survey was fixing moorings in the Slipways zone. There is also anecdotal evidence of bait diggers spending time on the intertidal mud in the West End zone (SEPA pers. comm., 2013).

Activities undertaken by interviewees

The main activities taking place within the survey area were dog walking, walking, playing, sailing and boating related activities.

There were many access points to the survey area and the dog walkers and walkers variously walked through part or all of the area, sometimes making a return trip through the area and sometimes passing through one way as part of a longer walk or circular route. Many local walkers and dog walkers followed a regular route while others preferred to vary their route from day to day. The most popular routes were between the North End zone and the Fenced Area zone, between the Headland zone and the West End zone and through the entire survey area. Most dog walkers and walkers stayed predominantly on the paths and grass areas above the shore but approximately 60% of the dog walkers and 30% of the walkers regularly visited one or more of the beaches as part of their walk. The beach most frequently visited by dog walkers and walkers was in the Ross Plantation zone, but they tended to pass through this area quite quickly. Fewer people used the beach at the West End zone, but this beach, with its golden sand, was considered more attractive by most people and they tended to stay on the beach for longer. A few walkers and dog walkers went onto the beach at New Harbour and the Slipways. Some dog walkers kept their dogs on leads but many let the dogs run free and exercised them by throwing balls, sticks and stones for the dogs to chase. A few encouraged their dogs to go into the sea by throwing objects into the water. It was noted that small quantities of sand and sediment often adhered to the balls and sticks when the dogs retrieved them to the dog walkers. Several dog walkers used plastic sticks with a moulded grip in the end to throw the balls with, and although the primary reason for their use was to save the dog walker bending down to pick up the ball, their use also resulted in the dog walker handling the ball less. Dogs frequently had sediments on their paws and fur and were subsequently petted by the dog walkers. Occasionally small dogs were picked up and carried. It was noted that dogs had been digging in the sand on the beach at West End.

Several families spent time on the small sand beach in the West End zone, engaged in activities such as playing and building sandcastles or rock pooling in the rocks nearby. They reported that they also visited this beach in the summer time, when they took picnics and paddled or swam in the sea. A few families also played and paddled on the small sand beach at New Harbour and one family was identified that spent time playing on the shore at the Slipways. One family was identified that spent time climbing on the rocks at the south-west end of the Headland zone. This was the only activity recorded taking place on the upper shore in this zone. Most of the shore in front of the Headland was large stones, which were difficult to walk on.

A few individuals that were walking, dog walking or playing, picked up shells or stones from the beaches at Ross Plantation, the Slipways, New Harbour and West End. Some people took the stones and shells home with them. One family were identified that picked up broken crockery from

the beaches at Ross Plantation and the Slipways but did not take it home. One person occasionally collected driftwood from the beaches at West End and New Harbour for use in their garden. No one was identified that was deliberately seeking for old aircraft artefacts on the shore at the time of the survey, although this is known to have occurred in the past (SEPA pers. comm., 2013).

A few of the walkers were engaged in other activities while out on their walks, such as taking photographs. A small number of runners and joggers were recorded and they took similar routes through the survey area as the walkers. A few cyclists passed through all or part of the survey area and they stayed on the paths and grass areas above the shore. Horse riders were observed on the Fife Coastal Path but were not interviewed. Four bird watchers were interviewed. They mainly used the beach at Ross Plantation since it provided a good vantage point out across the mudflats of the bay, which attracted many birds. The bird watchers also spent time on the grass areas and paths above the shore at the Headland and in other zones.

Several people commented that the sand beach at West End could be very busy with families having days out on the beach in the summer, and that the Fife Coastal Path attracted more walkers in the summer months. Therefore, the number of people observed and the occupancy rates obtained during this survey may be an underestimate.

Boating activities centred around the sailing club. The club catered for dinghy sailors, keelboat sailors and powerboat sailors, who mainly used rigid inflatable boats (RIBs). Adults and children sailed at the club. The main sailing season was between April and October although a minority of sailors continued through to December. One individual was identified who used a powerboat all through the year. The club ran regular racing programmes for dinghies and keelboats and sail training courses. During the summer they held a Youth Sailing Week event to encourage youngsters to sail and it was reported that this was attended by approximately 80 children. The Youth Sailing Week is scheduled to take place in 2013. Most dinghy sailing took place in the waters close to the club. The keelboats and powerboats also sailed locally but also went further afield in the Firth of Forth, and some keelboats went cruising to areas outside the Firth of Forth. Time spent on voyages outside the Firth of Forth was not included in the survey results. The club kept a raft, which was used for lifting and inspecting moorings.

The main boating activities relevant to the survey were launching boats, carrying out boat maintenance on or close to the shore, inspecting moorings and spending time on the water. Most boats were launched from the slipways in the Slipways zone but boats were also launched down the ramp and across the beach at New Harbour. Keelboats were launched from trailers using a tractor. Most keelboats that were being used were launched in the spring, kept moored offshore through the summer, and brought out of the water for the winter. During the summer they were reached by tenders that were kept ashore. Dinghies and RIBs were kept ashore and launched each time that they were used. Dinghies and tenders were generally launched from hand towed trolleys. On race

days other people sometimes helped sailors by returning the trolleys up the slipway for them after a boat had been launched. Most people that launched small craft from the slipways kept on the concrete surface as much as possible, but they also sometimes stood on the surrounding sediment, particularly at congested times. It was noted that small amounts of sand and stones could be deposited on the concrete slipways by the tide. Boats could be launched quite quickly, with the sailors only spending a couple of minutes in the intertidal area, but it could also take much longer, particularly if the launching area was congested. Individuals were observed standing in shallow water holding boats for several minutes while waiting for crew to dispatch trolleys or fetch items of gear etc. Boat maintenance was identified taking place on the land close to the shore in the Boat Area zone, on the fringe of the upper shore near the main slipway and on the beach at New Harbour. Boat maintenance included work carried out on the club raft as well as on boats.

Keelboats were kept moored offshore of the sailing club and most boat owners lifted their moorings once or twice a year to check the condition of the chains and shackles. Moorings were usually lifted using the club raft. Usually three or four boat owners would work together to help each other lift the moorings. One individual was identified who kept his boat moored closer inshore and he walked out at low spring tide across the mud and sand in the Slipways zone to inspect his moorings, rather than use the raft. The moorings for the club's marker buoys were also lifted and inspected periodically. The moorings could have sediments adhering to them when lifted. Most people said that they wore gloves when handling moorings.

Activities that were reported to take place

Several interviewees reported that they had seen one or two people digging for angling bait in the area of mud, sand and stones on the lower shore of the West End zone. This activity was reported to only take place around the time of spring tides (*i.e.* fortnightly) when more of the shore was exposed at low tide.

It was also reported that groups of commercial winkle pickers had occasionally been seen on the shore, both within the survey area and also just outside the survey area on the shore near the church at St. Bridget's, further east in Dalgety Bay. However, interviewees were uncertain how long ago they had last seen this activity taking place.

It was reported that a group of people had a barbeque on the beach in the Ross Plantation/Fenced Area zone during the summer and that an individual occasionally cleared washed up seaweed from the shore at New Harbour, but details of these activities could not be obtained. It was also reported that children and teenagers frequently played in the woods and on the shore in the Ross Plantation zone during the summer.

3.3 Activities that have changed due to the radioactive materials

Many walkers and dog walkers reported that they now kept to the paths above the shore and did not go onto any of the beaches, although they used to in the past. Others said that they now avoided the beaches in the Ross Plantation zone and the Slipways zone although they still used the beach in the West End zone. Only one individual was interviewed who had used the shore in the Boat Area zone or the Fenced Area zone; this person had previously regularly walked all along the shore between the Slipways zone and the Ross Plantation zone, which includes the Boat Area zone and the Fenced Area Zone, but no longer did so. Many people reported that they now did not let their children or dogs go onto the beaches.

Several people said that they still used the shore but did not pick things up, or that they still picked things up to look at or play with, (for example shells and stones) but no longer took them home.

One person reported that he had previously collected small quantities of mussels for his own consumption from the shore in the Slipways zone and the Headland zone but that he had stopped doing this when the FEPA restriction was introduced.

A representative of the sailing club reported that prior to 2012 the club had hosted regattas at Dalgety Bay for visiting sailors but had not done so in 2012. Regattas are scheduled to take place in 2013 and typically take place over a weekend. The club had installed sinks outside the clubhouse so that people could wash off any sediment before entering the clubhouse. They had also advised members, particularly children, to stay on the concrete slipways when launching and recovering boats. Previously, one of the activities in youth training had been a swim from an offshore barge to the shore. This had been stopped, although a capsized drill was still practised in deeper water offshore.

Although in a minority compared to the people who had adapted their behaviour, several people said that they were not concerned about the radioactivity and had not changed any of their activities. They continued to visit the shore, throw sticks and balls for their dogs, and pick up or take home items from the shore such as shells and stones.

3.4 Clothing worn by people using the area

Observations of the type and amount of clothing worn by individuals and the amount of exposed skin were recorded and are presented below. This information can assist in determining the probability of radioactive materials coming into contact with an individual's skin.

Since the survey was undertaken in October, the weather was cold and most people were wearing long trousers and jackets, although a few wore just a jumper or fleece as their top outer layer and two walkers were wearing shorts and a shirt. People were typically wearing enclosed footwear such as

trainers, sturdy shoes, hiking boots or Wellington boots. Where possible, people were asked if their clothing changed in the warmer weather. Many of the dog walkers and walkers wore lighter clothing in the summer but most still wore long trousers and similar footwear throughout the year.

Families undertaking activities on the shore at West End such as playing, rock pooling, sitting on the beach and building sandcastles, reported that in the summer months they wore light summer clothing, typically shorts and short sleeved shirts with flip-flops or sandals. Many children wore bathing costumes and were often barefoot for all or part of their time on the beach. Adults and children who were paddling in the sea were usually barefoot. Children generally had a greater area of skin exposed than adults undertaking the same activities, with bathing costumes and shorts being more commonly worn by children.

Most sailors wore wetsuits and booties or waterproof sailing suits, although some reported that they wore lighter clothing in warm weather. Most of the people that were lifting and inspecting moorings wore gloves.

Other observations

It was noted that sediment adhered to the footwear and clothing of people on the shore and to items picked up from the shore. Sediment also adhered to the fur of dogs. One lady who kept her dog's ball in her pocket when it was not being used reported that she frequently had sand in her pocket that had brushed off the ball. People were often observed leaving the shore with sediments still adhering to their footwear and to their dogs. It was reported that towels and other possessions laid on the beach at West End in the summertime picked up sand from the beach, and although most of this was generally shaken or brushed off when people left the beach, small amounts remained attached. Sediments removed from the beach in this way could be transferred to people's vehicles and homes. A few people deliberately collected stones and shells or wood to take to their homes and these could have small amounts of sediments adhering to them.

3.5 Inadvertent ingestion

Individuals were reported to consume picnics on the beach at West End in the summertime. It was also reported that a group of people had a barbeque on the beach in the Ross Plantation/Fenced Area zone during the summer but details could not be obtained. The consumption of foods by people on the shore could potentially lead to the inadvertent ingestion of sediments adhered to foodstuffs.

Infants and children were reported to spend time playing on sand at the beaches at West End and New Harbour, and conducting activities involving the handling of sediments such as building sandcastles and playing with handfuls of sand. This could potentially lead to the inadvertent ingestion of sediments by hand to mouth transfer.

3.6 The consumption of foods from the survey area

No consumption of aquatic or terrestrial wild foods from survey area was identified.

One person reported that they had collected and consumed mussels from the shore at the Slipways and the Headland in recent years. However, they had stopped collecting mussels when the FEPA restriction was put in place. Another person reported that they had consumed winkles that were collected from the northern shore of Dalgety Bay near St Bridget's church but had not consumed them recently.

The survey team did not observe any terrestrial wild foods growing in the survey area. One person reported that they collected and consumed brambles from near the Fife Coastal Path on the northern part of Dalgety Bay, which was outside the survey area to the east.

4 DATA ANALYSIS

4.1 Frequency and duration of single visits, annual occupancy, and handling rates

The occupancy and handling rates are presented in Appendix 2 as the frequency and duration of single visits, and the hours per year for each person. This information can be used in calculating the probability of encountering radioactive material on a single visit or on an annual basis.

The occupancy rates presented in italics in Appendix 2 are estimates of the time people spent in the survey area, which have been used when interviewees could not provide times for their activities. These assumed times were based on actual times provided by other interviewees and timed walks undertaken by the survey team. The estimated rate for walking throughout the whole of the survey area was 15 minutes and the estimated rate for dog walking throughout the whole of the survey area was 20 minutes. Where people were not using all of the zones, their times were based on the proportion of the survey area that they were using.

People visited the survey area at various frequencies. Many dog walkers that lived locally visited on a daily basis and often two or three times per day. Walkers that lived locally also used the survey area regularly, often daily. Visitors walking along the Fife Coastal Path used the area less frequently, ranging from one to six times per year, and several people were encountered who were visiting the area for the first time. Many of the members at the sailing club sailed once or twice per week during the main season and a few people continued sailing into December. Local people spent time on the beaches at West End and New Harbour throughout the year, but more often in the summer months, particularly in the school summer holidays.

4.2 High-rate groups for occupancy and handling

High rates of occupancy and handling for adults, children and infants were identified using two methods; the 'cut-off' method described by Hunt *et al.*, 1982 and the 97.5th percentile.

With the 'cut-off' method, the appropriate high rate was calculated by taking the arithmetic mean of the values between the maximum observed rate and one third of the maximum observed rate. The individuals derived by the 'cut-off' method are referred to as the 'high-rate group' in this report. With small numbers of observations, there is the possibility of a high-rate group of one person. The International Commission on Radiological Protection (ICRP) considers this acceptable as long as the criteria "reasonable" and "sustainable" apply (ICRP, 2006).

Data analysed by the cut-off method were structured into age groups. The age groups and their relevant age ranges are based on the recommendations in ICRP 101 (ICRP, 2007), and are listed below:

Age group	Age range in group
Infant	0 to 5-year-old
Child	6-year-old to 15-year-old
Adult	16-year-old and over

The occupancy and handling rates for adults, children and infants are presented in Appendix 3 and are summarised in Tables 1 to 4 below.

Table 1. Summary of adults' occupancy rates						
Zone	Band	Number of observations	Number of people in the high-rate group	Maximum rate of the high-rate group (h y⁻¹)	Mean rate of the high-rate group (h y⁻¹)	97.5th percentile rate (h y⁻¹)
Any zone ^a	Paths or grass	176	11	630	327	322
Ross Plantation	Beach	62	7	160	94	116
Slipways	Beach	12	8	30	24	30
Slipways	Intertidal mud	1	1	4.0	4.0	Not applicable
Slipways	On the Slipways	33	6	30	15	18
Headland	Rocks	2	2	3.0	3.0	3.0
New Harbour	Beach	10	6	30	17	30
West End	Beach	62	7	183	121	151

^aThe term 'Any zone' has been used to represent either one zone, multiple zones, or all zones, where people were spending time. See Appendix 3.

The activities undertaken by people in the adult high-rate groups for occupancy in the following zones and bands included:

- For any zone, on paths or grass: undertaking boat maintenance in the Boat Area, and dog walking and cycling in all zones.
- For Ross Plantation, on the beach: dog walking, walking and bird watching.
- For the Slipways, on the beach: dog walking and boat maintenance.
- For the Slipways, on intertidal mud: checking moorings.
- For on the Slipways: launching and landing a RIB, a dinghy or a tender.
- For the Headland, on the rocks: climbing on rocks.

- For New Harbour, on the beach: dog walking, playing and building sandcastles, and boat maintenance.
- For West End, on the beach: dog walking, playing, rock pooling and building sandcastles.

Table 2. Summary of children's and infants' occupancy rates						
Zone	Band	Number of observations	Number of people in the high-rate group	Maximum rate of the high-rate group (h y⁻¹)	Mean rate of the high-rate group (h y⁻¹)	97.5th percentile rate (h y⁻¹)
Child age group (6 – 15 years old)						
Any zone ^a	Paths or grass	31	3	91	56	52
Ross Plantation	Beach	9	1	18	18	15
Slipways	Beach	4	1	12	12	11
Slipways	On the Slipways	5	5	6.0	4.9	6.0
Headland	Rocks	2	2	3.0	3.0	3.0
New Harbour	Beach	5	5	13	12	13
West End	Beach	34	12	91	45	62
Infant age group (0 – 5 years old)						
Any zone ^a	Paths or grass	14	6	93	73	92
Ross Plantation	Beach	3	3	18	16	18
Slipways	Beach	2	2	12	12	12
New Harbour	Beach	5	5	13	12	13
West End	Beach	18	2	91	91	91

^aThe term 'Any zone' has been used to represent either one zone, multiple zones, or all zones, where people were spending time. See Appendix 3.

The activities undertaken by individuals in the child high-rate groups for occupancy in the following zones and bands included:

- For any zone, on paths or grass: dog walking and walking.
- For Ross Plantation, on the beach: dog walking.
- For the Slipways, on the beach: dog walking.
- For on the Slipways: launching and landing a dinghy or a tender.
- For the Headland, on the rocks: climbing on rocks.
- For New Harbour, on the beach: playing and building sandcastles.
- For West End, on the beach: playing, rock pooling, building sandcastles and dog walking.

The activities undertaken by individuals in the infant high-rate groups for occupancy in the following zones and bands included:

- For any zone, on paths or grass: riding in a buggy, dog walking and walking.
- For Ross Plantation, on the beach: dog walking.
- For the Slipways, on the beach: dog walking.
- For New Harbour, on the beach: playing and building sandcastles.

Table 3. Summary of adults' handling rates of sediment or objects that may have had sediment adhering to them

Zone	Band	Number of observations	Number of people in the high-rate group	Maximum rate of the high-rate group (h y ⁻¹)	Mean rate of the high-rate group (h y ⁻¹)	97.5 th percentile rate (h y ⁻¹)
Ross Plantation	Beach	9	3	100	66	91
Slipways	Beach	6	3	30	23	30
Slipways	Intertidal mud	1	1	2.0	2.0	Not applicable
Headland	Offshore	5	1	4.0	4.0	3.7
New Harbour	Beach	9	5	30	19	30
West End	Beach	42	4	183	120	104

The activities undertaken by people in the adult high-rate groups for handling sediment for the following zones and bands included:

- For Ross Plantation, on the beach: throwing sticks for a dog, throwing a ball for a dog and occasionally collecting stones and shells.
- For the Slipways, on the beach: throwing sticks and stones for a dog and throwing a ball for a dog.
- For the Slipways, on intertidal mud: handling moorings.
- For the Headland, offshore: handing moorings (from a raft).
- For New Harbour, on the beach: throwing a ball and sticks for a dog, playing with stones, shells and sand, and building sandcastles.
- For West End, on the beach: throwing stones, sticks and balls for a dog, rock pooling, playing with stones, shells and sand, and building sandcastles.

Table 4. Summary of children's and infants' handling rates of sediment or objects that may have had sediment adhering to them						
Zone	Band	Number of observations	Number of people in the high-rate group	Maximum rate of the high-rate group (h y⁻¹)	Mean rate of the high-rate group (h y⁻¹)	97.5th percentile rate (h y⁻¹)
Child age group (6 – 15 years old)						
Ross Plantation	Beach	1	1	18	18	Not applicable
Slipways	Beach	3	1	12	12	12
New Harbour	Beach	5	5	13	12	13
West End	Beach	32	12	91	45	63
Infant age group (0 – 5 years old)						
Ross Plantation	Beach	2	2	18	18	18
Slipways	Beach	2	2	12	12	12
New Harbour	Beach	5	5	13	12	13
West End	Beach	17	2	91	91	91

The activities undertaken by individuals in the child and infant high-rate groups for handling sediment for the following zones and bands were the same. These included:

- For Ross Plantation, on the beach: throwing stones and sticks for a dog.
- For the Slipways, on the beach: throwing sticks and stones for a dog.
- For New Harbour, on the beach: playing with stones, shells and sand, and building sandcastles.
- For West End, on the beach: rock pooling, playing with stones, shells and sand, and building sandcastles.

4.3 Sum totals of all observations for occupancy and handling rates

The sum total of all occupancy rates and all handling rates for the zones and bands where people were spending time or where handling was taking place, is provided at the foot of the tables in Appendix 3. These sum totals are summarised below, in Table 5 for occupancy and in Table 6 for handling.

Table 5. Summary of the total of all occupancy rates for the zones and bands where people were spending time

Age group	Sum of all occupancy rates by zone and band (h y ⁻¹)							
	Any zone ^a	Ross Plantation	Slipways			Headland	New Harbour	West End
	Paths or grass	Beach	Beach	Intertidal mud	On the slipways	Rocks	Beach	Beach
Adult	10336	1327	209	4.0	176	6.0	127	1695
Child	375	35	21	-	24	6.0	59	724
Infant	472	49	24	-	-	-	59	332

^aThe term 'Any zone' has been used to represent either one zone, multiple zones, or all zones, where people were spending time. See Appendix 3.

Table 6. Summary of the total of all handling rates for the zones and bands where handling was taking place

Age group	Sum of all handling rates by zone and band (h y ⁻¹)						
	Ross Plantation	Slipways			Headland	New Harbour	West End
	Beach	Beach	Intertidal mud	Offshore	Beach	Beach	
Adult	276	80	2.0	6.5	115	1089	
Child	18	18	-	-	59	706	
Infant	36	24	-	-	59	318	

4.4 Water based activities

Water based activities were investigated because people might come into contact with sediments while undertaking these activities. Activities where there is a high likelihood of the individual's face submerging under water have been classified as activities 'in water' and all other activities have been classified as 'on water'.

Activities being undertaken 'on the water' offshore of the survey area or in the Firth of Forth by people who launched boats from the survey area were included. This was in order to provide data for the potential length of time that people might be exposed to radioactive material if any sediment had adhered to their clothes or skin while launching their boats. The frequency and duration of each trip on the water are provided in Appendix 2. Annual occupancy rates for activities taking place on the water for adults, children and infants are presented in Appendix 4. High rates have not been calculated for these activities. Activities taking place on the water were dinghy sailing, keelboat sailing, cruising on a RIB, rescue boat duties, powerboating, boat maintenance, lifting moorings from a raft and paddling. Thirty-three adults, five children and two infants were identified spending time on the water. The highest occupancy rate was 820 h y⁻¹ for a person who was cruising on a RIB and undertaking rescue boat duties. Adults and children were paddling when they visited the beach at West End during warm weather in the summer months, but they were unable to quantify the number of hours that they spent undertaking this activity.

Activities taking place 'in water' could lead to the inadvertent ingestion of radioactive material or contact with sediments. The only activity identified taking place in the water was swimming. Three individuals in the infant age group were identified who went swimming when they visited the beach at West End in the summer months. However, their parents were unable to quantify the number of hours that the children spent swimming.

5 FUTURE HABITS

People that were not concerned about the radioactive material on the shore, and had not already changed their activities, generally did not anticipate that their activities would change in the future. Others, who were concerned, and had changed or reduced some of their activities in the area, said that it was difficult to predict what they might do in the future and it depended largely on what remedial measures were undertaken.

If people reverted to their former activities this could result in more people using the beaches, particularly walkers and dog walkers in the Ross Plantation zone; an increase in the number of people picking up objects from the shore, such as stones and shells or balls thrown for dogs; and the resumption of the collection of small quantities of mussels for an individual's own consumption. An increased number of people undertaking activities would not necessarily mean that the mean for the high-rate groups for occupancy and handling rates would increase. However, the total of all occupancy rates would increase.

The sailing club has announced that it will hold regattas that are open to visiting sailors at Dalgety Bay again in 2013, the first of which will be attended by approximately 50 boats. The club will also continue to host their youth sailing week in 2013, which has previously been attended by approximately 80 children. The club is also considering a development plan that would aim to increase sailing and social activities at the club (dbscweb.wordpress.com).

It is not expected that the population of the town of Dalgety Bay will increase significantly in the foreseeable future. The Adopted Dunfermline and West Fife Local Plan 2012, which covers the period 2010-2022, makes provision for approximately 230 new dwellings to be built at Dalgety Bay (www.fifedirect.org.uk). Within the wider surrounding area, a housing requirement for 13000 new homes is identified for the whole of Dunfermline and West Fife in the Fife Structure Plan for 2006-2026. However, this is a large district that encompasses many coastal recreational areas and it is doubtful whether the increase in population would have any significant effect on the number of visitors to the shore of Dalgety Bay.

Estimated data for potential use of the beach in the Fenced Area zone, for use in assessments

Nobody was observed using the beach in the Fenced Area zone at the time of the survey. However, to aid assessments, consideration is given below to activities that might take place on the beach if there were no fence or warning signs.

Based on the activities observed at the time of the survey on the adjoining beach in the Ross Plantation zone, two potential groups of high occupancy rate beach users are considered. These are dog walkers and birdwatchers.

Dog walkers

It is estimated that it would take a dog walker approximately 3 minutes to walk one way along the beach through the Fenced Area zone. During the survey it was noted that many dog walkers walked their dogs every day and some dog walkers walked their dogs up to three times per day, every day.

If a dog walker made one return trip per day, all year, along the beach in the Fenced Area zone they would spend approximately 6 minutes per day on this beach, which is 36.5 hours per year.

If a dog walker made three return trips per day, all year, along the beach in the Fenced Area zone they would spend approximately 18 minutes per day on this beach, which is 109.5 hours per year.

Since many dog walkers observed at the time of the survey were throwing balls and sticks for their dogs, it can be assumed that potential dog walkers using the Fenced Area beach would do the same. Hence, following the convention adopted in this report of assigning all beach occupancy time as sediment handling time for people who are throwing balls and sticks for their dogs on the beach, once a day dog walkers would have a handling rate of 36.5 hours per year and three times a day dog walkers would have a handling rate of 109.5 hrs per year.

Birdwatchers

The beach in the Fenced Area zone affords a very good vantage point across the mud flats of Dalgety Bay and it is therefore considered to be an area that birdwatchers might use in preference to the beach in the Ross Plantation zone.

Four birdwatchers were identified using the beach in the Ross Plantation zone during the survey. The annual occupancy rates for these four individuals were 9, 116, 116 and 160 hours per year. If these people spent all their bird watching time on the beach in the Fenced Area zone rather than the Ross Plantation zone this would give a maximum rate for bird watching on the beach in the fenced area zone of 160 hours per year and a mean for the high-rate group for birdwatchers on the beach in the fenced area zone of 130.7 hours per year.

No sediment handling time is attributed to the activity of bird watching.

6 LIMITATIONS AND ASSUMPTIONS

The results of the survey were subject to limitations relating to the fieldwork, and assumptions were made during interpretation of the data. These are outlined below for consideration when undertaking radiological assessments.

Limitations arising during the fieldwork and data collection include the following:

- Meteorological limitations; during the fieldwork the weather was variable and there were periods of rain and cold temperatures which affected the number of people observed in the survey area. Therefore, the data obtained during the survey could be an underestimate.
- Temporal limitations; fieldwork was generally conducted during the daytime, between the hours of 9 am and 5 pm. Nevertheless, interviews that were conducted during the day covered activities undertaken in the evening. However, if there were people only using the area outwith these times, such as a person walking their dog before and after their working day, they would not have been included in the survey and therefore the data obtained could be an underestimate.
- Seasonal limitations; the fieldwork was conducted over 8 days in October and although interviewees were asked about their activities throughout the year, activities taking place at other times of the year may not have been accounted for. Therefore, the data obtained during the survey could be an underestimate.
- Spatial limitations; due to the shape of the coastline it was not possible to have a complete view of the survey area from a single vantage point. Consequently, some people visiting the area during the survey may not have been observed and therefore the data obtained may be an underestimate.
- Data provision limitations; data provided by interviewees could be an underestimate or overestimate of their actual time particularly for walkers and dog walkers whose time in the area would depend on the weather, variations to their route and people encountered during their walk.

Assumptions made during the interpretation of the data were:

- If people stated that they undertook an activity along the length of the survey area, it was assumed that this covered the area from the North End zone to the West End zone.
- During interviews, many dog walkers stated that they walk their dogs every day all year. There may be times due to ill health or holidays that this might not be the case. However, the information provided was taken at face value and included.
- Where interviewees could not provide times for their activities, they were estimated. These are presented in italics in Appendix 2, 3 and 4. The estimations were based on averages of

the times provided for the same activities undertaken in the same areas by other interviewees and timed walks undertaken by the survey team.

- Interviewees who were undertaking activities that involved handling sediment or handling objects that may have had sediment adhering to them were usually unable to provide times that they actually spent handling. Therefore the time that they spend handling was assumed to be the same as the amount of time they spend undertaking the activity that involved handling. For example, dog walkers who threw balls for their dogs on the beach were unable to say how long they were actually handling the balls for, so their handling time was taken as the amount of time they spent dog walking on the beach. This could lead to an overestimate of the handling rate if the sediment does not transfer from the ball to the hands or if sediment is brushed or falls off the hands before the person leaves the beach or to an underestimate if the sediment remains on the hands or under the finger nails after the person leaves the beach.

7 ACKNOWLEDGEMENTS

Gratitude is expressed to representatives of the sailing club, local authorities and associations and members of the public who offered helpful advice and information during the survey. This survey was undertaken on behalf of the Scottish Environment Protection Agency, who provided the funding for this study. Gratitude is also expressed to the SEPA project officers who provided considerable help during the planning of the survey and the drafting of the report.

8 REFERENCES

Hunt, G.J., Hewett, C.J. and Shepherd, J.G., 1982. The identification of critical groups and its application to fish and shellfish consumers in the coastal area of the north-east Irish Sea. *Health Physics*, Vol. 43, No 6, pp. 875-889.

ICRP, 2006. Assessing dose of the representative person for the purpose of radiation protection of the public. *Annal. ICRP 36 (3)*. Elsevier Science, Oxford, (ICRP Publ. 101.).

ICRP, 2007. Assessing the dose of the representative person for the purpose of radiological protection of the public and the optimisation of radiological protection. *Annal. ICRP 36 (3)*. Elsevier Science, Oxford, (ICRP Publ. 101.).

Scottish Environment Protection Agency, 17/05/2013. Personal communication.

www.dbscweb.wordpress.com

www.fifedirect.org.uk

www.food.gov.uk

www.sepa.org.uk

APPENDIX 1. DAILY RECORD OF THE NUMBER OF PEOPLE AND THE ACTIVITIES OBSERVED AT LOCATIONS WITHIN THE SURVEY AREA

Date and zone	Number of people for whom data was collected and their activities observed during the survey	Number of people observed but not interviewed and their activities observed during the survey	Temperature (°C)	Observed cloud cover (%)	Observed weather
Saturday 13th October 2012					
a.m.			13	100	Light rain, overcast
West End	2 dog walkers	2 dog walkers			
Ross Plantation	2 dog walkers	2 dog walkers			
Boat Area		3 people undertaking boat maintenance			
p.m.			13	100	Dry, overcast, light wind
Ross Plantation		4 horse riders 3 teenagers walking on the shore (1 throwing stones into the water)			
New Harbour	1 dog walker	1 dog walker			
Ross Plantation	2 dog walkers	2 dog walkers			
Ross Plantation		2 dog walkers			
Ross Plantation		3 cyclists			
Sunday 14th October 2012					
a.m.			10	90	Dry, overcast, occasional sunshine
	1 walker	5 cyclists			
	1 walker				
Ross Plantation	2 adults and 2 children dog walking	2 dog walkers			
Ross Plantation	1 bird watcher	2 dog walkers			
Ross Plantation	1 dog walker				
Ross Plantation	1 dog walker				
Ross Plantation	1 dog walker				
New Harbour		1 person driving a tractor that is hauling a boat out of the water			
p.m.			11	100	Patchy drizzle, strong breeze, sunny periods
West End		1 cyclist			
Ross Plantation	1 walker	2 horse riders			
Ross Plantation	1 dog walker	1 dog walker			
Slipways	2 adults and 2 children playing				
Ross Plantation	1 adult and 1 child dog walking				
Ross Plantation	1 walker/jogger				
Fenced Area	1 adult and 2 children walking				

APPENDIX 1. DAILY RECORD OF THE NUMBER OF PEOPLE AND THE ACTIVITIES OBSERVED AT LOCATIONS WITHIN THE SURVEY AREA

Date and zone	Number of people for whom data was collected and their activities observed during the survey	Number of people observed but not interviewed and their activities observed during the survey	Temperature (°C)	Observed cloud cover (%)	Observed weather
Ross Plantation	1 dog walker				
	1 walker				
Fenced Area	1 dog walker				
	2 dog walkers				
	1 dog walker				
Monday 15th October 2012					
a.m.			5	0	Clear sky, sunny, slight breeze
Headland	2 dog walkers				
	1 dog walker				
West End	1 dog walker				
	2 walkers				
	1 dog walker				
	1 adult and 2 children dog walking				
Ross Plantation		1 adult and 2 children walking on the shore			
p.m.			11	0	Clear sky, sunny, slight breeze
North End		2 cyclists			
	2 walkers	2 joggers			
	1 dog walker	2 dog walkers			
	1 dog walker				
	2 adults and 3 children walking				
Ross Plantation	2 walkers				
	4 walkers		11	40	Sunny, patchy cloud
	2 walkers	2 cyclists			
	1 dog walker	1 dog walker (already interviewed)			
	2 adults and 2 children walking	1 dog walker (already interviewed)			
	2 walkers	1 dog walker (already interviewed)			
	2 walkers	1 dog walker (already interviewed)			
Boat Area	1 bird watcher				
Ross Plantation	1 adults and 2 children walking				
	2 walkers				
Boat Area	1 sailor undertaking boat maintenance				

APPENDIX 1. DAILY RECORD OF THE NUMBER OF PEOPLE AND THE ACTIVITIES OBSERVED AT LOCATIONS WITHIN THE SURVEY AREA

Date and zone	Number of people for whom data was collected and their activities observed during the survey	Number of people observed but not interviewed and their activities observed during the survey	Temperature (°C)	Observed cloud cover (%)	Observed weather
Tuesday 16th October 2012					
a.m.			6	100	Overcast, heavy rain, slight breeze
Interview conducted at an interviewees home. Therefore no observations made in the survey area.					
p.m.			7	100	Overcast, slight drizzle
Boat area	1 sailor	1 dog walker (already interviewed)			
Ross Plantation	1 adult and 1 child dog walking	2 dog walkers (already interviewed)	7	30	Sunny periods
	1 dog walker				
	2 adults and 2 children walking				
	1 walker				
Slipways	2 sailors				
Headland	1 dog walker	1 dog walker			
Wednesday 17th October 2012					
a.m.			6	100	Overcast, raining heavily, moderate breeze
Ross Plantation	1 dog walker				
	1 dog walker				
	1 dog walker				
	1 dog walker				
	1 walker				
West End	1 dog walker				
p.m.			9	100	Rain easing to drizzle
Boat area	1 dog walker				
	1 dog walker				
Ross Plantation	1 dog walker		10	100	Drizzle
Thursday 18th October 2012					
a.m.			11	70	Short sunny periods, light breeze
Ross Plantation	1 walker	2 walkers			
	2 dog walkers				
Slipways		1 sailor (already interviewed)			
		1 dog walker			

APPENDIX 1. DAILY RECORD OF THE NUMBER OF PEOPLE AND THE ACTIVITIES OBSERVED AT LOCATIONS WITHIN THE SURVEY AREA

Date and zone	Number of people for whom data was collected and their activities observed during the survey	Number of people observed but not interviewed and their activities observed during the survey	Temperature (°C)	Observed cloud cover (%)	Observed weather
West End	1 dog walker 2 adults and 4 children walking/playing				
Boat Area	1 sailor				
p.m.			12	70	Short sunny periods, slight breeze
West End	1 walker				
Ross Plantation	1 walker	2 walkers 1 dog walker			Light patchy drizzle
Fenced Area		1 jogger			
Ross Plantation	1 dog walker	1 dog walker (already interviewed)			
Fenced Area	1 walker				
Ross Plantation		1 dog walker (already interviewed)			
Headland		2 walkers			
West End	2 adults and 3 children dog walking				
Boat Area	1 sailor				
Ross Plantation		4 children playing			
Slipways		3 children sitting on a bench			
New Harbour		3 children playing			
Ross Plantation	1 dog walker 1 dog walker	1 jogger			
Friday 19th October 2012					
a.m.			10	100	Slight drizzle, overcast, slight breeze
Boat Area	2 sailors				
West End	1 dog walker				
	1 dog walker				
	1 dog walker				
Ross Plantation	2 walkers 1 adult and 3 children dog walking 3 adults and 3 children walking	1 cyclist			
	2 walkers				
p.m.			11	100	Drizzling, overcast, wind increasing in strength
Boat Area	2 sailors				
Ross Plantation	1 cyclist				

APPENDIX 1. DAILY RECORD OF THE NUMBER OF PEOPLE AND THE ACTIVITIES OBSERVED AT LOCATIONS WITHIN THE SURVEY AREA

Date and zone	Number of people for whom data was collected and their activities observed during the survey	Number of people observed but not interviewed and their activities observed during the survey	Temperature (°C)	Observed cloud cover (%)	Observed weather
Boat Area		1 dog walker (already interviewed)			
West End	1 adult and 3 children playing 2 dog walkers				
Ross Plantation	1 adult and 1 child walking 1 walker	1 dog walker 1 dog walker 2 dog walkers			
Boat Area		1 dog walker			
Headland	1 dog walker				
West End		1 jogger			
Boat Area	1 dog walker 1 dog walker				
Ross Plantation	1 dog walker 1 walker				
Fenced Area	1 dog walker				
Boat Area	1 dog walker				
North End	1 dog walker				
Ross Plantation		1 jogger			
Saturday 20th October 2012					
a.m.			10	100	Overcast, patchy light rain, no wind
Ross Plantation	1 dog walker				
New Harbour	1 dog walker	1 dog walker 2 cyclists 1 dog walker (already interviewed)			
Boat Area	1 sailor 1 dog walker				
Ross Plantation	1 walker	2 cyclists 1 dog walker (already interviewed) 2 dog walkers (already interviewed)			
Headland		1 dog walker (already interviewed)			
West End		1 adult and 1 child dog walking			
Headland		2 dog walkers (already interviewed)			
West End		1 dog walker (already interviewed)			
Headland		2 cyclists			

APPENDIX 1. DAILY RECORD OF THE NUMBER OF PEOPLE AND THE ACTIVITIES OBSERVED AT LOCATIONS WITHIN THE SURVEY AREA

Date and zone	Number of people for whom data was collected and their activities observed during the survey	Number of people observed but not interviewed and their activities observed during the survey	Temperature (°C)	Observed cloud cover (%)	Observed weather
p.m.			13	70	Sunny periods, dry, pleasant
New Harbour	1 dog walker				
West End	2 walkers				
Ross Plantation	1 dog walker	2 cyclists			
	1 dog walker	1 jogger			
		1 cyclist			
Boat Area	1 sailor				
Ross Plantation	2 walkers	1 walker			
	1 dog walker	2 walkers			
	1 dog walker	2 children, 1 cycling and 1 walking			
	1 dog walker	1 dog walker (already interviewed)			
	1 dog walker				
	1 adult and 2 children walking				
Boat Area	2 sailors	2 dog walkers			
New Harbour		2 walkers			
	1 walker	1 walker			
	2 walkers	1 walker			
West End	2 adults and 3 children dog walking				
	1 adult and 3 children walking/playing				
	1 adult and 2 children walking/playing				
Ross Plantation	1 walker				
	2 walkers	2 dog walkers			
North End	2 adults and 1 child dog walking	1 cyclist (already interviewed)			
Ross Plantation	2 adults and 2 children walking				
Ross Plantation	1 dog walker	1 cyclist (already interviewed)			
Ross Plantation	2 walkers	2 walkers			
Sunday 21st October 2012					
a.m.			10	50	Bright, sunny periods
Boat Area	1 sailor	1 dog walker (already interviewed)			
		1 dog walker			
		1 dog walker			
		2 dog walkers (already interviewed)			
		1 dog walker			

APPENDIX 1. DAILY RECORD OF THE NUMBER OF PEOPLE AND THE ACTIVITIES OBSERVED AT LOCATIONS WITHIN THE SURVEY AREA

Date and zone	Number of people for whom data was collected and their activities observed during the survey	Number of people observed but not interviewed and their activities observed during the survey	Temperature (°C)	Observed cloud cover (%)	Observed weather
Headland	1 dog walker				
	1 dog walker	2 dog walkers (already interviewed)			
West End		1 dog walker			
		1 dog walker (already interviewed)			
		1 dog walker			
Ross Plantation	4 walkers	1 jogger			
	1 dog walker	1 dog walker (already interviewed)			
	2 walkers	2 dog walkers (already interviewed)			
		1 cyclist			
		1 adult and 1 child cycling			
		1 adult and 1 child cycling			
West End	2 walkers	2 walkers			
	1 adult and 3 children dog walking				
New Harbour	1 dog walker				
p.m.			12	20	Sunny, no wind
Ross Plantation		1 cyclist			
		1 cyclist			
Slipways	1 sailor	1 dog walker			
	2 sailors				
	2 sailors				
	2 adult and 2 child sailors				
	1 sailor				
	1 sailor				
	1 sailor				
	1 sailor				
Boat Area	1 dog walker	1 cyclist			
	1 dog walker	1 sailor (already interviewed)			
	1 walker	2 walkers			
		1 cyclist			
		2 walkers			
		2 walkers			
		2 walkers			
		1 walker			
	6 walkers				

APPENDIX 1. DAILY RECORD OF THE NUMBER OF PEOPLE AND THE ACTIVITIES OBSERVED AT LOCATIONS WITHIN THE SURVEY AREA

Date and zone	Number of people for whom data was collected and their activities observed during the survey	Number of people observed but not interviewed and their activities observed during the survey	Temperature (°C)	Observed cloud cover (%)	Observed weather
Boat Area		2 dog walkers			
		1 dog walker			
		2 walkers			
Headland		2 adults and 2 children walking			
West End		2 walkers			
Slipways		1 dog walker			
		Several dinghies being launched			
Ross Plantation	2 walkers	2 walkers			
	2 walkers	2 cyclists			
		1 cyclist			
North End	2 walkers				
	1 walker/photographer				
Ross Plantation	2 bird watchers	1 jogger			
	2 walkers	1 dog walker (already interviewed)			
	6 walkers	2 walkers			

Notes

Headcounts for the entire survey area are not given since it was not possible to see the whole of the area from a single vantage point.

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
1	M	53	-	Dog walking	All zones	-	4 - 5 x per week	20 mins	78	Local	-
					West End	On the beach.	2 x per week	20 mins	35		Throwing a ball for the dog.
2	M	62	#2 - 3	Walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	1 x per day	15 mins	91	Local	-
3	F	65	#2 - 3	Walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	1 x per day	15 mins	91	Local	-
4	M	U	#4 - 5	Walking	All zones	-	10 x per year	15 mins	2.5	Visitor	-
5	F	U	#4 - 5	Walking	All zones	-	10 x per year	15 mins	2.5	Visitor	-
6	M	62	#6 - 7	Dog walking	All zones	Goes onto the beach at Ross Plantation and at West End as part of the walk.	2 - 3 x per week	15 mins	33	Local	Throwing sticks and stones for the dog on the beach at West End.
7	F	60	#6 - 7	Dog walking	All zones	Goes onto the beach at Ross Plantation and at West End as part of the walk.	4 - 5 x per week	15 mins	59	Local	-
8	F	54	-	Dog walking	West End to the Headland	-	2 - 3 x per week	7.5 mins	16	Local	-
9	M	54	-	Dog walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	1 x per day	20 mins	122	Local	-
10	M	59	-	Walking	All zones	-	1 x per day	15 mins	91	Local	-
11	F	41	-	Dog walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	3 x per day	20 mins	365	Local	Throwing a ball for the dog.
					West End	On the beach.	2 - 3 x per week	15 mins	33		
12	U	U	-	Dog walking	All zones	-	5 x per week	20 mins	87	Local	-
13	M	50	-	Dog walking	All zones	-	1 x per week	20 mins	17	Local	-
14	F	U	-	Dog walking	Ross Plantation to the Boat Area	-	1 x per day	9 mins	55	Local	-
15	M	72	-	Walking	All zones	-	3 x per year	15 mins	0.75	Visitor	-
16	F	36	-	Dog walking	All zones	-	1 x per week	20 mins	17	Local	-
17	F	62	-	Dog walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	2 - 3 x per week	20 mins	43	Local	-
18	M	73	-	Dog walking	West End to Ross Plantation	-	1 x per day	19 mins	116	Local	-
					West End	On the beach.	3 - 4 x per week	20 mins	61		
19	M	U	#19 - 20	Walking and taking photographs	Ross Plantation to West End	-	1 x per month	20 mins	4.0	Local	-
				Cycling		1 x per month	5 mins	1.0	-		
20	F	U	#19 - 20	Walking	Ross Plantation to West End	-	1 x per month	20 mins	4.0	Local	-

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
21	M	U	-	Cycling	All zones	-	3 - 4 x per week	5 mins	15	Local	-
				Dog walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	1 x per day	40 mins (includes walking both ways)	243		-
				Dog walking	West End	On the beach.	1 x per day	20 mins	122		-
22	M	45	#22 - 24	Walking	North End to the Boat Area	-	1 x per year	7.3 mins	0.12	Local	-
23	F	5	#22 - 24	Walking	North End to the Boat Area	-	1 x per year	7.3 mins	0.12	Local	-
24	M	2	#22 - 24	Walking	North End to the Boat Area	-	1 x per year	7.3 mins	0.12	Local	-
25	M	61	#25 - 26	Walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	1 x per day	15 mins	91	Local	-
26	F	65	#25 - 26	Walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	1 x per day	15 mins	91	Local	-
27	F	38	#27 - 31	Dog walking	All zones	Goes onto the beach at Ross Plantation and at the Slipways as part of the walk.	1 x per day	20 mins	122	Local	Throwing stones and sticks for the dog.
				Playing, paddling, rock pooling, building sandcastles and dog walking	West End	On the beach.	1 x per week for 46 weeks (1 hour) and 3 x per week for 6 weeks (2 - 3 hours)	1 hour and 2 - 3 hours	91		Throwing stones and sticks for the dog, playing with stones, shells and sand.
28	M	39	#27 - 31	Dinghy sailing	Offshore of the Headland	-	1 x per week for 26 weeks	2 hours	52	Local	-
				Launching and landing a dinghy	Slipways	-	1 x per week for 26 weeks	10 mins (includes launching and landing)	4.3		-
29	M	3	#27 - 31	Dog walking	All zones	Goes onto the beach at Ross Plantation and at the Slipways as part of the walk.	1 x per day	20 mins	122	Local	Throwing stones and sticks for the dog.
				Playing, paddling, rock pooling, building sandcastles and dog walking	West End	On the beach.	1 x per week for 46 weeks (1 hour) and 3 x per week for 6 weeks (2 - 3 hours)	1 hour and 2 - 3 hours	91		Throwing stones and sticks for the dog, playing with stones, shells and sand.
30	M	5	#27 - 31	Dog walking	All zones	Goes onto the beach at Ross Plantation and at the Slipways as part of the walk.	1 x per day	20 mins	122	Local	Throwing stones and sticks for the dog.
				Playing, paddling, rock pooling, building sandcastles and dog walking	West End	On the beach.	1 x per week for 46 weeks (1 hour) and 3 x per week for 6 weeks (2 - 3 hours)	1 hour and 2 - 3 hours	91		Throwing stones and sticks for the dog, playing with stones, shells and sand.

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
31	F	7	#27 - 31	Dog walking	All zones	Goes onto the beach at Ross Plantation and at the Slipways as part of the walk.	1 x per day	20 mins	122	Local	Throwing stones and sticks for the dog.
				Playing, paddling, rock pooling, building sandcastles and dog walking	West End	On the beach.	1 x per week for 46 weeks (1 hour) and 3 x per week for 6 weeks (2 - 3 hours)	1 hour and 2 - 3 hours	91		Throwing stones and sticks for the dog, playing with stones, shells and sand.
32	M	36	#32 - 36	Playing and rock pooling	West End	On the beach.	1 x per week	45 mins	39	Local	Playing with stones, shells and sand.
33	F	U	#32 - 36	Playing and rock pooling	West End	On the beach.	1 x per week	45 mins	39	Local	Playing with stones, shells and sand.
				Dinghy sailing	Offshore of the Headland	-	2 x per day for 5 days	2 hours	20		-
				Launching and landing a dinghy	Slipways	-	2 x per day for 5 days	10 mins (includes launching and landing)	1.7		-
34	M	6	#32 - 36	Playing and rock pooling	West End	On the beach.	1 x per week	45 mins	39	Local	Playing with stones, shells and sand.
				Walking	Ross Plantation (along the Fife Coastal Path)	-	10 x per week for 40 weeks	3 mins	20		-
35	F	8	#32 - 36	Playing and rock pooling	West End	On the beach.	1 x per week	45 mins	39	Local	Playing with stones, shells and sand.
				Walking	Ross Plantation (along the Fife Coastal Path)	-	10 x per week for 40 weeks	3 mins	20		-
36	M	9	#32 - 36	Playing and rock pooling	West End	On the beach.	1 x per week	45 mins	39	Local	Playing with stones, shells and sand.
				Walking	Ross Plantation (along the Fife Coastal Path)	-	10 x per week for 40 weeks	3 mins	20		-
37	M	39	#37 - 39	Playing	West End	On the beach.	4 - 5 x per year	45 mins	3.4	Visitor	Playing with sand.
38	F	5	#37 - 39	Playing	West End	On the beach.	4 - 5 x per year	45 mins	3.4	Visitor	Playing with sand.
39	F	6	#37 - 39	Playing	West End	On the beach.	4 - 5 x per year	45 mins	3.4	Visitor	Playing with sand.

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
40	M	51	#40 - 41	Walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	2 - 3 x per month	15 mins	7.5	Local	-
41	F	54	#40 - 41	Walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	2 - 3 x per month	15 mins	7.5	Local	-
42	M	78	#42 - 43	Walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	1 - 2 x per week	15 mins	20	Local	-
43	F	72	#42 - 43	Walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	1 - 2 x per week	15 mins	20	Local	-
44	M	39	-	Dog walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	1 - 2 x per month	20 mins	6.0	Local	-
45	F	50's	#45 - 48	Dog walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	3 x per year	20 mins	1.0	Visitor	-
46	F	50's	#45 - 48	Dog walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	3 x per year	20 mins	1.0	Visitor	-
47	M	50's	#45 - 48	Dog walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	3 x per year	20 mins	1.0	Visitor	-
48	M	50's	#45 - 48	Dog walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	3 x per year	20 mins	1.0	Visitor	-
49	M	44	#49 - 52	Dog walking	Ross Plantation and North End (along the Fife Coastal Path)	-	3 - 4 x per week	5 mins	15	Local	Throwing sticks for the dog.
				Playing	West End	On the beach.	1 x per week	45 mins	39	Local	Playing with sand.
50	M	8	#49 - 52	Playing	West End	On the beach.	1 x per week	45 mins	39	Local	Playing with sand.
51	M	8	#49 - 52	Playing	West End	On the beach.	1 x per week	45 mins	39	Local	Playing with sand.
52	M	10	#49 - 52	Playing	West End	On the beach.	1 x per week	45 mins	39	Local	Playing with sand.
53	M	54	-	Dog walking	West End	On the beach.	1 x per day	30 mins	183	Local	-
54	F	70	-	Dog walking	West End to the Headland	Goes onto the beach at West End as part of the walk.	2 x per week	10 mins	17	Local	-
55	M	U	-	Dog walking	All zones	-	2 - 3 x per week	20 mins	43	Local	-
56	F	47	-	Dinghy sailing	Offshore of the Headland	-	1 x per week for 24 weeks (2 - 3 hours) and 1 x per week for 18 weeks (2 hours)	2 - 3 hours and 2 hours	96	Local	-
				Launching and landing a dinghy	Slipways		2 x per week for 18 weeks and 1 x per week for 6 weeks	5 - 10 mins (includes launching and landing)	5.3		

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects	
57	M	52	-	Dinghy sailing	Offshore of the Headland	-	1 x per week for 26 weeks	2 hours	52	Local	-	
				Launching and landing a dinghy	Slipways		1 x per week for 26 weeks	10 mins (includes launching and landing)	4.3			
58	M	50	#58 - 60	Dinghy sailing	Offshore of the Headland	-	30 x per year	2 hours	60	Local	-	
				Launching and landing a dinghy	Slipways		30 x per year	10 mins (includes launching and landing)	5.0			
				Dog walking	Ross Plantation to the Headland		Goes onto the beach at Ross Plantation as part of the walk.	5 x per week	14 mins			61
				Playing	West End		On the beach.	2 x per month for 6 months (15 - 20 mins) and 1 x per week for 26 weeks (2 hours)	15 - 20 mins and 2 hours			56
59	F	11	#58 - 60	Playing	West End	On the beach.	2 x per month for 6 months (15 - 20 mins) and 1 x per week for 26 weeks (2 hours)	15 - 20 mins and 2 hours	56	Local	Playing with sand	
60	F	7	#58 - 60	Playing	West End	On the beach.	2 x per month for 6 months (15 - 20 mins) and 1 x per week for 26 weeks (2 hours)	15 - 20 mins and 2 hours	56	Local	Playing with sand	
61	M	81	#61 - 62	Dog walking	Headland to West End	-	1 x per week	15 mins (includes walking both ways)	13	Local	-	
62	F	76	#61 - 62	Dog walking	Headland to West End	-	1 x per week	15 mins (includes walking both ways)	13	Local	-	
63	F	53	-	Walking	All zones	Goes onto the beach at West End as part of the walk.	1 x per month	15 mins	3.0	local	-	
64	F	45	-	Walking and taking photos	All zones (prefers to take photographs in the woods at Ross Plantation)	-	2 x per month	30 mins	12	Local	-	
65	F	55	#65 - 70	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	6 x per year	3.5 mins	0.35	Local	-	
66	F	48	#65 - 70	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	6 x per year	3.5 mins	0.35	Local	-	

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
67	M	10	#65 - 70	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	6 x per year	3.5 mins	0.35	Local	-
68	M	10	#65 - 70	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	6 x per year	3.5 mins	0.35	Local	-
69	M	59	#65 - 70	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	6 x per year	3.5 mins	0.35	Local	-
70	M	53	#65 - 70	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	6 x per year	3.5 mins	0.35	Local	-
71	M	47	#71 - 72	Bird watching	Ross Plantation	On the beach.	Daily for 26 weeks and 3 - 4 times per week for 26 weeks	15 - 30 mins	102	Local	-
				Walking	All zones	Via the beach at Ross Plantation in one direction and via the woods in the other direction.		30 mins (includes walking both ways)	137		
72	F	46	#71 - 72	Bird watching	Ross Plantation	On the beach.	Daily for 26 weeks and 3 - 4 times per week for 26 weeks	15 - 30 mins	102	Local	-
				Walking	All zones	Via the beach at Ross Plantation in one direction and via the woods in the other direction.		30 mins (includes walking both ways)	137		
73	M	73	#73 - 74	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	1 x per month	3.5 mins	0.70	Local	-
74	F	72	#73 - 74	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	1 x per month	3.5 mins	0.70	Local	-
75	F	63	-	Walking	Slipways to Ross Plantation	Goes onto the beach at Ross Plantation as part of the walk.	1 x per week	10 mins	8.7	Local	-
76	M	57	-	Dog walking	Ross Plantation to Boat Area	-	1 - 2 x per day	5 - 10 mins	68	Local	-
77	F	67	-	Dog walking	Headland to North End	Goes onto Ross Plantation beach as part of the walk.	1 x per day	15 mins	91	Local	Collecting stones from the beach. Keeps the stones in her pocket to take home for the garden. Could be in her pocket for 10 - 20 mins.

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
78	M	53	-	Dog walking	West End to Ross Plantation	Goes onto Ross Plantation beach as part of the walk.	1 x per day	15 mins	91	Local	-
79	M	34	#79 - 81	Walking	Slipways to West End	-	1 x per month	10 mins	2.0	Local	-
80	F	4	#79 - 81	Walking	Slipways to West End	-	1 x per month	10 mins	2.0	Local	-
81	F	7	#79 - 81	Walking	Slipways to West End	-	1 x per month	10 mins	2.0	Local	-
82	M	63	-	Dog walking	Boat Area to Ross Plantation	Goes onto the beach at Ross Plantation as part of the walk.	2 x per day for 5 days per week and 3 x per day at weekends	10 mins	139	Local	Throwing stones for the dog on the beach and occasionally collecting stones and shells to put in his aquarium.
83	F	75	-	Walking	Slipways to Ross Plantation	-	1 x per month	8.7 mins	1.7	Local	-
				Sitting on a bench	Slipways	-	1 x per month	30 mins	6.0		
84	F	44	#84 - 85	Dog walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	2 x per day	20 mins	243	Local	-
85	F	39	#84 - 85	Dog walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	2 x per day	20 mins	243	Local	-
86	F	53	#86 - 87	Dog walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	2 x per day	20 mins	243	Local	-
				Sitting on the beach	West End	On the beach.	1 x per day	5 - 10 mins	46		
87	F	17	#86 - 87	Dog walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	1 x per day	20 mins	122	Local	-
				Sitting on the beach	West End	On the beach.	3 - 4 x per week	5 - 10 mins	23		
88	F	66	-	Dog walking	West End	On the beach.	1 x per day	30 mins	183	Local	Throwing a ball for the dog and keeps the sandy ball in her pocket.
89	F	62	#89 - 91	Walking	Headland to West End	-	1 x per week	5.7 mins	4.9	Local	-
				Playing	West End	On the beach.	1 x every 2 weeks	15 mins	6.5		Playing with sand
90	M	65	#89 - 91	Walking	Headland to West End	-	1 x per week	5.7 mins	4.9	Local	-
				Playing	West End	On the beach.	1 x every 2 weeks	15 mins	6.5		Playing with sand
91	F	3	#89 - 91	Playing	West End	On the beach.	1 x every 2 weeks	15 mins	6.5	Local	Playing with sand

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
92	F	32	#92 - 93	Dog walking	All zones	Goes onto the beach at the slipways as part of the walk.	1 - 2 x per week	20 mins	26	Local	-
					West End	On the beach.	1 - 2 x per week	10 - 15 mins	16		
93	F	8	#92 - 93	Dog walking	All zones	Goes onto the beach at the slipways as part of the walk.	1 - 2 x per week	20 mins	26	Local	-
					West End	On the beach.	1 - 2 x per week	10 - 15 mins	16		
94	M	55	-	Dog walking	All zones	Goes onto the beach at Ross Plantation as part of the walk every other visit.	1 - 2 x per week	20 mins	26	Local	-
					West End	On the beach.	1 - 2 x per week	5 mins	6.5		
95	M	47	#95 - 99	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	1 x per year	3.5 mins	0.06	Visitor	-
96	F	44	#95 - 99	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	1 x per year	3.5 mins	0.06	Visitor	-
97	F	10	#95 - 99	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	1 x per year	3.5 mins	0.06	Visitor	-
98	F	8	#95 - 99	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	1 x per year	3.5 mins	0.06	Visitor	-
99	M	5	#95 - 99	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	1 x per year	3.5 mins	0.06	Visitor	-
100	M	53	-	Dog walking	Ross Plantation to the Fenced Area	-	3 x per week	5 mins	13	Local	Throwing a ball for the dog on the path.
101	M	48	#101 - 104	Walking	Headland to the North End	-	1 x per month	22.2 mins (includes walking both ways)	4.4	Local	-
				Playing. Paddling in summer.	West End	On the beach.	1 x per month	1 hour	12		Playing with sand
102	F	46	#101 - 104	Walking	Headland to the North End	-	1 x per month	22.2 mins (includes walking both ways)	4.4	Local	-
				Playing. Paddling in summer.	West End	On the beach.	1 x per month	1 hour	12		Playing with sand.

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
103	M	7	#101 - 104	Walking	Headland to the North End	-	1 x per month	22.2 mins (includes walking both ways)	4.4	Local	-
				Playing. Paddling and swimming in summer.	West End	On the beach.	1 x per month	1 hour	12		Playing with sand.
104	F	7	#101 - 104	Walking	Headland to the North End	-	1 x per month	22.2 mins (includes walking both ways)	4.4	Local	-
				Playing. Paddling and swimming in summer.	West End	On the beach.	1 x per month	1 hour	12		Playing with sand.
105	F	60	#105 - 107	Walking	Ross Plantation to West End or New Harbour	-	1 - 2 x per month for 6 months and 1 x per month for 6 months.	30 mins (includes walking both ways)	7.5	Local	-
				Playing and building sandcastles. Paddling in summer.	West End and New Harbour	On the beach.	1 - 2 x per month for 6 months and 1 x per month for 6 months.	1 - 2 hours	23		Collecting stones and shells to take home and put in the garden. Playing with sand.
106	M	9	#105 - 107	Walking	Ross Plantation to West End or New Harbour	-	1 - 2 x per month for 6 months and 1 x per month for 6 months.	30 mins (includes walking both ways)	7.5	Local	-
				Playing and building sandcastles. Paddling in summer.	West End and New Harbour	On the beach.	1 - 2 x per month for 6 months and 1 x per month for 6 months.	1 - 2 hours	23		Collecting stones and shells to take home and put in the garden. Playing with sand.
107	F	4	#105 - 107	Walking	Ross Plantation to West End or New Harbour	-	1 - 2 x per month for 6 months and 1 x per month for 6 months.	30 mins (includes walking both ways)	7.5	Local	-
				Playing and building sandcastles. Paddling in summer.	West End and New Harbour	On the beach.	1 - 2 x per month for 6 months and 1 x per month for 6 months.	1 - 2 hours	23		Collecting stones and shells to take home and put in the garden. Playing with sand.
108	F	34	#108 - 109	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	6 x per year	3.5 mins	0.35	Visitor	-

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
109	F	34	#108 - 109	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	6 x per year	3.5 mins	0.35	Visitor	-
110	M	61	#110 - 111	Dog walking	All zones	-	1 x per month	30 mins (includes walking both ways)	6.0	Local	-
111	M	13	#110 - 111	Dog walking	All zones	-	1 x per month	30 mins (includes walking both ways)	6.0	Local	-
112	F	31	-	Dog walking	Ross Plantation to West End	Goes onto the beach at Ross Plantation as part of the walk.	1 x per day	19 mins	116	Local	-
113	M	69	-	Walking	All zones	-	2 - 3 x per week	15 - 20 mins	38	Local	-
114	M	12	#114 - 115	Dinghy sailing	Offshore of the Headland	-	2 x per week for 26 weeks	1 - 3 hours	104	Local	-
				Launching and landing a dinghy	Slipways	-	2 x per week for 26 weeks	6 mins (includes launching and landing)	5.2		
115	F	11	#114 - 115	Dinghy sailing	Offshore of the Headland	-	2 x per week for 26 weeks	1 - 3 hours	104	Local	-
				Launching and landing a dinghy	Slipways	-	2 x per week for 26 weeks	6 mins (includes launching and landing)	5.2		
116	F	47	-	Dog walking	All zones	-	3 - 4 x per week	20 mins	61	Local	-
				Running	All zones	-	1 x per week	5 mins	4.3		
117	M	73	-	Dog walking	West End to Ross Plantation	-	1 - 2 x per day	15 - 20 mins	160	Local	-
118	F	43	-	Dog walking	All zones	-	1 x per day	20 mins	122	Local	-
119	M	40	#119 - 120	Dog walking	North End to the Fenced Area	-	1 x per day	10 mins (includes walking both ways)	61	Local	-
120	F	65	#119 - 120	Dog walking	North End to the Fenced Area	-	1 x per day	10 mins (includes walking both ways)	61	Local	-
121	F	57	-	Dog walking	West End to Ross Plantation	Goes onto the beach at West End, New Harbour and the Slipways.	1 x per day	1 hour (includes both ways)	365	Local	Throwing a ball for the dog. Keeps the ball in her pocket.
122	M	43	-	Walking	West End to Ross Plantation	-	4 x every 3 months	10 - 15 mins	3.3	Visitor	-
123	M	38	-	Walking	North End	-	5 x per week for 43 weeks	1 min	3.6	Local	-
124	M	14	-	Dog walking	Ross Plantation to the Headland	-	1 x per fortnight	20 - 30 mins (includes walking both ways)	11	Local	-
125	M	75	-	Walking	Fenced Area to North End	-	1 x per year	10 mins	0.17	Visitor	-

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
126	F	45	#126 - 130	Dog walking	West End to Ross Plantation	Goes onto the beach at Ross Plantation as part of the walk.	1 x per day	19 mins	116	Local	-
				Dog walking and playing	West End	On the beach.	4 x per week	30 mins	104		Throwing a ball for the dog. Playing with sand.
127	M	44	#126 - 130	Dog walking	West End to Ross Plantation	Goes onto the beach at Ross Plantation as part of the walk.	1 x per day	19 mins	116	Local	-
				Dog walking and playing	West End	On the beach.	4 x per week	30 mins	104		Throwing a ball for the dog. Playing with sand.
128	M	10	#126 - 130	Dog walking	West End to Ross Plantation	Goes onto the beach at Ross Plantation as part of the walk.	2 - 3 x per week for 12 weeks. 1 x per week for 40 weeks.	19 mins	22	Local	-
				Dog walking and playing	West End	On the beach.	2 - 3 x per week for 12 weeks. 1 x per week for 40 weeks.	30 mins	35		Playing with stones and sand. Throwing a ball for the dog.
129	M	8	#126 - 130	Dog walking	West End to Ross Plantation	Goes onto the beach at Ross Plantation as part of the walk.	2 - 3 x per week for 12 weeks. 1 x per week for 40 weeks.	19 mins	22	Local	-
				Dog walking and playing	West End	On the beach.	2 - 3 x per week for 12 weeks. 1 x per week for 40 weeks.	30 mins	35		Playing with stones and sand. Throwing a ball for the dog.
130	M	8	#126 - 130	Dog walking	West End to Ross Plantation	Goes onto the beach at Ross Plantation as part of the walk.	2 - 3 x per week for 12 weeks. 1 x per week for 40 weeks.	19 mins	22	Local	-
				Dog walking and playing	West End	On the beach.	2 - 3 x per week for 12 weeks. 1 x per week for 40 weeks.	30 mins	35		Playing with stones and sand. Throwing a ball for the dog.
131	M	54	-	Walking	All zones	-	1 x per month	15 mins	3.0	Local	-
132	F	72	-	Dog walking	Fenced Area to Ross Plantation	-	1 - 2 x per week	5 - 10 mins	9.8	Local	-
133	M	39	#133 - 134	Dog walking	Fenced Area to North End	Goes onto the beach at Ross Plantation as part of the walk.	3 x per day	10 mins (includes walking both ways)	183	Local	-
134	F	27	#133 - 134	Dog walking	Fenced Area to North End	Goes onto the beach at Ross Plantation as part of the walk.	3 x per day	10 mins (includes walking both ways)	183	Local	-
135	F	38	#135 - 138	Dog walking	Ross Plantation to North End	-	1 x per day	10 mins (includes walking both ways)	61	Local	-
136	M	38	#135 - 138	Dog walking	Ross Plantation to North End	-	1 x per day	10 mins (includes walking both ways)	61	Local	-

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
137	F	3	#135 - 138	Riding in a buggy	Ross Plantation to North End	-	1 x per day	10 mins (includes walking both ways)	61	Local	-
138	F	1	#135 - 138	Riding in a buggy	Ross Plantation to North End	-	1 x per day	10 mins (includes walking both ways)	61	Local	-
139	M	57	#139 - 140	Dog walking	All zones	-	2 - 3 x per month	15 mins	7.5	Local	-
140	F	54	#139 - 140	Dog walking	All zones	-	2 - 3 x per month	15 mins	7.5	Local	-
141	M	45	-	Bird watching	Ross Plantation	On the beach	5 x per week for 40 weeks	1 hour	160	Local	-
					Headland to Fenced Area	-			40		
142	M	67	-	Walking	All zones	-	1 x per day	15 - 20 mins	106	Local	-
143	M	54	-	Dog walking	All zones	Occasionally goes onto the beach at Ross Plantation and West End as part of the walk.	4 x days per week	40 mins (includes walking both ways)	139	Local	-
144	M	43	-	Dog walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	1 x per day	20 mins	122	Local	Throwing a ball for the dog.
145	M	45	#145 - 148	Walking	All zones	-	1 x per month	1 hour	9.0	Local	-
				Playing	West End and Slipways	On the beach.					Collecting crockery, stones and shells. Take stones and shells home. Playing with sand.
				Climbing on rocks	Headland	On the rocks.					-
146	F	39	#145 - 148	Walking	All zones	-	1 x per month	1 hour	9.0	Local	-
				Playing	West End and Slipways	On the beach.					Collecting crockery, stones and shells. Take stones and shells home. Playing with sand.
				Climbing on rocks	Headland	On the rocks.					-
147	F	7	#145 - 148	Walking	All zones	-	1 x per month	1 hour	9.0	Local	-
				Playing	West End and Slipways	On the beach.					Collecting crockery, stones and shells. Take stones and shells home. Playing with sand.
				Climbing on rocks	Headland	On the rocks.					-

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects	
148	F	8	#145 - 148	Walking	All zones	-	1 x per month	1 hour	9.0	Local	-	
				Playing	West End and Slipways	On the beach.					Collecting crockery, stones and shells. Take stones and shells home. Playing with sand.	
				Climbing on rocks	Headland	On the rocks.					-	
149	F	44	#149 - 150	Dog walking	All zones	-	2 x per month	10 mins	4.0	Local	-	
150	M	11	#149 - 150	Dog walking	All zones	-	1 x per month	10 mins	2.0	Local	-	
				Dinghy sailing	Offshore of the Headland		2 x per day for 5 days	2 hours	20			
				Launching and landing a dinghy	Slipways		2 x per day for 5 days	10 - 15 mins (includes launching and landing)	2.1			
151	M	38	-	Walking or jogging	Ross Plantation	-	1 - 2 x per week	2 - 3 mins	3.3	Local	-	
152	M	U	-	Dog walking	Ross Plantation to New Harbour	Goes onto the beach at New Harbour.	3 x per day	1 hour per day in total	365	Local	Throwing ball and sticks for the dog.	
				Boat maintenance	Boat Area	-	3 x days	8 hours	24			
				Keelboat sailing and powerboating	Firth of Forth		20 x per year	4 hours	80			
				Launching and landing a powerboat or a tender	Slipways		20 x per year	10 mins (includes launching and landing)	3.3			
				Checking moorings	Slipways		Walks out onto the intertidal mud and sand.	1 x per year	4 hours		4.0	
				Handling moorings	Slipways		-	1 x per year	2 hours		2.0	Handling moorings.
153	F	61	#153 - 160	Dog walking	All zones	-	2 - 3 days per week	20 mins	43	Local	-	
				Playing	New Harbour and West End	On the beach.	20 - 30 x per year	1 hour	25		Playing with stones, shells and sand. Take shells home.	
154	M	2	#153 - 160	Playing	New Harbour and West End	On the beach.	20 - 30 x per year	1 hour	25	Local	Playing with stones, shells and sand. Take shells home.	

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
155	M	4	#153 - 160	Playing	New Harbour and West End	On the beach.	20 - 30 x per year	1 hour	25	Local	Playing with stones, shells and sand. Take shells home.
156	M	5	#153 - 160	Playing	New Harbour and West End	On the beach.	20 - 30 x per year	1 hour	25	Local	Playing with stones, shells and sand. Take shells home.
157	F	10	#153 - 160	Playing	New Harbour and West End	On the beach.	20 - 30 x per year	1 hour	25	Local	Playing with stones, shells and sand. Take shells home.
158	F	12	#153 - 160	Playing	New Harbour and West End	On the beach.	20 - 30 x per year	1 hour	25	Local	Playing with stones, shells and sand. Take shells home.
159	F	14	#153 - 160	Playing	New Harbour and West End	On the beach.	20 - 30 x per year	1 hour	25	Local	Playing with stones, shells and sand. Take shells home.
160	F	38	#153 - 160	Playing	New Harbour and West End	On the beach.	10 - 15 x per year	1 hour	13	Local	Playing with stones, shells and sand. Take shells home.
161	F	69	-	Dog walking	All zones	Goes onto the beach at Ross Plantation and at West End as part of the walk. Sometimes spends more time on the beach at West End.	1 - 2 x per day	20 - 30 mins	228	Local	Throwing stones for the dog on the beach at West End.
162	M	U	-	Dog walking	All zones	-	1 x per day	15 mins	91	Local	-
163	F	32	#163 - 165	Dog walking	West End to Headland	-	2 x per year	30 mins	1.0	Visitor	-
					West End	On the beach.	2 x per year	15 mins	0.50		Picking up stones.
164	F	3	#163 - 165	Dog walking	West End to Headland	-	2 x per year	30 mins	1.0	Visitor	-
					West End	On the beach.	2 x per year	15 mins	0.50		Picking up stones.
165	M	6	#163 - 165	Dog walking	West End to Headland	-	2 x per year	30 mins	1.0	Visitor	-
					West End	On the beach.	2 x per year	15 mins	0.50		Picking up stones.
166	M	64	#166 - 167	Walking	All zones	-	2 x per week	15 mins	26	Local	-
167	F	62	#166 - 167	Walking	All zones	-	1 x per month	15 mins	3.0	Local	-

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
168	F	48	-	Dog walking	All zones	-	1 x per day	20 mins	122	Local	Throwing sticks for the dog.
				Dog walking	West End, Slipways and Ross Plantation	On the beach.	1 x per day	20 - 30 mins	152		
169	M	U	#169 - 170	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	1 x per year	3.5 mins	0.06	Local	-
170	F	U	#169 - 170	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	1 x per year	3.5 mins	0.06	Local	-
171	M	U	#171 - 174	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	1 x per year	3.5 mins	0.06	Visitor	-
172	M	U	#171 - 174	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	1 x per year	3.5 mins	0.06	Visitor	-
173	F	U	#171 - 174	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	1 x per year	3.5 mins	0.06	Visitor	-
174	F	U	#171 - 174	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	1 x per year	3.5 mins	0.06	Visitor	-
175	M	70	#175 - 176	Walking	All zones	-	3 x per year	15 mins	0.75	Local	-
176	F	70	#175 - 176	Walking	All zones	-	3 x per year	15 mins	0.75	Local	-
177	M	66	#177 - 178	Walking	All zones	-	6 x per year	15 mins	1.5	Local	-
178	F	66	#177 - 178	Walking	All zones	-	6 x per year	15 mins	1.5	Local	-
179	M	38	-	Dog walking	West End	Spends half the time on the beach.	1 - 2 x per week	30 mins	39	Local	-
				Bird watching	Ross Plantation	On the beach.	1 - 2 x per month	30 mins	9.0		
180	M	59	-	Boat maintenance	Boat Area	-	3 x per week for 35 weeks	6 hours	630	Local	-
181	M	72	#181 - 182	Walking	All zones	-	2 x per week	1 hour	104	Local	-
182	F	U	#181 - 182	Dog walking	Headland and Slipways	Goes onto the beach at the Slipways.	1 x per day	30 mins	183	Local	-
183	F	56	-	Dog walking	All zones	Goes onto the beach at West End.	3 x per week	40 mins (includes walking both ways)	104	Local	Throwing a ball for the dog.
184	M	33	#184 - 187	Walking	All zones	-	1 x per week	30 - 60 mins	39	Local	-

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
185	F	31	#184 - 187	Walking	All zones	-	1 x per week	30 - 60 mins	39	Local	-
186	F	10	#184 - 187	Walking	All zones	-	1 x per week	30 - 60 mins	39	Local	-
187	M	2	#184 - 187	Walking (sometimes being carried)	All zones	-	1 x per week	30 - 60 mins	39	Local	-
188	M	52	-	Dog walking	All zones	-	1 x per day	15 - 20 mins	106	Local	Throwing sticks for the dog.
189	F	58	-	Dog walking	All zones	-	1 - 2 x per day	40 mins (includes walking both ways)	365	Local	Throwing sticks and a ball for the dog.
					West End	On the beach.	3 x per week	15 - 20 mins	46		
190	F	38	-	Dog walking	All zones	-	1 x per day	40 mins (includes walking both ways)	243	Local	-
191	M	59	-	Dog walking	Ross Plantation to West End	Goes onto the beach at Ross Plantation and at West End as part of the walk.	2 - 3 x per day	30 mins (includes walking both ways)	456	Local	-
192	M	84	-	Walking	Fenced Area to Ross Plantation or Headland to West End	-	1 x per day	6 mins	37	Local	-
					New Harbour and West End	On the beach.	1 x per week	10 mins	8.7		Occasionally collects wood for the garden.
193	M	63	-	Dog walking	All zones	-	1 x per week	40 mins (includes walking both ways)	35	Local	-
194	M	76	-	Dog walking	North End to Headland	Once per day goes onto the beach at Ross Plantation as part of the walk.	3 x per day	14.4 mins	263	Local	-
195	F	62	-	Walking	All zones	-	1 x per week	15 mins	13	Local	-
196	M	70	-	Walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	1 x per day	15 mins	91	Local	-
197	F	65	#197 - 201	Walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	2 x per week	20 mins	31	Local	-
				Playing	West End	On the beach.			4.3		Playing with sand.
198	F	7	#197 - 201	Walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	1 x per fortnight	30 mins	8.7	Local	-
				Playing	West End	On the beach.			4.3		Playing with sand and stones but do not take stones home.
199	F	8	#197 - 201	Walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	1 x per fortnight	30 mins	8.7	Local	-
				Playing	West End	On the beach.			4.3		Playing with sand and stones but do not take stones home.

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
200	M	8	#197 - 201	Walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	2 x per year	30 mins	0.67	Visitor	-
				Playing	West End	On the beach.			0.33		Playing with sand and stones but do not take stones home.
201	M	10	#197 - 201	Walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	2 x per year	30 mins	0.67	Visitor	-
				Playing	West End	On the beach.			0.33		Playing with sand and stones but do not take stones home.
202	M	60	#202 - 204	Keelboat sailing	Firth of Forth	-	1 x per week for 31 weeks	2 - 3 hours	78	Local	-
				Launching and landing a tender	Slipways		1 x per week for 31 weeks	4 - 6 mins (includes launching and landing)	2.6		-
				Lifting moorings from a raft (on water)	Offshore of the Headland		1 x per year	1 hour	1.0		-
				Handling moorings	Offshore of the Headland		1 x per year	30 mins	0.50		Handling moorings
				Boat maintenance	Boat Area		7 x per year	6 hours	42		-
203	M	U	#202 - 204	Keelboat sailing	Firth of Forth	-	3 x per month for 7 months	2 - 3 hours	53	Local	-
				Launching and landing a tender	Slipways		3 x per month for 7 months	4 - 6 mins (includes launching and landing)	1.8		
204	F	U	#202 - 204	Keelboat sailing	Firth of Forth	-	3 x per month for 7 months	2 - 3 hours	53	Local	-
				Launching and landing a tender	Slipways		3 x per month for 7 months	4 - 6 mins (includes launching and landing)	1.8		
205	M	U	-	Keelboat sailing	Firth of Forth	-	8 x per year	2 - 3 hours	20	Local	-
				Launching and landing a tender	Slipways		8 x per year	10 mins (includes launching and landing)	1.3		-
				Lifting moorings from a raft (on water)	Offshore of the Headland		2 x per year	3 - 4 hours	7.0		-
				Handling moorings	Offshore of the Headland		2 x per year	2 hours	4.0		Handling moorings
				Boat maintenance	Boat Area		14 x per year	6 hours	84		-

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
206	M	63	-	Dog walking	Ross Plantation to North End	1 x per week goes onto the beach at Ross Plantation as part of the walk.	5 x per week	5 mins	22	Local	Throwing a ball and sticks for the dog.
					Headland to West End	1 x per month goes onto the beach at West End as part of the walk.	2 x per month	10 mins	4.0		
207	F	43	-	Dog walking	All zones	-	1 x per month	20 mins	4.0	Local	-
208	M	50	#208 - 209	Dinghy sailing	Offshore of the Headland	-	4 x per year	4 hours	16	Local	-
				Launching and landing a dinghy	Slipways	-	4 x per year	10 mins (includes launching and landing)	0.66		
209	M	50	#208 - 209	Dinghy sailing	Offshore of the Headland	-	4 x per year	4 hours	16	Local	-
				Launching and landing a dinghy	Slipways	-	4 x per year	10 mins (includes launching and landing)	0.66		
210	M	70	-	Dog walking	All zones	Goes onto the beach at West End as part of the walk.	3 - 4 x per week	20 mins	61	Local	Throwing the ball for the dog.
211	M	44	-	Dog walking	Ross Plantation and North End (along the Fife Coastal Path)	-	1 x per day	5 mins	30	Local	-
212	F	38	#212 - 215	Dog walking	All zones	-	1 x per day for 40 weeks	20 mins	93	Local	-
				Playing, picnicking and building sandcastles.	West End	On the beach.	10 x per year (in summer)	1 - 2 hrs	15		Playing with sand, stones and shells. Do not take anything home.
213	F	6	#212 - 215	Playing, picnicking and building sandcastles.	West End	On the beach.	10 x per year (in summer)	1 - 2 hrs	15	Local	Playing with sand, stones and shells. Do not take anything home.
214	M	4	#212 - 215	Playing, picnicking and building sandcastles.	West End	On the beach.	10 x per year (in summer)	1 - 2 hrs	15	Local	Playing with sand, stones and shells. Do not take anything home.
215	F	1	#212 - 215	Riding in a buggy	All zones	-	1 x per day for 40 weeks	20 mins	93	Local	-
				Playing and picnicking	West End	On the beach.	10 x per year (in summer)	1 - 2 hrs	15		Playing with sand.

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
216	M	40	#216 - 220	Playing	West End and New Harbour	On the beach.	4 x per month	20 - 30 mins	20	Local	Playing with sand, shells and stones.
				Cycling	Ross Plantation and North End (along the Fife Coastal Path)	-	1 x per week	2 mins	1.7		-
217	F	3	#216 - 220	Playing	West End and New Harbour	On the beach.	4 x per month	20 - 30 mins	20	Local	Playing with sand, shells and stones.
218	M	6	#216 - 220	Playing	West End and New Harbour	On the beach.	4 x per month	20 - 30 mins	20	Local	Playing with sand, shells and stones.
219	F	U	#216 - 220	Playing	West End and New Harbour	On the beach.	2 x per month	20 - 30 mins	10	Visitors	Playing with sand, shells and stones.
220	M	U	#216 - 220	Playing	West End and New Harbour	On the beach.	2 x per month	20 - 30 mins	10	Visitors	Playing with sand, shells and stones.
221	M	73	#221 - 222	Keelboat sailing	Firth of Forth	-	3 - 4 x per week for 26 weeks	3 hours	273	Local	-
				Launching and landing a tender	Slipways	-	3 - 4 x per week for 26 weeks	10 mins (includes launching and landing)	15		
222	F	62	#221 - 222	Keelboat sailing	Firth of Forth	-	3 - 4 x per week for 26 weeks	3 hours	273	Local	-
				Launching and landing a tender	Slipways	-	3 - 4 x per week for 26 weeks	10 mins (includes launching and landing)	15		
223	M	71	-	Keelboat sailing	Firth of Forth	-	1 x per month for 7 months	3 hours	21	Local	-
				Launching and landing a tender	Slipway		1 x per month for 7 months	10 mins (includes launching and landing)	1.2		
				Boat maintenance	New Harbour	On the beach.	2 x per year	6 hours	12		
				Boat maintenance (while boat is afloat)	New Harbour	-	2 x per year	6 hours	12		
				Lifting moorings from a raft (on water)	Offshore of the Headland	-	1 x per year	1 hour	1.0		
				Handling moorings	Offshore of the Headland	-	1 x per year	30 mins	0.50		

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
224	M	70	-	Cycling	Fenced Area to Ross Plantation	-	1 x per month	2 - 3 mins	0.50	Local	-
225	M	39	#225 - 227	Playing	West End	On the beach.	1 x per year	45 mins	0.75	Visitors	Playing with sand, stones and shells but does not take anything home.
226	M	2	#225 - 227	Playing	West End	On the beach.	1 x per year	45 mins	0.75	Visitors	Playing with sand, stones and shells but does not take anything home.
227	F	5	#225 - 227	Playing	West End	On the beach.	1 x per year	45 mins	0.75	Visitors	Playing with sand, stones and shells but does not take anything home.
228	M	33	#228 - 229	Walking	Ross Plantation to North End (along the Fife Coastal Path)	-	1 x per year	5 mins	0.08	Visitors	-
229	M	1	#228 - 229	Riding in a buggy	Ross Plantation to North End (along the Fife Coastal Path)	-	1 x per year	5 mins	0.08	Visitors	-
230	M	85	-	Walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	250 x per year	30 mins (includes walking both ways)	125	Local	-
231	M	24	-	Dog walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	1 - 2 x per week	20 mins	26	Local	Throwing a ball and sticks for the dog.
232	M	U	-	Dog walking	All zones	-	9 x per year	40 mins (includes walking both ways)	6.0	Visitor	-
233	M	33	-	Dog walking	All zones	-	5 x per week	20 mins	87	Local	-
234	M	45	#234 - 236	Dog walking	West End to Headland	Goes onto the beach at West End.	2 x per week	10 mins	17	Local	-
				Keelboat sailing	Firth of Forth		2 x per year	6 hours	12		
				Launching and landing a tender	Slipways		2 x per year	10 mins (includes launching and landing)	0.33		
235	M	14	#234 - 236	Dinghy sailing	Offshore of the Headland	-	2 x per day for 5 days during youth week (2 hours) and 1 x per week for 26 weeks (1.5 hours)	2 hours and 1.5 hours	59	Local	-
				Launching and landing a tender	Slipways	-	2 x per day for 5 days and 1 x per week for 26 weeks	10 mins (includes launching and landing)	6.0		

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
236	F	11	#234 - 236	Dinghy sailing	Offshore of the Headland	-	2 x per day for 5 days during youth week (2 hours) and 1 x per week for 26 weeks (1.5 hours)	2 hours per time for youth week. 1.5 hours per time April - September	59	Local	-
				Launching and landing a tender	Slipways	-	2 x per day for 5 days and 1 x per week for 26 weeks	10 mins (includes launching and landing)	6.0		
237	M	41	#237 - 239	Keelboat sailing	Firth of Forth	-	1 x per week racing on Fridays (2 hours) for 22 weeks, 2 x per month racing on Sundays (5 hours) for 5 months and 8 day cruises per year (4 hours).	2 hours, 5 hours and 4 hours	126	Local	-
				Boat maintenance	Boat Area	-	8 x per year	4 hours	32		
				Lifting moorings from a raft (on water)	Offshore of the Headland	-	1 x per year	2 hour	2.0	Local	-
				Handling moorings	Offshore of the Headland	-	1 x per year	1 hour	1.0		Handling moorings
				Launching and landing a tender	Slipways	-	40 x per year	10 mins (includes launching and landing)	6.7		-
238	F	42	#237 - 239	Keelboat sailing	Firth of Forth	-	1 x per week racing on Fridays (2 hours) for 22 weeks, 2 x per month racing on Sundays (5 hours) for 5 months and 8 day cruises per year (4 hours).	2 hours, 5 hours and 4 hours	126	Local	-
				Launching and landing a tender	Slipways	-	40 x per year	10 mins (includes launching and landing)	6.7		
239	F	U	#237 - 239	Keelboat sailing	Firth of Forth	-	1 x per week racing on Fridays (2 hours) for 22 weeks and 2 x per month racing on Sundays (5 hours).	2 hours and 5 hours	94	Local	-
				Launching and landing a tender	Slipways	-	32 x per year	10 mins (includes launching and landing)	5.3		

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
240	M	U	-	Boat maintenance	Slipways	On the upper edge of the beach.	3 weekends per year	8 hours per weekend	24	Local	-
241	M	U	-	Boat maintenance	Slipways	On the upper edge of the beach.	3 weekends per year	8 hours per weekend	24	Local	-
242	M	U	-	Boat maintenance	Slipways	On the upper edge of the beach.	3 weekends per year	8 hours per weekend	24	Local	-
243	M	U	-	Boat maintenance	Slipways	On the upper edge of the beach.	3 weekends per year	8 hours per weekend	24	Local	-
244	M	62	#244 - 245	Walking	West End to the Headland	-	5 x per week	6.6 mins	29	Local	-
				Walking	West End	On the beach	1 x per week	30 mins	26		
				Launching and landing a RIB	Slipways	-	1 - 2 x per week for 26 weeks	10 mins (includes launching and	6.5		
				Cruising on a RIB and rescue boat duties	Firth of Forth and offshore of the Headland	-	1 - 2 x per week for 26 weeks	2 hours	78		
245	F	60	#244 - 245	Launching and landing a RIB	Slipways	-	1 x per week for 26 weeks	10 mins (includes launching and landing)	4.3	Local	-
				Cruising on a RIB and rescue boat duties	Firth of Forth and offshore of the Headland	-	1 x per week for 26 weeks	2 hours	52		
246	M	53	-	Keelboat sailing	Firth of Forth	-	1 x per week for 26 weeks	3 hours	78	Local	-
				Launching and landing a tender	Slipways	-	1 x per week for 26 weeks	10 mins (includes launching and landing)	4.3		
				Lifting moorings from a raft (on water)	Offshore of the Headland	-	1 x per year	1 hour	1.0		
				Handling moorings	Offshore of the Headland	-	1 x per year	30 mins	0.50		
247	M	52	#247 - 248	Dog walking	All zones	-	2 x per month	20 mins	8.0	Local	-
248	F	49	#247 - 248	Dog walking	All zones	-	2 x per month	20 mins	8.0	Local	-
249	M	U	-	Dog walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	1 x per month	20 mins	4.0	Local	-
250	F	U	-	Dog walking	All zones	Goes onto the beach at Ross Plantation, at the Slipways and at West End as part of the walk.	3 x per day	20 mins	365	Local	Throwing sticks for the dog.

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
251	M	35	-	Keelboat and dinghy sailing and power boating	Firth of Forth	-	4 x per year on a Keelboat. 5 x per year on a dinghy. 5 x per year on a safety boat. 5 x on boat courses.	3 hours	57	Local	-
				Boat maintenance	Boat Area		-	100 hours	100		
				Launching and landing a tender or dinghy	Slipways		19 x per year	10 mins (includes launching and landing)	3.2		
252	M	U	-	Keelboat sailing	Firth of Forth	-	4 x per year	3 hours	12	Local	-
				Launching and landing a tender	Slipways		4 x per year	10 mins (includes launching and landing)	0.66		
253	M	81	-	Walking	All zones	Goes onto the beach at Ross Plantation as part of the walk.	1 x per week	15 mins	13	Local	-
254	F	37	#254 - 257	Walking and running	All zones	Goes onto the beach at West End and at Ross Plantation as part of the walk/run.	4 - 5 x per week	5 - 15 mins	39	Local	-
255	M	9	#254 - 257	Cycling	West End	-	2 x per week for 40 weeks	2 mins	2.7	Local	-
256	F	8	#254 - 257	Cycling	West End	-	2 x per week for 40 weeks	2 mins	2.7	Local	-
257	M	6	#254 - 257	Cycling	West End	-	2 x per week for 40 weeks	2 mins	2.7	Local	-
258	M	26	#258 - 260	Dog walking	All zones	-	2 - 3 x per week	20 mins	43	Local	-
				Dog walking	Ross Plantation and West End	On the beach.	2 - 3 x per week	20 mins	43		
259	F	26	#258 - 260	Dog walking	All zones	-	1 - 2 x per week	20 mins	26	Local	-
				Dog walking	Ross Plantation and West End	On the beach.	1 - 2 x per week	20 mins	26		
260	M	3	#258 - 260	Dog walking	All zones	-	1 - 2 x per week	20 mins	26	Local	-
				Dog walking	Ross Plantation and West End	On the beach.	1 - 2 x per week	20 mins	26		
261	F	U	-	Dog walking	All zones	Occasionally goes onto the beach at Ross Plantation as part of the walk.	1 x per day	20 mins	122	Local	-
				Dog walking	West End	On the beach.	2 x per month	10 mins	4.0		
262	M	16	-	Cruising on a RIB and rescue boat duties	Firth of Forth and Offshore of the Headland	-	3 - 4 x per week (all year)	4 - 5 hours	819	Local	-
				Launching and landing a RIB	Slipways		3 - 4 x per week (all year)	10 mins (includes launching and landing)	30		

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
263	M	65	#263 - 269	Dog walking	All zones	-	1 x per day	20 mins	122	Local	-
					West End	On the beach.	1 x per month	10 mins	2.0		
				Playing	West End	On the beach.	6 x per year	2 hours	12		Playing with sand.
264	F	U	#263 - 269	Playing	West End	On the beach.	6 x per year	2 hours	12	Local	Playing with sand.
265	M	8	#263 - 269	Playing	West End	On the beach.	6 x per year	2 hours	12	Local	Playing with sand.
266	M	6	#263 - 269	Playing	West End	On the beach.	6 x per year	2 hours	12	Local	Playing with sand.
267	F	4	#263 - 269	Playing	West End	On the beach.	6 x per year	2 hours	12	Local	Playing with sand.
268	F	2	#263 - 269	Playing	West End	On the beach.	6 x per year	2 hours	12	Local	Playing with sand.
269	F	1	#263 - 269	Playing	West End	On the beach.	6 x per year	2 hours	12	Local	Playing with sand.
270	M	58	-	Dog walking	All zones	-	1 x per day	40 mins (includes walking both ways)	243	Local	-
271	M	76	#271 - 275	Walking	All zones	-	4 x per week	15 mins	52	Local	-
				Rock pooling	West End	On the beach.	1 x per month	1 hour	12		Picking up stones and shells.
272	F	76	#271 - 275	Walking	All zones	-	4 x per week	15 mins	52	Local	-
				Rock pooling	West End	On the beach.	1 x per month	1 hour	12		Picking up stones and shells.
273	F	16	#271 - 275	Rock pooling	West End	On the beach.	1 x per month	1 hour	12	Local	Picking up stones and shells.
274	M	14	#271 - 275	Rock pooling	West End	On the beach.	1 x per month	1 hour	12	Local	Picking up stones and shells.
275	M	10	#271 - 275	Rock pooling	West End	On the beach.	1 x per month	1 hour	12	Local	Picking up stones and shells.
276	M	51	#276 - 277	Walking	All zones	Occasionally goes onto the beach at West End and at Ross Plantation as part of the walk.	2 x per week	25 mins	43	Local	-
277	M	13	#276 - 277	Walking	All zones	Occasionally goes onto the beach at West End and at Ross Plantation as part of the walk.	2 x per week	25 mins	43	Local	-

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
278	M	65	-	Powerboating	Firth of Forth	-	3 x per year	2 hours	6.0	Local	-
				Launching and landing a boat	Slipways		3 x per year	10 mins (includes launching and landing)	0.50		
279	M	54	#279 - 280	Dinghy sailing	Offshore of the Headland	-	1 x per week for 31 weeks	3 hours	93	Local	-
				Launching and landing a dinghy	Slipways		1 x per week for 31 weeks	10 mins (includes launching and landing)	5.2		
280	M	16	#279 - 280	Dinghy sailing	Offshore of the Headland	-	2 x per week for 31 weeks	3 hours	186	Local	-
				Launching and landing a dinghy	Slipways		2 x per week for 31 weeks	10 mins (includes launching and landing)	10		
281	M	54	#281 - 282	Dinghy sailing	Offshore of the Headland	-	6 x per year	2.5 hours	15	Local	-
				Launching and landing a dinghy	Slipways		6 x per year	10 mins (includes launching and landing)	1.0		
282	F	53	#281 - 282	Dinghy sailing	Offshore of the Headland	-	6 x per year	2.5 hours	15	Local	-
				Launching and landing a dinghy	Slipways		6 x per year	10 mins (includes launching and landing)	1.0		
283	F	32	#283 - 286	Dinghy sailing	Offshore of the Headland	-	2 x per week for 26 weeks and 1 x per week for 13 weeks	2.5 - 3 hours	179	Local	-
				Launching and landing a dinghy	Slipways		2 x per week for 26 weeks and 1 x per week for 13 weeks	10 mins (includes launching and landing)	11		
284	F	2	#283 - 286	Dinghy sailing with parents	Offshore of the Headland	-	1 x per week for 31 weeks	2.5 - 3 hours	85	Local	-
285	F	4	#283 - 286	Dinghy sailing with parents	Offshore of the Headland	-	1 x per week for 31 weeks	2.5 - 3 hours	85	Local	-
286	M	33	#283 - 286	Dinghy sailing	Offshore of the Headland	-	2 x per week for 26 weeks and 1 x per week for 13 weeks	2.5 - 3 hours	179	Local	-
				Launching and landing a dinghy	Slipways		2 x per week for 26 weeks and 1 x per week for 13 weeks	10 mins (includes launching and landing)	11		

APPENDIX 2. SINGLE VISIT AND ANNUAL OCCUPANCY AND HANDLING RATES

Observation number	Sex	Age	Observation numbers of groups of interviewees	Activity	Zone	On the beach	Frequency of visit	Time per visit	Annual occupancy rate (hours)	Local or visitor	Activities involving handling sediments or objects
287	M	72	-	Dinghy sailing	Offshore of the Headland	-	1 x per week for 31 weeks	3 hours	93	Local	-
				Launching and landing a dinghy	Slipways		1 x per week for 31 weeks	10 mins (includes launching and landing)	5.2		
288	F	40	#288 - 289	Walking	Ross Plantation and North End (on the Fife Coastal Path)	-	1 x per fortnight	3.5 mins	1.5	Local	-
				Having a bonfire	Ross Plantation	On the beach	1 x per year	3 hours	3.0		
289	M	43	#288 - 289	Walking	Ross Plantation and North End (on the Fife Coastal Path)	-	1 x per fortnight	3.5 mins	1.5	Local	-
				Having a bonfire	Ross Plantation	On the beach	1 x per year	3 hours	3.0		
290	F	55	#290 - 291	Walking	Headland	-	2 x per week	5 mins	8.7	Local	-
291	M	U	#290 - 291	Walking	Headland	-	1 x per year	5 mins	0.08	Visitor	-
292	M	63	#292 - 293	Walking	All zones	Goes on to the beach at Ross Plantation as part of the walk.	2 x per year	15 mins	0.50	Visitor	-
293	F	53	#292 - 293	Walking	All zones	Goes on to the beach at Ross Plantation as part of the walk.	2 x per year	15 mins	0.50	Visitor	-

Notes

The data in italics are estimated rates (see Section 4.1).

The data in this table are presented as integers for values greater than 10 hours, rounded to one decimal place for values less than 10 hours and two decimal places for values less than 1 hour. This rounding process can result in a difference of up to 1 hour in the annual rates compared with the data in Appendix 3.

U - Unknown

APPENDIX 3. OCCUPANCY AND HANDLING RATES, WITH MEMBERS OF THE HIGH-RATE GROUPS IDENTIFIED
Table A3.1 Adults' occupancy rates on land and on the shore for the zones and bands where people were spending time

Observation number	Activity	Zone	Occupancy rate by zone and band (h y ⁻¹)							
			Any zone ^a	Ross Plantation	Slipways			Headland	New Harbour	West End
			Paths or grass	Beach	Beach	Intertidal mud	On the slipways	Rocks	Beach	Beach
180	Boat maintenance	Boat Area	630	-	-	-	-	-	-	-
191	Dog walking	Ross Plantation to West End. Goes onto the beach at Ross Plantation and West End as part of the walk.	383	37	-	-	-	-	-	37
189	Dog walking	All zones. Spends time on the beach at West End.	365	-	-	-	-	-	-	46
152	Dog walking and boat maintenance	Ross Plantation to New Harbour. Goes onto the beach at New Harbour with the dog.	359	-	-	-	-	-	30	-
	Checking moorings	Slipways	-	-	-	4.0	-	-	-	-
	Launching and landing a powerboat or tender	Slipways	-	-	-	-	3.3	-	-	-
250	Dog walking	All zones. Goes onto the beach at Ross Plantation, Slipways and West End as part of the walk.	329	18	6.1	-	-	-	-	12
11	Dog walking	All zones. Goes onto the beach at Ross Plantation as part of the walk. Spends time on the beach at West End.	310	55	-	-	-	-	-	33
121	Dog walking	West End to Ross Plantation. Spends time on the beach at the Slipways, New Harbour and West End.	274	-	30	-	-	-	30	30
194	Dog walking	North End to Headland. Once per day goes onto the beach at Ross Plantation as part of the walk.	245	18	-	-	-	-	-	-
190	Dog walking	All zones	243	-	-	-	-	-	-	-
270	Dog walking	All zones	243	-	-	-	-	-	-	-
21	Dog walking and cycling	All zones. Goes onto the beach at Ross Plantation and West End when dog walking.	222	37	-	-	-	-	-	122
86	Dog walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	207	37	-	-	-	-	-	-
	Sitting on the beach	West End	-	-	-	-	-	-	-	46
84	Dog walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	207	37	-	-	-	-	-	-
85	Dog walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	207	37	-	-	-	-	-	-
117	Dog walking	West End to Ross Plantation	160	-	-	-	-	-	-	-
161	Dog walking	All zones. Goes onto the beach at Ross Plantation and West End as part of the walk. Spends more time on the beach at West End.	155	27	-	-	-	-	-	46

Table A3.1 Adults' occupancy rates on land and on the shore for the zones and bands where people were spending time

Observation number	Activity	Zone	Occupancy rate by zone and band (h y ⁻¹)							
			Any zone ^a	Ross Plantation	Slipways			Headland	New Harbour	West End
			Paths or grass	Beach	Beach	Intertidal mud	On the slipways	Rocks	Beach	Beach
9	Dog walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	103	18	-	-	-	-	-	-
251	Boat maintenance	Boat Area	100	-	-	-	-	-	-	-
	Launching and landing a tender or dinghy	Slipways	-	-	-	-	3.2	-	-	-
82	Dog walking	Boat Area to Ross Plantation. Goes onto the beach at Ross Plantation as part of the walk.	97	42	-	-	-	-	-	-
126	Dog walking	West End to Ross Plantation. Goes onto the beach at Ross Plantation as part of the walk.	97	18	-	-	-	-	-	-
	Dog walking and playing	West End	-	-	-	-	-	-	-	104
127	Dog walking	West End to Ross Plantation. Goes onto the beach at Ross Plantation as part of the walk.	97	18	-	-	-	-	-	-
	Dog walking and playing	West End	-	-	-	-	-	-	-	104
112	Dog walking	Ross Plantation to West End. Goes onto the beach at Ross Plantation as part of the walk.	97	18	-	-	-	-	-	-
212	Dog walking	All zones	93	-	-	-	-	-	-	-
	Playing, picnicking and building sandcastles	West End	-	-	-	-	-	-	-	15
27	Dog walking	All zones. Goes onto the beach at Ross Plantation and at the Slipways as part of the walk.	91	18	12	-	-	-	-	-
	Playing, rock pooling and building sandcastles	West End	-	-	-	-	-	-	-	91
183	Dog walking	All zones. Goes onto the beach at West End.	91	-	-	-	-	-	-	13
10	Walking	All zones	91	-	-	-	-	-	-	-
162	Dog walking	All zones	91	-	-	-	-	-	-	-
12	Dog walking	All zones	87	-	-	-	-	-	-	-
233	Dog walking	All zones	87	-	-	-	-	-	-	-
205	Boat maintenance	Boat Area	84	-	-	-	-	-	-	-
	Launching and landing a tender	Slipways	-	-	-	-	1.3	-	-	-
1	Dog walking	All zones. Spends time on the beach at West End.	78	-	-	-	-	-	-	35
196	Walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	73	18	-	-	-	-	-	-
2	Walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	73	18	-	-	-	-	-	-
3	Walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	73	18	-	-	-	-	-	-

Table A3.1 Adults' occupancy rates on land and on the shore for the zones and bands where people were spending time

Observation number	Activity	Zone	Occupancy rate by zone and band (h y ⁻¹)							
			Any zone ^a	Ross Plantation	Slipways			Headland	New Harbour	West End
			Paths or grass	Beach	Beach	Intertidal mud	On the slipways	Rocks	Beach	Beach
25	Walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	73	18	-	-	-	-	-	-
26	Walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	73	18	-	-	-	-	-	-
77	Dog walking	Headland to North End. Goes onto the beach at Ross Plantation as part of the walk.	73	18	-	-	-	-	-	-
78	Dog walking	West End to Ross Plantation. Goes onto the beach at Ross Plantation as part of the walk.	73	18	-	-	-	-	-	-
76	Dog walking	Ross Plantation to Boat Area	68	-	-	-	-	-	-	-
116	Dog walking and running	All zones	65	-	-	-	-	-	-	-
119	Dog walking	North End to the Fenced Area	61	-	-	-	-	-	-	-
120	Dog walking	North End to the Fenced Area	61	-	-	-	-	-	-	-
135	Dog walking	Ross Plantation to North End	61	-	-	-	-	-	-	-
136	Dog walking	Ross Plantation to North End	61	-	-	-	-	-	-	-
14	Dog walking	Ross Plantation to the Boat Area	55	-	-	-	-	-	-	-
271	Walking	All zones	52	-	-	-	-	-	-	-
	Rock pooling	West End	-	-	-	-	-	-	-	12
272	Walking	All zones	52	-	-	-	-	-	-	-
	Rock pooling	West End	-	-	-	-	-	-	-	12
210	Dog walking	All zones. Goes onto the beach at West End as part of the walk.	52	-	-	-	-	-	-	8.7
58	Dog walking	Ross Plantation to the Headland. Goes onto the beach at Ross Plantation as part of the walk.	48	13	-	-	-	-	-	-
	Launching and landing a dinghy	Slipways	-	-	-	-	5.0	-	-	-
	Playing	West End	-	-	-	-	-	-	-	56
7	Dog walking	All zones. Goes onto the beach at Ross Plantation and West End as part of the walk.	47	6.0	-	-	-	-	-	6.0
55	Dog walking	All zones	43	-	-	-	-	-	-	-
258	Dog walking	All zones. Goes onto the beach at Ross Plantation and West End as part of the walk.	43	22	-	-	-	-	-	22
153	Dog walking	All zones	43	-	-	-	-	-	-	-
	Playing	New Harbour and West End	-	-	-	-	-	-	13	13
202	Boat maintenance	Boat Area	42	-	-	-	-	-	-	-
	Launching and landing a tender	Slipways	-	-	-	-	2.6	-	-	-
141	Bird watching	Headland to Fenced Area. Spends most of the time on the beach at Ross Plantation.	40	160	-	-	-	-	-	-
276	Walking	All zones. Occasionally goes onto the beach at Ross Plantation and West End as part of the walk.	39	2.2	-	-	-	-	-	2.2

Table A3.1 Adults' occupancy rates on land and on the shore for the zones and bands where people were spending time

Observation number	Activity	Zone	Occupancy rate by zone and band (h y ⁻¹)							
			Any zone ^a	Ross Plantation	Slipways			Headland	New Harbour	West End
			Paths or grass	Beach	Beach	Intertidal mud	On the slipways	Rocks	Beach	Beach
184	Walking	All zones	39	-	-	-	-	-	-	-
185	Walking	All zones	39	-	-	-	-	-	-	-
113	Walking	All zones	38	-	-	-	-	-	-	-
17	Dog walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	37	7.0	-	-	-	-	-	-
192	Walking	Fenced Area to Ross Plantation or Headland to West End. Spends time on the beach at New Harbour and West End.	37	-	-	-	-	-	4.4	4.4
193	Dog walking	All zones	35	-	-	-	-	-	-	-
237	Boat maintenance	Boat Area	32	-	-	-	-	-	-	-
	Launching and landing a tender	Slipways	-	-	-	-	6.7	-	-	-
211	Dog walking	Ross Plantation and North End (along the Fife Coastal Path)	30	-	-	-	-	-	-	-
244	Walking	West End to the Headland. Spends time on the beach at West End.	29	-	-	-	-	-	-	26
	Launching and landing a RIB	Slipways	-	-	-	-	6.5	-	-	-
197	Walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	29	2.2	-	-	-	-	-	-
	Playing	West End	-	-	-	-	-	-	-	4.3
254	Walking and running	All zones. Goes onto the beach at Ross Plantation and West End as part of the walk/run.	27	3.9	-	-	-	-	-	7.8
259	Dog walking	All zones. Goes onto the beach at Ross Plantation and West End as part of the walk.	26	13	-	-	-	-	-	13
6	Dog walking	All zones. Goes onto the beach at Ross Plantation and West End as part of the walk.	26	3.5	-	-	-	-	-	3.5
166	Walking	All zones	26	-	-	-	-	-	-	-
94	Dog walking	All zones. Goes onto the beach at Ross Plantation as part of the walk. Spends more time on the beach at West End.	24	2.0	-	-	-	-	-	6.5
92	Dog walking	All zones. Goes onto the beach at the Slipways as part of the walk. Spends more time on the beach at West End.	23	-	2.6	-	-	-	-	16
231	Dog walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	22	3.9	-	-	-	-	-	-
206	Dog walking	Ross Plantation to North End or Headland to West End. Goes onto the beach at Ross Plantation and West End as part of the walk.	22	2.6	-	-	-	-	-	1.0
179	Dog walking	Goes onto the beach at West End	20	-	-	-	-	-	-	20
	Bird watching	Ross Plantation	-	9.0	-	-	-	-	-	-

Table A3.1 Adults' occupancy rates on land and on the shore for the zones and bands where people were spending time

Observation number	Activity	Zone	Occupancy rate by zone and band (h y ⁻¹)							
			Any zone ^a	Ross Plantation	Slipways			Headland	New Harbour	West End
			Paths or grass	Beach	Beach	Intertidal mud	On the slipways	Rocks	Beach	Beach
13	Dog walking	All zones	17	-	-	-	-	-	-	-
16	Dog walking	All zones	17	-	-	-	-	-	-	-
8	Dog walking	West End to the Headland	16	-	-	-	-	-	-	-
42	Walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	16	3.9	-	-	-	-	-	-
43	Walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	16	3.9	-	-	-	-	-	-
49	Dog walking	Ross Plantation and North End (along the Fife Coastal Path)	15	-	-	-	-	-	-	-
	Playing	West End	-	-	-	-	-	-	-	39
234	Dog walking	West End to Headland. Goes onto the beach at West End.	14	-	-	-	-	-	-	3.5
	Launching and landing a tender	Slipways	-	-	-	-	0.33	-	-	-
61	Dog walking	Headland to West End	13	-	-	-	-	-	-	-
62	Dog walking	Headland to West End	13	-	-	-	-	-	-	-
100	Dog walking	Ross Plantation to the Fenced Area	13	-	-	-	-	-	-	-
195	Walking	All zones	13	-	-	-	-	-	-	-
54	Dog walking	West End to the Headland. Goes onto the beach at West End as part of the walk.	12	-	-	-	-	-	-	5.2
64	Walking and taking photos	All zones (prefers to take photographs in the woods)	12	-	-	-	-	-	-	-
253	Walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	10	2.6	-	-	-	-	-	-
132	Dog walking	Fenced Area to Ross Plantation	9.8	-	-	-	-	-	-	-
290	Walking	Headland	8.7	-	-	-	-	-	-	-
247	Dog walking	All zones	8.0	-	-	-	-	-	-	-
248	Dog walking	All zones	8.0	-	-	-	-	-	-	-
83	Walking and sitting on a bench near the Slipways	Slipways to Ross Plantation	7.7	-	-	-	-	-	-	-
105	Walking	Ross Plantation to West End or New Harbour	7.5	-	-	-	-	-	-	-
	Playing and building sandcastles	New Harbour and West End	-	-	-	-	-	-	11	11
139	Dog walking	All zones	7.5	-	-	-	-	-	-	-
140	Dog walking	All zones	7.5	-	-	-	-	-	-	-
75	Walking	Slipways to Ross Plantation. Goes onto the beach at Ross Plantation as part of the walk.	6.1	2.6	-	-	-	-	-	-
40	Walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	6.0	1.5	-	-	-	-	-	-

Table A3.1 Adults' occupancy rates on land and on the shore for the zones and bands where people were spending time

Observation number	Activity	Zone	Occupancy rate by zone and band (h y ⁻¹)							
			Any zone ^a	Ross Plantation	Slipways			Headland	New Harbour	West End
			Paths or grass	Beach	Beach	Intertidal mud	On the slipways	Rocks	Beach	Beach
41	Walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	6.0	1.5	-	-	-	-	-	-
110	Dog walking	All zones	6.0	-	-	-	-	-	-	-
232	Dog walking	All zones	6.0	-	-	-	-	-	-	-
44	Dog walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	5.1	0.90	-	-	-	-	-	-
19	Walking, taking photographs and cycling	Ross Plantation to West End	5.0	-	-	-	-	-	-	-
89	Walking	Headland to West End	4.9	-	-	-	-	-	-	-
	Playing	West End	-	-	-	-	-	-	-	6.5
90	Walking	Headland to West End	4.9	-	-	-	-	-	-	-
	Playing	West End	-	-	-	-	-	-	-	6.5
101	Walking	Headland to the North End	4.4	-	-	-	-	-	-	-
	Playing	West End	-	-	-	-	-	-	-	12
102	Walking	Headland to the North End	4.4	-	-	-	-	-	-	-
	Playing	West End	-	-	-	-	-	-	-	12
20	Walking	Ross Plantation to West End	4.0	-	-	-	-	-	-	-
149	Dog walking	All zones	4.0	-	-	-	-	-	-	-
207	Dog walking	All zones	4.0	-	-	-	-	-	-	-
123	Walking	North End	3.6	-	-	-	-	-	-	-
249	Dog walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	3.4	0.60	-	-	-	-	-	-
122	Walking	West End to Ross Plantation	3.3	-	-	-	-	-	-	-
151	Walking or jogging	Ross Plantation	3.3	-	-	-	-	-	-	-
145	Walking	All zones	3.0	-	-	-	-	-	-	-
	Playing	Slipways and West End	-	-	3.0	-	-	-	-	3.0
	Climbing on rocks	Headland	-	-	-	-	-	3.0	-	-
146	Walking	All zones	3.0	-	-	-	-	-	-	-
	Playing	Slipways and West End	-	-	3.0	-	-	-	-	3.0
	Climbing on rocks	Headland	-	-	-	-	-	3.0	-	-
131	Walking	All zones	3.0	-	-	-	-	-	-	
167	Walking	All zones	3.0	-	-	-	-	-	-	
4	Walking	All zones	2.5	-	-	-	-	-	-	
5	Walking	All zones	2.5	-	-	-	-	-	-	
63	Walking	All zones. Spends time on the beach at West End.	2.4	-	-	-	-	-	-	0.60
79	Walking	Slipways to West End	2.0	-	-	-	-	-	-	-

Table A3.1 Adults' occupancy rates on land and on the shore for the zones and bands where people were spending time

Observation number	Activity	Zone	Occupancy rate by zone and band (h y ⁻¹)							
			Any zone ^a	Ross Plantation	Slipways			Headland	New Harbour	West End
			Paths or grass	Beach	Beach	Intertidal mud	On the slipways	Rocks	Beach	Beach
216	Cycling	Ross Plantation to North End (along the Fife Coastal Path)	1.7	-	-	-	-	-	-	-
	Playing	West End and New Harbour	-	-	-	-	-	-	10	10
288	Walking	Ross Plantation and North End (on the Fife Coastal Path)	1.5	-	-	-	-	-	-	-
	Having a bonfire	Ross Plantation	-	3.0	-	-	-	-	-	-
289	Walking	Ross Plantation and North End (on the Fife Coastal Path)	1.5	-	-	-	-	-	-	-
	Having a bonfire	Ross Plantation	-	3.0	-	-	-	-	-	-
177	Walking	All zones	1.5	-	-	-	-	-	-	-
178	Walking	All zones	1.5	-	-	-	-	-	-	-
163	Dog walking	West End to Headland. Goes onto the beach at West End as part of the walk.	1.0	-	-	-	-	-	-	0.50
45	Dog walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	0.85	0.15	-	-	-	-	-	-
46	Dog walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	0.85	0.15	-	-	-	-	-	-
47	Dog walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	0.85	0.15	-	-	-	-	-	-
48	Dog walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	0.85	0.15	-	-	-	-	-	-
15	Walking	All zones	0.75	-	-	-	-	-	-	-
175	Walking	All zones	0.75	-	-	-	-	-	-	-
176	Walking	All zones	0.75	-	-	-	-	-	-	-
73	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.70	-	-	-	-	-	-	-
74	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.70	-	-	-	-	-	-	-
224	Cycling	Fenced Area to Ross Plantation	0.50	-	-	-	-	-	-	-
292	Walking	All zones. Goes on to the beach at Ross Plantation as part of the walk.	0.40	0.10	-	-	-	-	-	-
293	Walking	All zones. Goes on to the beach at Ross Plantation as part of the walk.	0.40	0.10	-	-	-	-	-	-
65	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.35	-	-	-	-	-	-	-
66	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.35	-	-	-	-	-	-	-
69	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.35	-	-	-	-	-	-	-

Table A3.1 Adults' occupancy rates on land and on the shore for the zones and bands where people were spending time

Observation number	Activity	Zone	Occupancy rate by zone and band (h y ⁻¹)							
			Any zone ^a	Ross Plantation	Slipways			Headland	New Harbour	West End
			Paths or grass	Beach	Beach	Intertidal mud	On the slipways	Rocks	Beach	Beach
70	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.35	-	-	-	-	-	-	-
108	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.35	-	-	-	-	-	-	-
109	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.35	-	-	-	-	-	-	-
125	Walking	Fenced Area to North End	0.17	-	-	-	-	-	-	-
22	Walking	North End to the Boat Area	0.12	-	-	-	-	-	-	-
228	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.08	-	-	-	-	-	-	-
291	Walking	Headland	0.08	-	-	-	-	-	-	-
95	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.06	-	-	-	-	-	-	-
96	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.06	-	-	-	-	-	-	-
169	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.06	-	-	-	-	-	-	-
170	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.06	-	-	-	-	-	-	-
171	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.06	-	-	-	-	-	-	-
172	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.06	-	-	-	-	-	-	-
173	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.06	-	-	-	-	-	-	-
174	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.06	-	-	-	-	-	-	-
240	Boat maintenance	Slipways (on the upper edge of the beach)	-	-	24	-	-	-	-	-
241	Boat maintenance	Slipways (on the upper edge of the beach)	-	-	24	-	-	-	-	-
242	Boat maintenance	Slipways (on the upper edge of the beach)	-	-	24	-	-	-	-	-
243	Boat maintenance	Slipways (on the upper edge of the beach)	-	-	24	-	-	-	-	-
262	Launching and landing a RIB	Slipways	-	-	-	-	30	-	-	-
221	Launching and landing a tender	Slipways	-	-	-	-	15	-	-	-
222	Launching and landing a tender	Slipways	-	-	-	-	15	-	-	-
283	Launching and landing a dinghy	Slipways	-	-	-	-	11	-	-	-

Table A3.1 Adults' occupancy rates on land and on the shore for the zones and bands where people were spending time

Observation number	Activity	Zone	Occupancy rate by zone and band (h y ⁻¹)								
			Any zone ^a	Ross Plantation	Slipways			Headland	New Harbour	West End	
			Paths or grass	Beach	Beach	Intertidal mud	On the slipways	Rocks	Beach	Beach	
32	Playing and rock pooling	West End	-	-	-	-	-	-	-	-	39
264	Playing	West End	-	-	-	-	-	-	-	-	12
273	Rock pooling	West End	-	-	-	-	-	-	-	-	12
37	Playing	West End	-	-	-	-	-	-	-	-	3.4
225	Playing	West End	-	-	-	-	-	-	-	-	0.75
Sum of all occupancy rates for each band/zone			10336	1327	209	4.0	176	6.0	127	1695	

Notes

^aThe term 'Any zone' has been used to represent either one zone, multiple zones, or all zones, where people were spending time.

There are no columns for the Boat Area, the Fenced Area and the North End since no activities were identified on the shore in these zones.

The values in the high-rate groups are emboldened.

The data in italics are estimated rates (see Section 4.1).

The occupancy data in this table are presented as integers for values greater than 10 hours, rounded to one decimal place for values less than 10 hours and two decimal places for values less than 1 hour.

This rounding process can result in a difference of up to 1 hour in the annual rates compared with the data in Appendix 2.

For paths or grass in any zone, the mean occupancy rate based on 11 high-rate observations is 327 h y⁻¹ and the observed 97.5th percentile rate based on 176 observations is 322 h y⁻¹

For the beach at Ross Plantation, the mean occupancy rate based on 7 high-rate observations is 94 h y⁻¹ and the observed 97.5th percentile rate based on 62 observations is 116 h y⁻¹

For the beach at the Slipways, the mean occupancy rate based on 8 high-rate observations is 24 h y⁻¹ and the observed 97.5th percentile rate based on 12 observations is 30 h y⁻¹

For the intertidal mud at the Slipways, the mean occupancy rate based on the only high-rate observation is 4.0 h y⁻¹. The observed 97.5th percentile rate is not applicable for 1 observation.

For on the Slipways, the mean occupancy rate based on 6 high-rate observations is 15 h y⁻¹ and the observed 97.5th percentile rate based on 33 observations for the Slipways is 18 h y⁻¹

For the rocks at the Headland, the mean occupancy rate based on 2 high-rate observations is 3.0 h y⁻¹ and the observed 97.5th percentile rate based on 2 observations is 3.0 h y⁻¹

For the beach at New Harbour, the mean occupancy rate based on 6 high-rate observations is 17 h y⁻¹ and the observed 97.5th percentile rate based on 10 observations is 30 h y⁻¹

For the beach at West End, the mean occupancy rate based on 7 high-rate observations is 121 h y⁻¹ and the observed 97.5th percentile rate based on 62 observations is 151 h y⁻¹

Table A3.2 Children's occupancy rates on land and on the shore for the zones and bands where people were spending time

Observation number	Sex	Age	Activity	Zone	Occupancy rate by zone and band (h y ⁻¹)						
					Any zone ^a	Ross Plantation	Slipways		Headland	New Harbour	West End
					Paths or grass	Beach	Beach	On the slipways	Rocks	Beach	Beach
Child age group (6 to 15 years old)											
31	F	7	Dog walking	All zones. Goes onto the beach at Ross Plantation and at the Slipways as part of the walk.	91	18	12	-	-	-	-
			Playing, rock pooling and building sandcastles	West End	-	-	-	-	-	-	91
277	M	13	Walking	All zones. Occasionally goes onto the beach at Ross Plantation and West End as part of the walk.	39	2.2	-	-	-	-	2.2
186	F	10	Walking	All zones	39	-	-	-	-	-	-
93	F	8	Dog walking	All zones. Goes onto the beach at the Slipways as part of the walk. Spends time on the beach at West End.	23	-	2.6	-	-	-	16
36	M	9	Walking	Ross Plantation and North End (along the Fife Coastal Path)	20	-	-	-	-	-	-
			Playing and rock pooling	West End	-	-	-	-	-	-	39
35	F	8	Walking	Ross Plantation and North End (along the Fife Coastal Path)	20	-	-	-	-	-	-
			Playing and rock pooling	West End	-	-	-	-	-	-	39
34	M	6	Walking	Ross Plantation and North End (along the Fife Coastal Path)	20	-	-	-	-	-	-
			Playing and rock pooling	West End	-	-	-	-	-	-	39
128	M	10	Dog walking	West End to Ross Plantation. Goes onto the beach at Ross Plantation as part of the walk.	19	3.5	-	-	-	-	-
			Dog walking and playing	West End	-	-	-	-	-	-	35
129	M	8	Dog walking	West End to Ross Plantation. Goes onto the beach at Ross Plantation as part of the walk.	19	3.5	-	-	-	-	-
			Dog walking and playing	West End	-	-	-	-	-	-	35

Table A3.2 Children's occupancy rates on land and on the shore for the zones and bands where people were spending time

Observation number	Sex	Age	Activity	Zone	Occupancy rate by zone and band (h y ⁻¹)						
					Any zone ^a	Ross Plantation	Slipways		Headland	New Harbour	West End
					Paths or grass	Beach	Beach	On the slipways	Rocks	Beach	Beach
130	M	8	Dog walking	West End to Ross Plantation. Goes onto the beach at Ross Plantation as part of the walk.	19	3.5	-	-	-	-	-
			Dog walking and playing	West End	-	-	-	-	-	-	35
124	M	14	Dog walking	Ross Plantation to the Headland	11	-	-	-	-	-	-
106	M	9	Walking	Ross Plantation to West End or New Harbour	7.5	-	-	-	-	-	-
			Playing and building sandcastles	New Harbour and West End	-	-	-	-	-	11	11
198	F	7	Walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	6.5	2.2	-	-	-	-	-
			Playing	West End	-	-	-	-	-	-	4.3
199	F	8	Walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	6.5	2.2	-	-	-	-	-
			Playing	West End	-	-	-	-	-	-	4.3
111	M	13	Dog walking	All zones	6.0	-	-	-	-	-	-
103	M	7	Walking	Headland to the North End	4.4	-	-	-	-	-	-
			Playing	West End	-	-	-	-	-	-	12
104	F	7	Walking	Headland to the North End	4.4	-	-	-	-	-	-
			Playing	West End	-	-	-	-	-	-	12
147	F	7	Walking	All zones	3.0	-	-	-	-	-	-
			Playing	Slipways and West End	-	-	3.0	-	-	-	3.0
			Climbing on rocks	Headland	-	-	-	-	3.0	-	-
148	F	8	Walking	All zones	3.0	-	-	-	-	-	-
			Playing	Slipways and West End	-	-	3.0	-	-	-	3.0
			Climbing on rocks	Headland	-	-	-	-	3.0	-	-
255	M	9	Cycling	West End	2.7	-	-	-	-	-	-
256	F	8	Cycling	West End	2.7	-	-	-	-	-	-
257	M	6	Cycling	West End	2.7	-	-	-	-	-	-
150	M	11	Dog walking	All zones	2.0	-	-	-	-	-	-
			Launching and landing a dinghy	Slipways	-	-	-	2.1	-	-	-
81	F	7	Walking	Slipways to West End	2.0	-	-	-	-	-	-

Table A3.2 Children's occupancy rates on land and on the shore for the zones and bands where people were spending time

Observation number	Sex	Age	Activity	Zone	Occupancy rate by zone and band (h y ⁻¹)						
					Any zone ^a	Ross Plantation	Slipways		Headland	New Harbour	West End
					Paths or grass	Beach	Beach	On the slipways	Rocks	Beach	Beach
165	M	6	Dog walking	West End to Headland. Goes onto the beach at West End.	1.0	-	-	-	-	-	0.50
200	M	8	Walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	0.50	0.17	-	-	-	-	-
			Playing	West End	-	-	-	-	-	-	0.33
201	M	10	Walking	All zones. Goes onto the beach at Ross Plantation as part of the walk.	0.50	0.17	-	-	-	-	-
			Playing	West End	-	-	-	-	-	-	0.33
67	M	10	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.35	-	-	-	-	-	-
68	M	10	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.35	-	-	-	-	-	-
97	F	10	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.06	-	-	-	-	-	-
98	F	8	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.06	-	-	-	-	-	-
235	M	14	Launching and landing a tender	Slipways	-	-	-	6.0	-	-	-
236	F	11	Launching and landing a tender	Slipways	-	-	-	6.0	-	-	-
114	M	12	Launching and landing a dinghy	Slipways	-	-	-	5.2	-	-	-
115	F	11	Launching and landing a dinghy	Slipways	-	-	-	5.2	-	-	-
157	F	10	Playing	New Harbour and West End	-	-	-	-	-	13	13
158	F	12	Playing	New Harbour and West End	-	-	-	-	-	13	13
159	F	14	Playing	New Harbour and West End	-	-	-	-	-	13	13
218	M	6	Playing	New Harbour and West End	-	-	-	-	-	10	10
59	F	11	Playing	West End	-	-	-	-	-	-	56
60	F	7	Playing	West End	-	-	-	-	-	-	56
50	M	8	Playing	West End	-	-	-	-	-	-	39
51	M	8	Playing	West End	-	-	-	-	-	-	39
52	M	10	Playing	West End	-	-	-	-	-	-	39

Table A3.2 Children's occupancy rates on land and on the shore for the zones and bands where people were spending time

Observation number	Sex	Age	Activity	Zone	Occupancy rate by zone and band (h y ⁻¹)						
					Any zone ^a	Ross Plantation	Slipways		Headland	New Harbour	West End
					Paths or grass	Beach	Beach	On the slipways	Rocks	Beach	Beach
213	F	6	Playing, picnicking and building sandcastles.	West End	-	-	-	-	-	-	15
274	M	14	Rock pooling	West End	-	-	-	-	-	-	<i>12</i>
275	M	10	Rock pooling	West End	-	-	-	-	-	-	<i>12</i>
265	M	8	Playing	West End	-	-	-	-	-	-	<i>12</i>
266	M	6	Playing	West End	-	-	-	-	-	-	<i>12</i>
39	F	6	Playing	West End	-	-	-	-	-	-	<i>3.4</i>
Sum of all occupancy rates for each band/zone					375	35	21	24	6.0	59	724

Notes

^aThe term 'Any zone' has been used to represent either one zone, multiple zones, or all zones, where people were spending time.

There are no columns for the Boat Area, the Fenced Area and the North End since no activities were identified on the shore in these zones.

The values in the high-rate groups are emboldened.

The data in italics are estimated rates (see Section 4.1).

The occupancy data in this table are presented as integers for values greater than 10 hours, rounded to one decimal place for values less than 10 hours and two decimal places for values less than 1 hour. This rounding process can result in a difference of up to 1 hour in the annual rates compared with the data in Appendix 2.

For paths or grass in any zone, the mean occupancy rate based on 3 high-rate observations is 56 h y⁻¹ and the observed 97.5th percentile rate based on 31 observations is 52 h y⁻¹

For the beach at Ross Plantation, the mean occupancy rate based on the only high-rate observation is 18 h y⁻¹ and the observed 97.5th percentile rate based on 9 observations is 15 h y⁻¹

For the beach at the Slipways, the mean occupancy rate based on the only high-rate observation is 12 h y⁻¹ and the observed 97.5th percentile rate based on 4 observations is 11 h y⁻¹

For on the Slipways, the mean occupancy rate based on 5 high-rate observations is 4.9 h y⁻¹ and the observed 97.5th percentile rate based on 5 observations is 6.0 h y⁻¹

For the rocks at the Headland, the mean occupancy rate based on 2 high-rate observations is 3.0 h y⁻¹ and the observed 97.5th percentile rate based on 2 observations is 3.0 h y⁻¹

For the beach at New Harbour, the mean occupancy rate based on 5 high-rate observations is 12 h y⁻¹ and the observed 97.5th percentile rate based on 5 observations is 13 h y⁻¹

For the beach at West End, the mean occupancy rate based on 12 high-rate observations is 45 h y⁻¹ and the observed 97.5th percentile rate based on 34 observations is 62 h y⁻¹

Table A3.3 Infants' occupancy rates on land and on the shore for the zones and bands where people were spending time

Observation number	Sex	Age	Activity	Zone	Occupancy rate by zone and band (h y ⁻¹)				
					Any zone ^a	Ross Plantation	Slipways	New Harbour	West End
					Paths or grass	Beach	Beach	Beach	Beach
Infant age group (0 to 5 years old)									
215	F	1	Riding in a buggy	All zones	93	-	-	-	-
			Playing and picnicking	West End	-	-	-	-	15
29	M	3	Dog walking	All zones. Goes onto the beach at Ross Plantation and at the Slipways as part of the walk.	91	18	12	-	-
			Playing, rock pooling and building sandcastles	West End	-	-	-	-	91
30	M	5	Dog walking	All zones. Goes onto the beach at Ross Plantation and at the Slipways as part of the walk.	91	18	12	-	-
			Playing, rock pooling and building sandcastles	West End	-	-	-	-	91
137	F	3	Riding in a buggy	Ross Plantation to North End	61	-	-	-	-
138	F	1	Riding in a buggy	Ross Plantation to North End	61	-	-	-	-
187	M	2	Walking	All zones	39	-	-	-	-
260	M	3	Dog walking	All zones. Goes onto the beach at Ross Plantation and West End.	26	13	-	-	13
107	F	4	Walking	Ross Plantation to West End or New Harbour	7.5	-	-	-	-
			Playing and building sandcastles	New Harbour and West End	-	-	-	11	11
80	F	4	Walking	Slipways to West End	2.0	-	-	-	-
23	F	5	Walking	North End to the Boat Area	0.12	-	-	-	-
24	M	2	Walking	North End to the Boat Area	0.12	-	-	-	-
164	F	3	Dog walking	West End to Headland. Goes onto the beach at West End.	1.0	-	-	-	0.5
229	M	1	Riding in a buggy	Ross Plantation to North End (along the Fife Coastal Path)	0.08	-	-	-	-
99	M	5	Walking	Ross Plantation to North End (along the Fife Coastal Path)	0.06	-	-	-	-
154	M	2	Playing	New Harbour and West End	-	-	-	13	13
155	M	4	Playing	New Harbour and West End	-	-	-	13	13
156	M	5	Playing	New Harbour and West End	-	-	-	13	13
217	F	3	Playing	New Harbour and West End	-	-	-	10	10

Table A3.3 Infants' occupancy rates on land and on the shore for the zones and bands where people were spending time

Observation number	Sex	Age	Activity	Zone	Occupancy rate by zone and band (h y ⁻¹)				
					Any zone ^a	Ross Plantation	Slipways	New Harbour	West End
					Paths or grass	Beach	Beach	Beach	Beach
214	M	4	Playing, picnicking and building sandcastles.	West End	-	-	-	-	15
267	F	4	Playing	West End	-	-	-	-	12
268	F	2	Playing	West End	-	-	-	-	12
269	F	1	Playing	West End	-	-	-	-	12
91	F	3	Playing	West End	-	-	-	-	6.5
38	F	5	Playing	West End	-	-	-	-	3.4
227	F	5	Playing	West End	-	-	-	-	0.75
226	M	2	Playing	West End	-	-	-	-	0.75
Sum of all occupancy rates for each band/zone					472	49	24	59	332

Notes

^aThe term 'Any zone' has been used to represent either one zone, multiple zones, or all zones, where people were spending time.

There are no columns for the Boat Area, the Fenced Area and the North End since no activities were identified on the shore in these zones.

The values in the high-rate groups are emboldened.

The data in italics are estimated rates (see Section 4.1).

The occupancy data in this table are presented as integers for values greater than 10 hours, rounded to one decimal place for values less than 10 hours and two decimal places for values less than 1 hour. This rounding process can result in a difference of up to 1 hour in the annual rates compared with the data in Appendix 2.

For paths or grass in any zone, the mean occupancy rate based on 6 high-rate observations is 73 h y⁻¹ and the observed 97.5th percentile rate based on 14 observations is 92 h y⁻¹
 For the beach at Ross Plantation, the mean occupancy rate based on 3 high-rate observations is 16 h y⁻¹ and the observed 97.5th percentile rate based on 3 observations is 18 h y⁻¹
 For the beach at the Slipways, the mean occupancy rate based on 2 high-rate observations is 12 h y⁻¹ and the observed 97.5th percentile rate based on 2 observations is 12 h y⁻¹
 For the beach at New Harbour, the mean occupancy rate based on 5 high-rate observations is 12 h y⁻¹ and the observed 97.5th percentile rate based on 5 observations is 13 h y⁻¹
 For the beach at West End, the mean occupancy rate based on 2 high-rate observations is 91 h y⁻¹ and the observed 97.5th percentile rate based on 18 observations is 91 h y⁻¹

Table A3.4 Adults' handling rates of sediment and objects that may have sediment adhering to them, for the zones and bands where handling was taking place

Observation number	Activity	Handling rate by zone and band h y ⁻¹					
		Ross Plantation	Slipways		Headland	New Harbour	West End
		Beach	Beach	Intertidal mud	Offshore	Beach	Beach
168	Throwing sticks for the dog	100	26	-	-	-	26
11	Throwing a ball for the dog	55	-	-	-	-	33
82	Throwing stones for the dog on the beach and occasionally collecting stones and shells to put in his aquarium	42	-	-	-	-	-
144	Throwing a ball for the dog	18	-	-	-	-	-
250	Throwing sticks for the dog	18	6.1	-	-	-	12
27	Throwing stones and sticks for their dog	18	12	-	-	-	-
	Throwing stones and sticks for their dog, rock pooling, playing with stones, shells and sand, building sandcastles	-	-	-	-	-	91
77	Collecting stones from the beach (keeps the stones in her pocket to take home for the garden, could be in her pocket for 10 - 20 mins)	18	-	-	-	-	-
231	Throwing a ball and sticks for the dog	3.9	-	-	-	-	-
206	Throwing a ball and sticks for the dog	2.6	-	-	-	-	1.0
121	Throwing a ball for the dog and keeps the ball in her pocket	-	30	-	-	30	30
145	Playing, collecting crockery, stones and shells (take stones and shells home)	-	3.0	-	-	-	3.0
146	Playing, collecting crockery, stones and shells (take stones and shells home)	-	3.0	-	-	-	3.0
152	Handling moorings	-	-	2.0	-	-	-
	Throwing ball and sticks for the dog	-	-	-	-	30	-
205	Handling moorings (from a raft)	-	-	-	4.0	-	-
237	Handling moorings (from a raft)	-	-	-	1.0	-	-
202	Handling moorings (from a raft)	-	-	-	0.5	-	-
223	Handling moorings (from a raft)	-	-	-	0.5	-	-
246	Handling moorings (from a raft)	-	-	-	0.5	-	-
153	Playing with stones, shells and sand (take shells home)	-	-	-	-	13	13
105	Building sandcastles, playing with sand, stones and shells (take stones and shells home and put in the garden)	-	-	-	-	11	11
216	Playing with sand, shells and stones	-	-	-	-	10	10
160	Playing with stones, shells and sand (take shells home)	-	-	-	-	6.3	6.3
219	Playing with sand, shells and stones	-	-	-	-	5.0	5.0

Table A3.4 Adults' handling rates of sediment and objects that may have sediment adhering to them, for the zones and bands where handling was taking place

Observation number	Activity	Handling rate by zone and band h y ⁻¹					
		Ross Plantation	Slipways		Headland	New Harbour	West End
		Beach	Beach	Intertidal mud	Offshore	Beach	Beach
220	Playing with sand, shells and stones	-	-	-	-	5.0	5.0
192	Occasionally collecting wood for the garden	-	-	-	-	4.4	4.4
88	Throwing a ball for the dog and keeps the sandy ball in her pocket	-	-	-	-	-	183
126	Throwing a ball for the dog and playing with sand	-	-	-	-	-	104
127	Throwing a ball for the dog and playing with sand	-	-	-	-	-	104
58	Playing with sand	-	-	-	-	-	56
161	Throwing stones for the dog	-	-	-	-	-	46
189	Throwing sticks and a ball for the dog	-	-	-	-	-	46
32	Rock pooling, playing with stones, shells and sand	-	-	-	-	-	39
33	Rock pooling, playing with stones, shells and sand	-	-	-	-	-	39
49	Playing with sand	-	-	-	-	-	39
1	Throwing a ball for the dog	-	-	-	-	-	35
212	Building sandcastles, playing with sand, stones and shells (do not take anything home)	-	-	-	-	-	15
183	Throwing a ball for the dog	-	-	-	-	-	13
101	Playing with sand	-	-	-	-	-	12
102	Playing with sand	-	-	-	-	-	12
263	Playing with sand	-	-	-	-	-	12
264	Playing with sand	-	-	-	-	-	12
271	Rock pooling, playing with stones and shells	-	-	-	-	-	12
272	Rock pooling, playing with stones and shells	-	-	-	-	-	12
273	Rock pooling, playing with stones and shells	-	-	-	-	-	12
210	Throwing the ball for the dog	-	-	-	-	-	8.7
89	Playing with sand	-	-	-	-	-	6.5
90	Playing with sand	-	-	-	-	-	6.5
197	Playing with sand	-	-	-	-	-	4.3
6	Throwing sticks and stones for the dog	-	-	-	-	-	3.5
37	Playing with sand	-	-	-	-	-	3.4

Table A3.4 Adults' handling rates of sediment and objects that may have sediment adhering to them, for the zones and bands where handling was taking place

Observation number	Activity	Handling rate by zone and band h y ⁻¹					
		Ross Plantation	Slipways		Headland	New Harbour	West End
		Beach	Beach	Intertidal mud	Offshore	Beach	Beach
225	Playing with sand, shells and stones (do not take anything home)	-	-	-	-	-	0.75
163	Picking up stones	-	-	-	-	-	0.50
Sum of all handling rates for each band/zone		276	80	2.0	6.5	115	1089

Notes

There are no columns for the Boat Area, the Fenced Area and the North End since no activities were identified on the shore in these zones.

The values in the high-rate groups are emboldened.

The data in italics are estimated rates (see Section 4.1).

The handling data in this table are presented as integers for values greater than 10 hours, rounded to one decimal place for values less than 10 hours and two decimal places for values less than 1 hour. This rounding process can result in a difference of up to 1 hour in the annual rates compared with the data in Appendix 2.

For the beach at Ross Plantation, the mean sediment handling rate based on 3 high-rate observations is 66 h y⁻¹ and the observed 97.5th percentile rate based on 9 observations is 91 h y⁻¹

For the beach at the Slipways, the mean sediment handling rate based on 3 high-rate observations is 23 h y⁻¹ and the observed 97.5th percentile rate based on 6 observations is 30 h y⁻¹

For the intertidal mud at the Slipways, the mean sediment handling rate based on the only high-rate observation is 2.0 h y⁻¹. The observed 97.5th percentile rate is not applicable for 1 observation.

For offshore of the Headland, the mean sediment handling rate based on the only high-rate observation is 4.0 h y⁻¹ and the observed 97.5th percentile rate based on 5 observations is 3.7 h y⁻¹

For the beach at New Harbour, the mean sediment handling rate based on 5 high-rate observations is 19 h y⁻¹ and the observed 97.5th percentile rate based on 9 observations is 30 h y⁻¹

For the beach at West End, the mean sediment handling rate based on 4 high-rate observations is 120 h y⁻¹ and the observed 97.5th percentile rate based on 42 observations is 104 h y⁻¹

Table A3.5 Children's handling rates of sediment and objects that may have sediment adhering to them, for the zones and bands where handling was taking place

Observation number	Sex	Age	Activity	Handling rate by zone and band h y ⁻¹			
				Ross Plantation	Slipways	New Harbour	West End
				Beach	Beach	Beach	Beach
Child age group (6 - 15 years old)							
31	F	7	Throwing stones and sticks for the dog	18	12	-	-
			Throwing stones and sticks for the dog, rock pooling, playing with stones, shells and sand, building sandcastles	-	-	-	91
147	F	7	Playing with sand. Collecting crockery, stones and shells (take stones and shells home)	-	3.0	-	3.0
148	F	8	Playing with sand. Collecting crockery, stones and shells (take stones and shells home)	-	3.0	-	3.0
157	F	10	Playing with sand, stones and shells (take shells home but not stones)	-	-	13	13
158	F	12	Playing with sand, stones and shells (take shells home but not stones)	-	-	13	13
159	F	14	Playing with sand, stones and shells (take shells home but not stones)	-	-	13	13
106	M	9	Building sandcastles, playing with sand, stones and shells (take stones and shells home and put in the garden)	-	-	11	11
218	M	6	Playing with sand, shells and stones	-	-	10	10
59	F	11	Playing with sand	-	-	-	56
60	F	7	Playing with sand	-	-	-	56
52	M	10	Playing with sand	-	-	-	39
35	F	8	Rock pooling, playing with stones, shells and sand	-	-	-	39
36	M	9	Rock pooling, playing with stones, shells and sand	-	-	-	39
50	M	8	Playing with sand	-	-	-	39
51	M	8	Playing with sand	-	-	-	39
34	M	6	Rock pooling, playing with stones, shells and sand	-	-	-	39
128	M	10	Playing with stones and sand. Throwing a ball for the dog	-	-	-	35
129	M	8	Playing with stones and sand. Throwing a ball for the dog	-	-	-	35
130	M	8	Playing with stones and sand. Throwing a ball for the dog	-	-	-	35
213	F	6	Building sandcastles, playing with sand, stones and shells (do not take anything home)	-	-	-	15
274	M	14	Rock pooling, playing with stones and shells	-	-	-	12
275	M	10	Rock pooling, playing with stones and shells	-	-	-	12
103	M	7	Playing with sand	-	-	-	12

Table A3.5 Children's handling rates of sediment and objects that may have sediment adhering to them, for the zones and bands where handling was taking place

Observation number	Sex	Age	Activity	Handling rate by zone and band $h\ y^{-1}$			
				Ross Plantation	Slipways	New Harbour	West End
				Beach	Beach	Beach	Beach
104	F	7	Playing with sand	-	-	-	12
265	M	8	Playing with sand	-	-	-	12
266	M	6	Playing with sand	-	-	-	12
198	F	7	Playing with sand and stones (do not take stones home)	-	-	-	4.3
199	F	8	Playing with sand and stones (do not take stones home)	-	-	-	4.3
39	F	6	Playing with sand	-	-	-	3.4
165	M	6	Picking up stones	-	-	-	0.50
200	M	8	Playing with sand and stones (do not take stones home)	-	-	-	0.33
201	M	10	Playing with sand and stones (do not take stones home)	-	-	-	0.33
Sum of all handling rates for each band/zone				18	18	59	706

Notes

There are no columns for the Boat Area, the Fenced Area and the North End since no activities were identified on the shore in these zones.

The values in the high-rate groups are emboldened.

The data in italics are estimated rates (see Section 4.1).

The handling data in this table are presented as integers for values greater than 10 hours, rounded to one decimal place for values less than 10 hours and two decimal places for values less than 1 hour. This rounding process can result in a difference of up to 1 hour in the annual rates compared with the data in Appendix 2.

For the beach at Ross Plantation, the mean sediment handling rate based on the only high-rate observation is $18\ h\ y^{-1}$. The observed 97.5th percentile rate is not applicable for 1 observation.

For the beach at the Slipways, the mean sediment handling rate based on the only high-rate observation is $12\ h\ y^{-1}$ and the observed 97.5th percentile rate based on 3 observations is $12\ h\ y^{-1}$

For the beach at New Harbour, the mean sediment handling rate based on 5 high-rate observations is $12\ h\ y^{-1}$ and the observed 97.5th percentile rate based on 5 observations is $13\ h\ y^{-1}$

For the beach at West End, the mean sediment handling rate based on 12 high-rate observations is $45\ h\ y^{-1}$ and the observed 97.5th percentile rate based on 32 observations is $63\ h\ y^{-1}$

Table A3.6 Infants' handling rates of sediment and objects that may have sediment adhering to them, for the zones and bands where handling was taking place

Observation number	Sex	Age	Activity	Handling rate by zone and band $h\ y^{-1}$			
				Ross Plantation	Slipways	New Harbour	West End
				Beach	Beach	Beach	Beach
Infant age group (0 - 5 years old)							
29	M	3	Throwing stones and sticks for the dog	18	12	-	-
			Throwing stones and sticks for the dog, rock pooling, playing with stones, shells and sand, building sandcastles	-	-	-	91
30	M	5	Throwing stones and sticks for the dog	18	12	-	-
			Throwing stones and sticks for the dog, rock pooling, playing with stones, shells and sand, building sandcastles	-	-	-	91
154	M	2	Playing with stones, shells and sand (take shells home)	-	-	13	13
155	M	4	Playing with stones, shells and sand (take shells home)	-	-	13	13
156	M	5	Playing with stones, shells and sand (take shells home)	-	-	13	13
107	F	4	Building sandcastles, playing with sand, stones and shells (take stones and shells home and put in the garden)	-	-	11	11
217	F	3	Playing with shells, stones and sand	-	-	10	10
214	M	4	Building sandcastles, playing with sand, stones and shells (do not take anything home)	-	-	-	15
215	F	1	Playing with sand	-	-	-	15
267	F	4	Playing with sand	-	-	-	12
268	F	2	Playing with sand	-	-	-	12
269	F	1	Playing with sand	-	-	-	12
91	F	3	Playing with sand	-	-	-	6.5

Table A3.6 Infants' handling rates of sediment and objects that may have sediment adhering to them, for the zones and bands where handling was taking place

Observation number	Sex	Age	Activity	Handling rate by zone and band h y ⁻¹			
				Ross Plantation	Slipways	New Harbour	West End
				Beach	Beach	Beach	Beach
38	F	5	Playing with sand	-	-	-	3.4
226	M	2	Playing with sand, shells and stones (do not take anything home)	-	-	-	0.75
227	F	5	Playing with sand, shells and stones (do not take anything home)	-	-	-	0.75
164	F	3	Picking up stones	-	-	-	0.50
Sum of all handling rates for each band/zone				36	24	59	318

Notes

There are no columns for the Boat Area, the Fenced Area and the North End since no activities were identified on the shore in these zones.

The values in the high-rate groups are emboldened.

The data in italics are estimated rates (see Section 4.1).

The handling data in this table are presented as integers for values greater than 10 hours, rounded to one decimal place for values less than 10 hours and two decimal places for values less than 1 hour. This rounding process can result in a difference of up to 1 hour in the annual rates compared with the data in Appendix 2.

For the beach at Ross Plantation, the mean sediment handling rate based on the 2 high-rate observations is 18 h y⁻¹ and the observed 97.5th percentile rate based on 2 observations is 18 h y⁻¹

For the beach at the Slipways, the mean sediment handling rate based on the 2 high-rate observations is 12 h y⁻¹ and the observed 97.5th percentile rate based on 2 observations is 12 h y⁻¹

For the beach at New Harbour, the mean sediment handling rate based on 5 high-rate observations is 12 h y⁻¹ and the observed 97.5th percentile rate based on 5 observations is 13 h y⁻¹

For the beach at West End, the mean sediment handling rate based on 2 high-rate observations is 91 h y⁻¹ and the observed 97.5th percentile rate based on 17 observations is 91 h y⁻¹

APPENDIX 4. OCCUPANCY RATES FOR ACTIVITIES ON THE WATER

Table A4.1 Adults' occupancy rates on the water

Observation number	Activity	Location	Occupancy on water (h y ⁻¹)
262	Cruising on a RIB and rescue boat duties	Firth of Forth and offshore of the Headland	819
221	Keelboat sailing	Firth of Forth	273
222	Keelboat sailing	Firth of Forth	273
280	Dinghy sailing	Offshore of the Headland	186
283	Dinghy sailing	Offshore of the Headland	179
286	Dinghy sailing	Offshore of the Headland	179
237	Keelboat sailing	Firth of Forth	128
	Lifting moorings from a raft	Offshore of the Headland	
238	Keelboat sailing	Firth of Forth	126
56	Dinghy sailing	Offshore of the Headland	96
239	Keelboat sailing	Firth of Forth	94
279	Dinghy sailing	Offshore of the Headland	93
287	Dinghy sailing	Offshore of the Headland	93
152	Keelboat sailing and powerboating	Firth of Forth	80
202	Keelboat sailing	Firth of Forth	79
	Lifting moorings from a raft	Offshore of the Headland	
246	Keelboat sailing	Firth of Forth	79
	Lifting moorings from a raft	Offshore of the Headland	
244	Cruising on a RIB and rescue boat duties	Firth of Forth and offshore of the Headland	78
58	Dinghy sailing	Offshore of the Headland	60
251	Keelboat and dinghy sailing and powerboating	Firth of Forth	57
203	Keelboat sailing	Firth of Forth	53
204	Keelboat sailing	Firth of Forth	53
28	Dinghy sailing	Offshore of the Headland	52
57	Dinghy sailing	Offshore of the Headland	52
245	Cruising on a RIB and rescue boat duties	Firth of Forth and offshore of the Headland	52
223	Boat maintenance (while boat is afloat)	New Harbour	34
	Keelboat sailing	Firth of Forth	
	Lifting moorings from a raft	Offshore of the Headland	
205	Keelboat sailing	Firth of Forth	27
	Lifting moorings from a raft	Offshore of the Headland	
33	Dinghy sailing	Offshore of the Headland	20
208	Dinghy sailing	Offshore of the Headland	16
209	Dinghy sailing	Offshore of the Headland	16
281	Dinghy sailing	Offshore of the Headland	15
282	Dinghy sailing	Offshore of the Headland	15
234	Keelboat sailing	Firth of Forth	12
252	Keelboat sailing	Firth of Forth	12
278	Powerboating	Firth of Forth	6

Notes

Four people were identified paddling at West End and New Harbour but they could not provide rates for this activity.

Table A4.2 Children's and infants' occupancy rates on the water

Observation number	Sex	Age	Location	Activity	Occupancy on water (h y ⁻¹)
Child age group (6 - 15 years old)					
114	M	12	Dinghy sailing	Offshore of the Headland	104
115	F	11	Dinghy sailing	Offshore of the Headland	104
235	M	14	Dinghy sailing	Offshore of the Headland	59
236	F	11	Dinghy sailing	Offshore of the Headland	59
150	M	11	Dinghy sailing	Offshore of the Headland	20
Infant age group (0 - 5 years old)					
284	F	2	Dinghy sailing (with parents)	Offshore of the Headland	85
285	F	4	Dinghy sailing (with parents)	Offshore of the Headland	85

Notes

Five individuals in the child age group were paddling at West End and New Harbour, 2 of whom were also swimming at West End. Three individuals in the infant age group were paddling at West End or New Harbour. Quantitative data were not provided for these activities.