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Radiological Habits Survey: Devonport, 2017

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Radiological Habits Survey: Devonport, 2017

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Radiological Habits Survey: Devonport, 2017

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KEY POINTS

- At the time of the last habits survey at Devonport in 2011, there was one classified shellfish bed in the aquatic survey area where the commercial collection of mussels by hand was permitted. In 2017, this fishery was reported to have closed.
- A net limitation order for salmon fisheries was in place in 2011, but in 2017, commercial salmon fishing was permitted on the River Tamar and the River Tavy. However, the catch was restricted to 23 fish landed per license per year on the River Tamar and six fish landed per license per year on the River Tavy.
- There was a significant increase in the consumption of foods from the mollusc and marine plants/algae food groups. This was due to the identification of a keen seashore forager who was consuming winkles and large quantities of sea lettuce and *Porphyra umbilicalis* collected from the shore near Cawsand.
- Intertidal occupancy rates decreased over mud and increased over mud and stones in 2017 compared with 2011, due to changes in the substrate where bait diggers at Torpoint were digging.
- The consumption of pork, milk and eggs had ceased since the last habits survey because a number of farms had been sold and pigs, dairy cattle and chickens were no longer being kept on farms within the survey area.
- High occupancy rates were obtained in all three zones in the direct radiation survey area since there were a wide range of amenities, schools and businesses in the area.

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SUMMARY

This report presents the results of a survey conducted in 2017 to determine the habits and consumption patterns of people living, working and pursuing recreational activities in the vicinity of the Devonport nuclear licensed site. The Devonport site comprises two defence establishments: the Devonport Royal Dockyard Limited and Her Majesty's Naval Base Devonport. These establishments are considered together as a single site for the purposes of this survey. Operations at the Devonport Royal Dockyard include refitting, refuelling, repairing and maintaining the Royal Navy's nuclear powered submarines. Operations at the Naval Base include the engineering, logistics and infrastructure support for the ships and submarines of the Devonport Flotilla. The site discharges gaseous radioactive waste via stacks, vents and other outlets to the atmosphere, liquid radioactive waste into the Hamoaze and the local sewer, and contains sources of direct radiation. Areas likely to be most affected by the discharges and sources of radiation were defined as the aquatic survey area for liquid discharges, the terrestrial survey area for the deposition from gaseous discharges, and the direct radiation survey area for ionising radiation emanating directly from the site. The occupancy data collected from the direct radiation survey area is also applicable to inhalation and external exposure arising from gaseous releases from the site.

The following potential exposure pathways were investigated:

- The consumption of food from the aquatic survey area
- Activities and occupancy over intertidal substrates
- The handling of fishing gear and sediment
- Occupancy in close proximity to sewage sludge
- Activities and occupancy in and on water
- The use of seaweed as a fertiliser or animal feed
- The consumption of food from the terrestrial survey area
- The use and destination of produce originating from the survey areas
- The consumption and use of groundwater and surface water in the terrestrial survey area
- The transfer of contamination off-site by wildlife
- Activities and occupancy within the direct radiation survey area
- Any new or unusual exposure pathways

Information was collected from members of the public by means of interviews and the data obtained for 684 individuals are presented and discussed. High rates of consumption, intertidal occupancy and handling are identified using established methods comprising (a) a 'cut off' to define the high-rate group and (b) 97.5th percentiles. The rates identified can be used in dose assessments. Additionally, profiles of integrated habits data are presented specifically for use in total dose assessments.

The aquatic survey area

The aquatic survey area (Figure 1, page 22) was defined as all tidal waters and intertidal areas north of a line extending from Cawsand to the western end of the Plymouth breakwater, along the breakwater and from the eastern end of the breakwater to Staddon Point. The survey area included Plymouth Sound, the Hamoaze and the tidal stretches of the rivers Lynher, Tamar, Tavy and Plym.

The mean consumption rates for the adult high-rate groups (as defined in Section 3.4) for the separate aquatic consumption pathways for foods potentially affected by liquid discharges were:

- 38 kg y⁻¹ for fish
- 3.4 kg y⁻¹ for crustaceans
- 1.2 kg y⁻¹ for molluscs
- 1.1 kg y⁻¹ for wildfowl
- 7.3 kg y⁻¹ for marine plants/algae

The predominant foods consumed by the people in the adult high-rate groups were:

- For fish: mackerel, pollack, bass and cod
- For crustaceans: common prawn, brown crab and common lobster
- For molluscs: winkle, queen scallop, cockle and mussel
- For wildfowl: mallard
- For marine plants/algae: *Porphyra umbilicalis* and sea lettuce

Seaweed was used as a fertiliser on allotment plots where fruit and vegetables were grown. The use of seaweed as an animal feed was not identified.

The mean occupancy rates for the adult high-rate groups over the separate intertidal substrates were:

- 100 h y⁻¹ for mud
- 170 h y⁻¹ for mud and sand
- 580 h y⁻¹ for mud and stones
- 20 h y⁻¹ for mud, sand and stones
- 100 h y⁻¹ for rock
- 35 h y⁻¹ for salt marsh
- 110 h y⁻¹ for sand
- 980 h y⁻¹ for sand and stones
- 46 h y⁻¹ for stones
- 160 h y⁻¹ for boat on mud

It was reported that people were living on boats in the survey area, but no quantitative data were obtained. An estimated annual occupancy rate for people living on board a boat while it is resting on mud is presented in Annex 3 for use in dose assessments.

The mean rates for the adult high-rate groups for handling were:

- 1500 h y⁻¹ for handling fishing gear (nets)
- 260 h y⁻¹ for handling sediment

For workers at the local sewage treatment plant, which receives liquid waste from the Devonport site, the maximum occupancy rates in close proximity (<10 m) to sewage sludge were:

- 680 h y⁻¹ for liquid sewage sludge
- 460 h y⁻¹ for dried sewage sludge

The maximum adult occupancy rates for water based activities were:

- 520 h y⁻¹ for 'in water'
- 2400 h y⁻¹ for 'on water'

Individuals in the child and infant age groups were recorded consuming aquatic foods and undertaking activities in the aquatic survey area.

The terrestrial survey area

The terrestrial survey area (see Figure 2, page 23) covered the land within 5 km of the Devonport site centre. Seven working farms were identified in the terrestrial survey area. They produced beef cattle, lambs and arable crops for human consumption including onions, potatoes, wheat, oats and barley. Oats, barley, wheat, beans, grass and lucerne were grown and used for animal feed on the farms where they were produced, and in some cases, were sold to other farms as animal feed. Oil seed rape was also being grown. Farmers and their families were consuming beef and lamb produced on their own farms.

Six large allotment sites, with a total of approximately 440 individual plots, and many private gardens were located in the survey area. A wide variety of fruit and vegetables were grown on the allotments and in the gardens. One person used small amounts of seaweed as a fertiliser on their allotment plot. Four beekeepers were interviewed who kept hives in the survey area and the consumption and sale of honey was recorded. Shooting took place on farmland in the area and pheasant, pigeon, partridge,

rabbit and venison were consumed. Wild foods such as blackberries, pennyworts, pickled pollen and mushrooms were collected and consumed.

Foods from the terrestrial survey area were consumed from the following thirteen food groups: green vegetables; other vegetables; root vegetables; potato; domestic fruit; cattle meat; sheep meat; poultry; wild/free foods; rabbits/hares; honey; wild fungi; venison. No consumption of locally produced milk, pig meat or eggs was identified. The mean consumption rates for the adult high-rate groups were above the national adult mean consumption rates that are used for comparison in habits surveys for the following seven food groups: green vegetables; other vegetables; root vegetables; potato; cattle meat; poultry; honey.

The consumption of groundwater by humans and livestock was identified.

The potential transfer of contamination off-site by wildlife was investigated as radionuclides could enter the food chain or contaminate the environment through this pathway. Representatives from the Devonport site reported that wildlife could not enter controlled areas. Routine pest control was undertaken on site, including the use of rodent traps and using a falconer with birds of prey to deter pigeons and seagulls.

The direct radiation survey area

The direct radiation survey area (see Figure 2, page 23) covered the land and sea within 1 km of the nuclear licensed site boundary. The occupancy data collected from the direct radiation survey area is also applicable to inhalation and external exposure pathways arising from gaseous releases from the site.

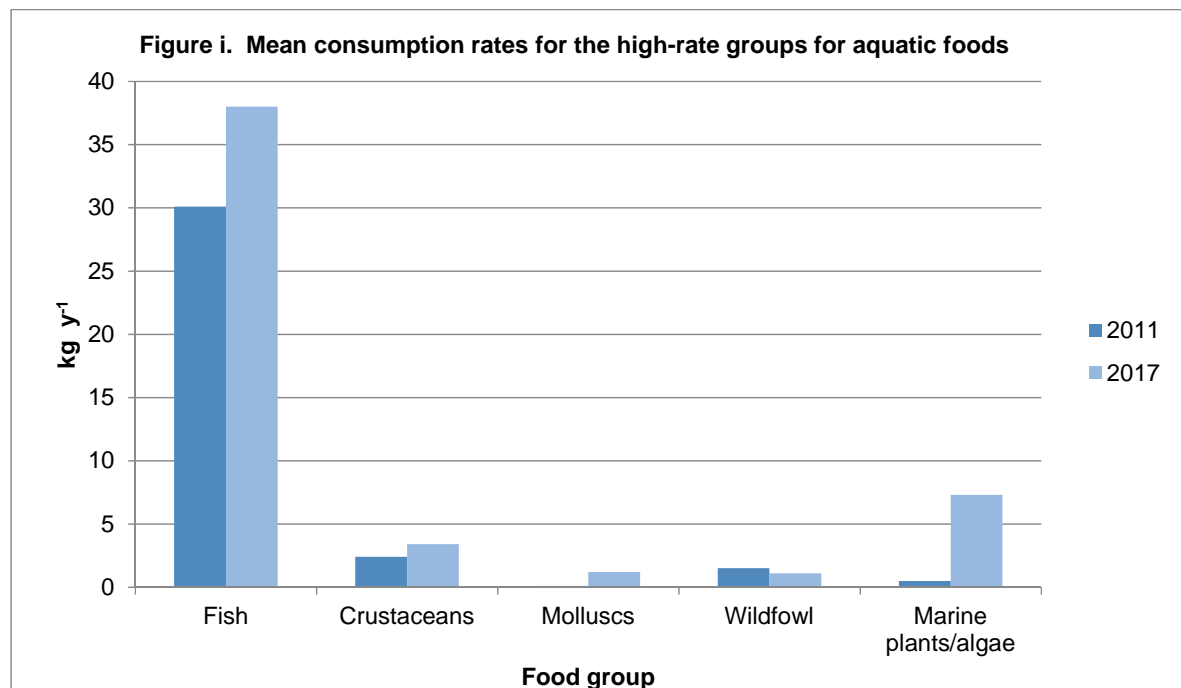
The occupancy rates were analysed in zones according to the distance from the Devonport nuclear licensed site boundary. The zones were 0 – 0.25 km, >0.25 – 0.5 km and >0.5 – 1.0 km. Except for the outdoor occupancy rate in the >0.5 – 1.0 km zone, the highest indoor, outdoor and total occupancy rates in all three zones were for residents. The highest outdoor occupancy rate in the >0.5 – 1.0 km zone was for people working in the area.

Gamma dose rate measurements were taken indoors and outdoors at most of the properties where interviews were conducted in the direct radiation survey area. Some of the outdoor measurements at residential properties were taken close to buildings because the properties had small courtyard gardens. Background readings were taken over grass at distances beyond 5 km from the Devonport site centre. The measurements taken outdoors at the properties were not notably different from the background measurements but several of the indoor measurements were notably higher than the background readings. Since gamma dose rate measurements are influenced by the nature of building materials,

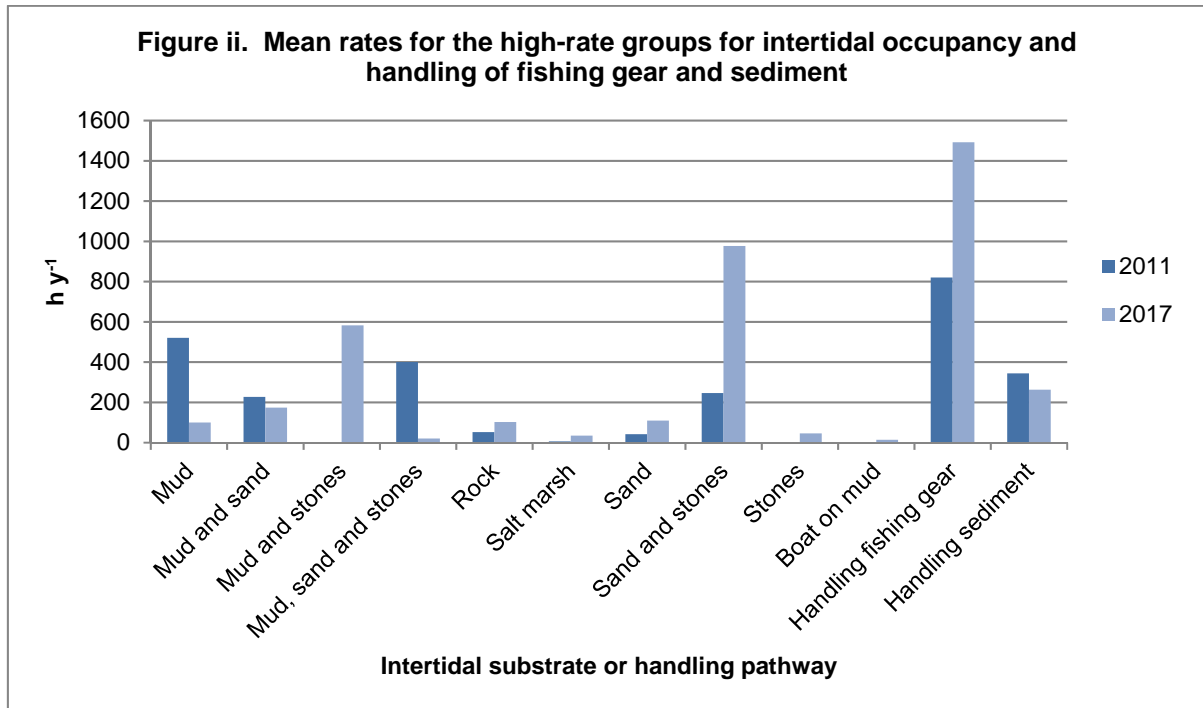
the substrate over which they are taken, and many other factors, the measurements taken inside properties are expected to be higher than those taken outdoors.

Comparisons with the previous survey

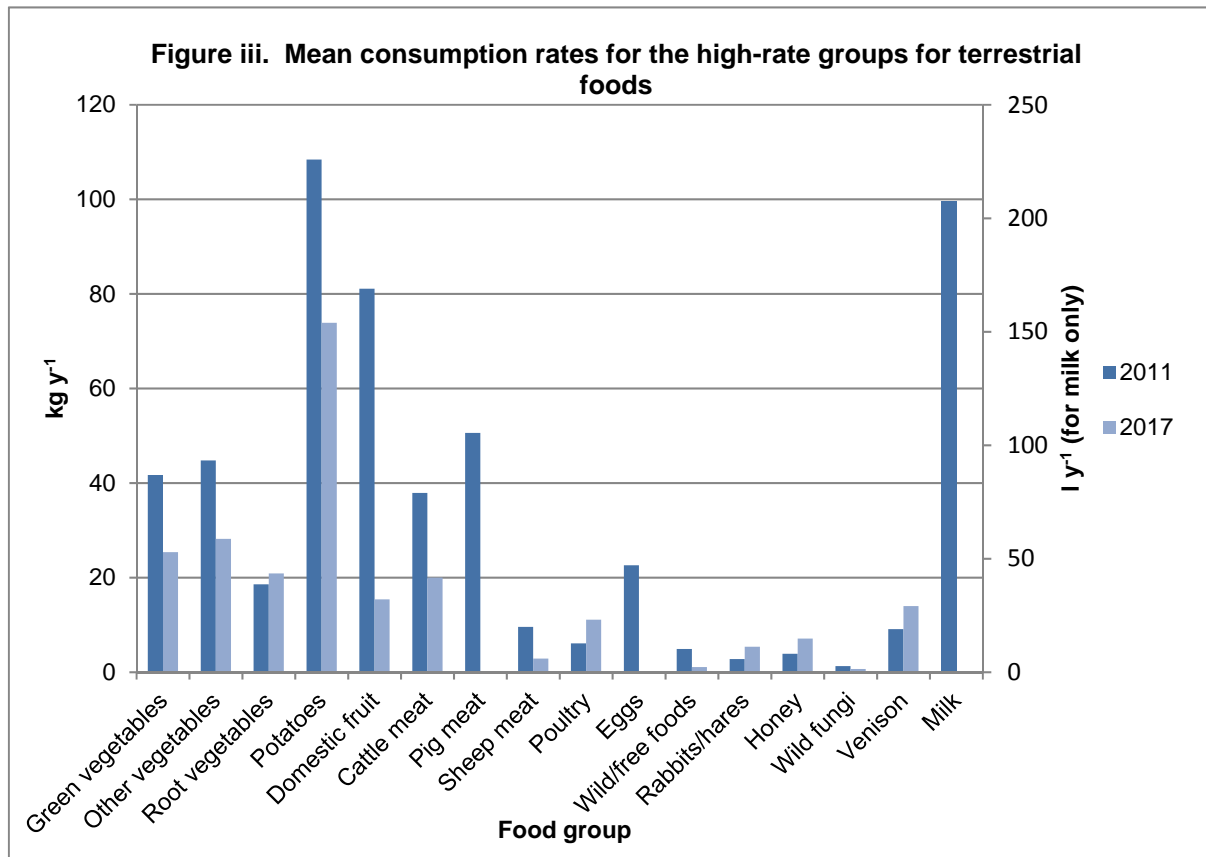
Comparisons were made with the results from a previous habits survey undertaken around the Devonport site in 2011. For the consumption rates of foods from the aquatic survey area, the main difference in 2017 was a significant increase in the consumption rate for the food group marine plants/algae (see Figure i, below) due to the identification of a person who consumed large quantities of *Porphyra umbilicalis* and sea lettuce.



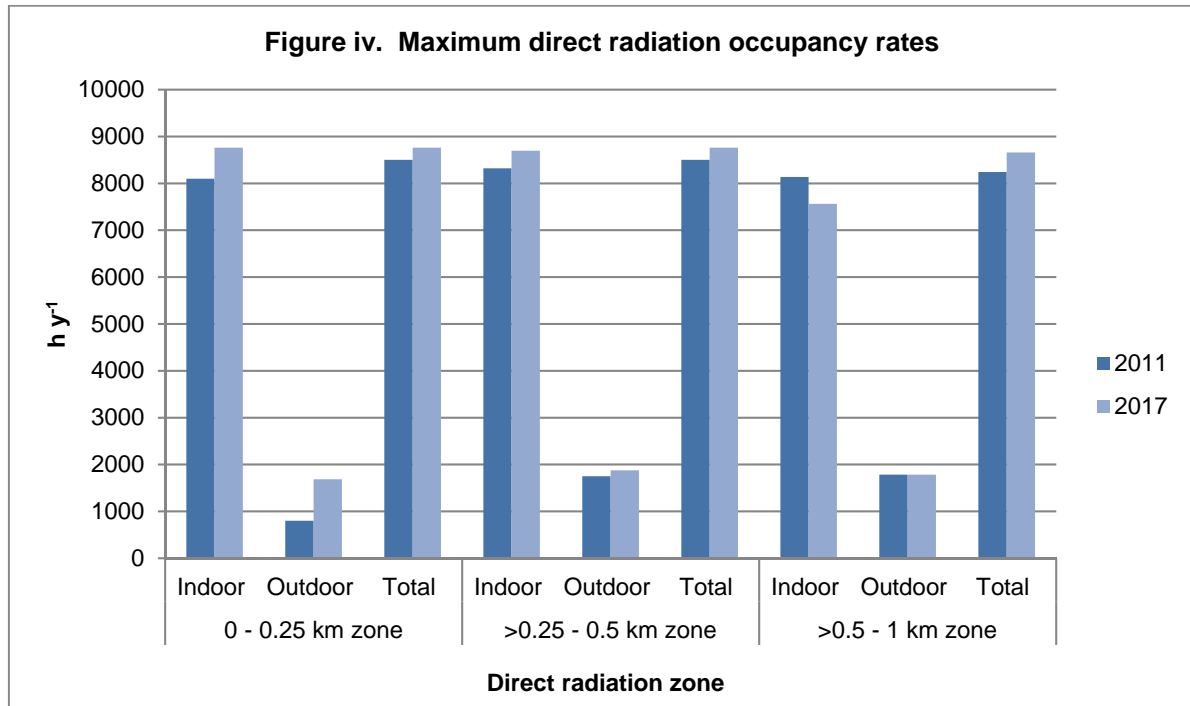
The most notable change in the intertidal occupancy rates was a significant increase in the occupancy on sand and stones (see Figure ii, page 14) which was due to the identification of a person working on the shore in the survey area. The decrease in the occupancy over mud and the increase in occupancy over mud and stones were due to bait diggers at Torpoint digging over mud and stones in 2017 compared with digging over mud in 2011. In 2011 and 2017 it was reported that people were living on boats that were resting on mud for part of the tidal cycle. However, no quantitative data were obtained in either year.



The most notable changes in the consumption rates of terrestrial foods were that pig meat, eggs and milk were no longer consumed (see Figure iii, below). Farms in the survey area where pigs, eggs and milk were produced in 2011 had been sold or rented to other farmers by 2017.



The occupancy rates in the direct radiation survey area in 2017 were very similar to those in 2011 (see Figure iv, below). Many people had high occupancy rates since there were a wide range of amenities, businesses and schools within the direct radiation survey area. The highest occupancy rates were over 8700 h y⁻¹ for elderly residents who were housebound and for children who lived and went to school in the area.



Habits survey information for consideration when selecting samples and measurements for monitoring programmes

The foods and intertidal locations identified in the 2017 Devonport habits survey could be used to assist in the selection of samples and measurements for monitoring programmes. The foods that were either consumed in the largest quantities in their food groups, or were the only food in their food group, are presented in Section 10.2 for consideration when selecting samples for the Food Standards Agency monitoring programme. The current environmental monitoring programme carried out for the Environment Agency adequately covers the Devonport area and no changes to this are suggested.

1 INTRODUCTION

Members of the public might be exposed to radiation as a result of the operations of the Devonport nuclear site, either through the permitted discharges of liquid or gaseous radioactive wastes into the local environment, or from radiation emanating directly from the site. This report provides information on activities carried out by members of the public in the vicinity of the Devonport nuclear site, which may influence their radiation exposure. The study has been funded by the Environment Agency, the Food Standards Agency and the Office for Nuclear Regulation in order to support their respective roles in protecting the public from exposure to radiation.

UK policy on the control of radiation exposure has long been based on the recommendations of the International Commission on Radiological Protection (ICRP), which embody the principles of justification of practices, optimisation of protection and dose limitation. Radiological protection of the public is based on the concept of a 'representative person'. This notional individual is defined as being representative of the more highly exposed members of the population. It follows that, if the dose to the representative person is acceptable when compared to dose limits and optimisation, other members of the public will receive acceptable doses, and overall protection to the public is provided from the effects of radiation. The term 'representative person' is equivalent to, and replaces, the term 'average member of the critical group' as recommended by ICRP (ICRP, 2006). The recommendations of the ICRP were updated in 2007 (ICRP, 2007) and, for the public, still include the principle of protecting the individuals most highly exposed to radiation, characterised by the representative person.

1.1 Regulatory framework

In England, the Environment Agency regulates the discharges of radioactive waste under the Environmental Permitting (England and Wales) Regulations 2016 (UK Parliament, 2016). These regulations take account of the European Union (EU) Basic Safety Standards (BSS) Directive 96/29/Euratom (Commission of the European Communities, 1996) which embody the recommendations of the ICRP, particularly ICRP 60 (ICRP, 1991). A new Basic Safety Standards (BSS) Directive was adopted by the European Council on 5th December 2013 (EC, 2014) and the UK Government plan to implement the Directive into UK law in 2018. Installation and operation of certain prescribed activities can only occur on sites if they are licensed under the Nuclear Installations Act 1965 (as amended) (NIA 65) (UK Parliament, 1965). The Office for Nuclear Regulation (ONR) has implemented this legislation and is also responsible for regulating, under the Ionising Radiations Regulations 2017 (IRR 17) (UK Parliament, 2017), the exposure of the public to direct radiation from the operations occurring on these sites.

Appropriate discharge limits are set by the Environment Agency, after wide-ranging consultations that include the Food Standards Agency. The Food Standards Agency is responsible for ensuring that any

radioactivity present in food does not compromise food safety and that permitted discharges of radioactivity do not result in unacceptable doses to consumers via the food chain. The Food Standards Agency also ensures that public radiation exposure via the food chain is within EU acceptable limits.

1.2 Radiological protection framework

Dose standards for the public are embodied in the national policy (UK Parliament, 2009), in guidance from the International Atomic Energy Agency (IAEA), in the Basic Safety Standards for Radiation Protection (IAEA, 1996) and in European Community legislation in the EU BSS Directive 96/29/Euratom (Commission of the European Communities, 1996). The public dose standards were incorporated into UK law under IRR 17. The requirement to observe the conditions laid down in the Basic Safety Standards (BSS) in England and Wales is incorporated in the Environmental Permitting (England and Wales) Regulations 2016 (UK Parliament, 2016). These require that the environment agencies ensure, wherever applicable, that:

- All public radiation exposures from radioactive waste disposals are kept As Low As Reasonably Achievable (ALARA), with social and economic factors being taken into account
- The sum of all exposures does not exceed the dose limit of 1 mSv a year
- The dose received from any new source does not exceed 0.3 mSv a year
- The dose received from any single site does not exceed 0.5 mSv a year

The dose limit of 1 mSv per year to the public from all anthropogenic sources other than medical applications is also the recommendation made by the ICRP (ICRP, 2007).

The environment agencies are also required to ensure that the dose estimates are as realistic as possible for the population as a whole and for reference groups of the population. They are required to take all necessary steps to identify the reference groups of the population taking into account the effective pathways of transmission of radioactive substances. Guidance on the principles underlying prospective radiological assessments (i.e. assessments of potential future doses) were provided by the National Dose Assessment Working Group (NDAWG), which consisted of representatives of UK Government Bodies and other organisations with responsibilities for dose assessments (EA, SEPA, DoENI, NRPB and FSA, 2002). NDAWG also published principles underlying retrospective radiological assessment (i.e. assessment of doses already received from past discharges) (Allott, 2005) and possible methods of carrying out these assessments using the data from combined habits surveys (Camplin *et al.*, 2005). NDAWG agreed that the optimal method for performing retrospective dose assessments would be to use habits profiles (profiling method) as described in Camplin *et al.* (2005). This approach was adopted in Radioactivity in Food and the Environment (RIFE) publications, (e.g. EA, FSA, FSS, NRW, NIEA and SEPA, 2016). NDAWG published reports on the collection and use of habits survey data in retrospective and prospective dose assessments (NDAWG, 2005; NDAWG 2009); the principles described in these reports are consistent with those used here. The UK environment agencies, the Health Protection Agency (now part of Public Health England) and the Food Standards

Agency jointly produced an update of the 2002 interim guidance and principles for assessing doses (EA, SEPA, NIEA, HPA and FSA, 2012).

2 THE SURVEY

2.1 Site activity

Devonport Royal Dockyard is located in a suburb of Plymouth in Devon, on the eastern shore of the Hamoaze (see Figure 1, page 22). The Dockyard is run by two organisations Devonport Royal Dockyard Limited (DRDL) and Her Majesty's Naval Base Devonport (HMNB). DRDL is part of the Naval Marine Sector of the Babcock International Group and HMNB Devonport is operated under the Ministry of Defence's (MOD) Navy Command. For the purposes of this survey these establishments are considered together as a single site. Operations under the control of DRDL include refitting, refuelling, repairing and maintaining the Royal Navy's nuclear powered submarines. Additionally, DRDL prepares nuclear powered submarines for lay-up pending de-fuelling and de-equipping. Operations at HMNB Devonport include the engineering, logistics and infrastructure support for the ships and submarines of the Devonport Flotilla. At the time of the habits survey, routine operations were being undertaken at the Devonport site as well as upgrading dock facilities.

DRDL has a licence from the Office for Nuclear Regulation (ONR) to operate a nuclear licensed site in the area around number 5 basin at Devonport Royal Dockyard. Under the radioactive substances provisions of the Environmental Permitting (England and Wales) Regulations 2016, DRDL is permitted to discharge gaseous radioactive wastes via stacks, vents and other outlets to the atmosphere, and liquid radioactive wastes via an outfall into the Hamoaze and to the local sewer. Details of the amounts of gaseous and liquid radioactive waste discharged by DRDL are published in the RIFE reports, for example, EA, FSA, FSS, NRW, NIEA and SEPA, 2017.

In addition to the site licensed by ONR, there is an authorised site which is regulated by the Defence Safety and Environment Authority - Defence Nuclear Safety Regulator (DSEA-DNSR), jointly, where appropriate, with the ONR. HMNB is permitted by the Environment Agency to discharge gaseous waste via stacks and to discharge liquid waste to the local sewer on the basis of an Approval.

The Devonport site contains sources of direct radiation, although these do not result in measurable dose rates at the site boundary.

2.2 Survey objectives

The Centre for Environment, Fisheries & Aquaculture Science (Cefas) undertook the Devonport habits survey in 2017 on behalf of the Environment Agency, the Food Standards Agency, and the Office for Nuclear Regulation. The aim of the survey was to obtain comprehensive information on the habits of the public that might lead to their exposure to radiation via gaseous discharges, liquid discharges and direct radiation from the Devonport nuclear site.

Specifically, investigations were conducted into the following:

- The consumption of food from the aquatic survey area
- Activities and occupancy over intertidal substrates
- The handling of fishing gear and sediment
- Occupancy in close proximity to sewage sludge
- Activities and occupancy in and on water
- The use of seaweed as a fertiliser or animal feed
- The consumption of food from the terrestrial survey area
- The use and destination of produce originating from the survey areas
- The consumption and use of groundwater and surface water in the terrestrial survey area
- The transfer of contamination off-site by wildlife
- Activities and occupancy within the direct radiation survey area
- Any new or unusual exposure pathways

No additional site-specific investigations were requested by the Environment Agency, the Food Standards Agency or the Office for Nuclear Regulation.

2.3 Survey areas

The geographic extents of potential effects from liquid discharges, deposition from gaseous releases, and direct radiation are different. Therefore, different survey areas were defined to cover each of these three main possible sources of exposure. These were an aquatic survey area relating to liquid discharges, a terrestrial survey area relating to deposition from gaseous discharges, and a direct radiation survey area relating to ionising radiation emanating directly from the site.

The aquatic survey area (see Figure 1, page 22) covered the tidal waters and intertidal areas north of a line extending from Cawsand to the western end of the Plymouth Breakwater, along the breakwater and from the eastern end of the breakwater to Staddon Point. The survey area included Plymouth Sound, the Hamoaze and the tidal stretches of the rivers Lynher, Tamar, Tavy and Plym. This area was taken to represent the predominant area of mixing of discharged radionuclides in seawater.

The terrestrial survey area (see Figure 2, page 23) covered the land within 5 km of the site centre (National Grid Reference: SX 445 565), to encompass the main areas of potential deposition from gaseous discharges.

The direct radiation survey area (see Figure 2, page 23) covered the land and sea within 1 km of the nuclear licensed site boundary. The occupancy data collected from the direct radiation survey area is

also applicable to inhalation and external exposure pathways arising from gaseous releases from the site.

The same aquatic, terrestrial and direct radiation survey areas were used in the previous habits survey conducted by Cefas in the Devonport area, which was in 2011 (Clyne *et al.*, 2012).

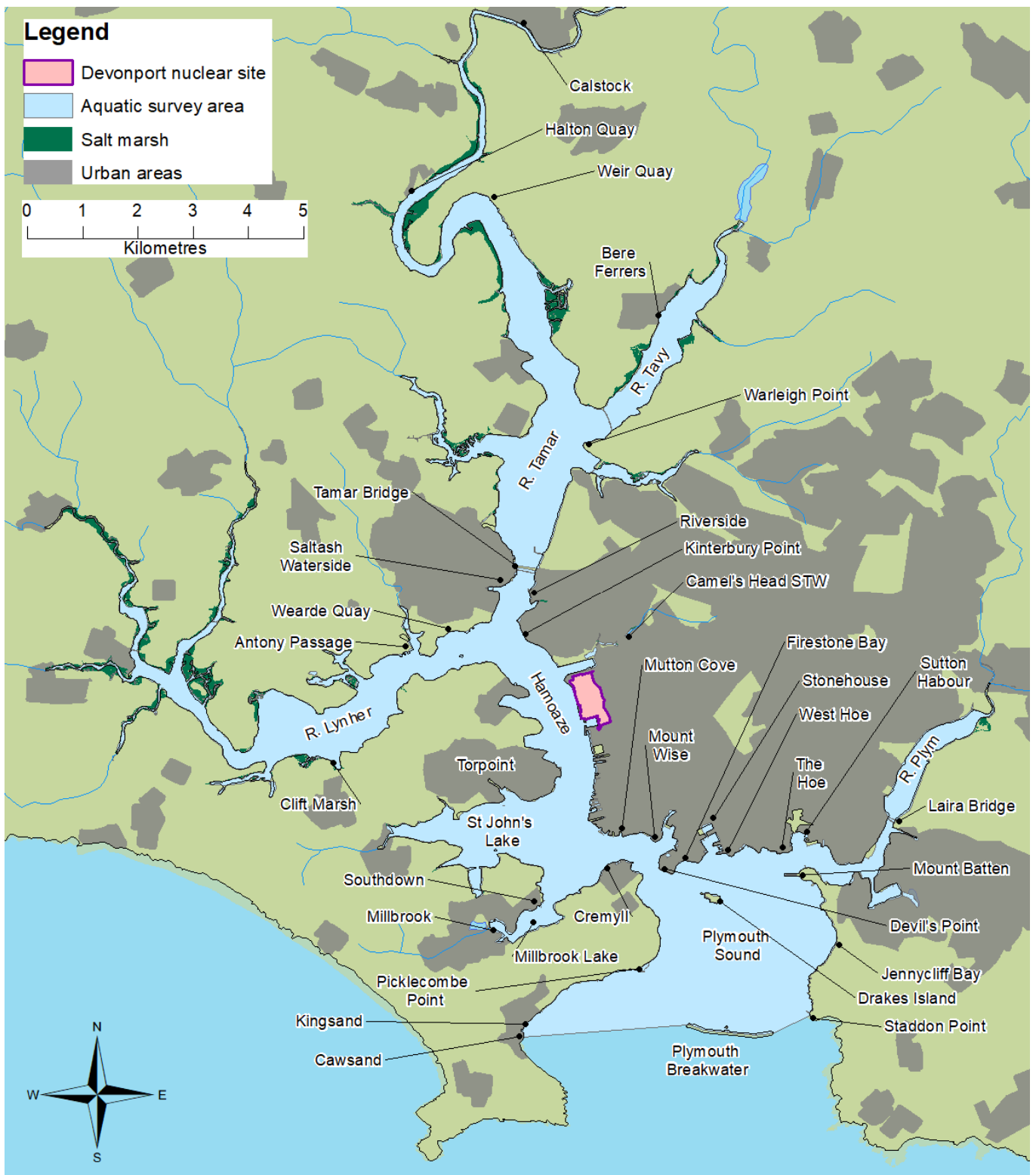


Figure 1. The Devonport aquatic survey area

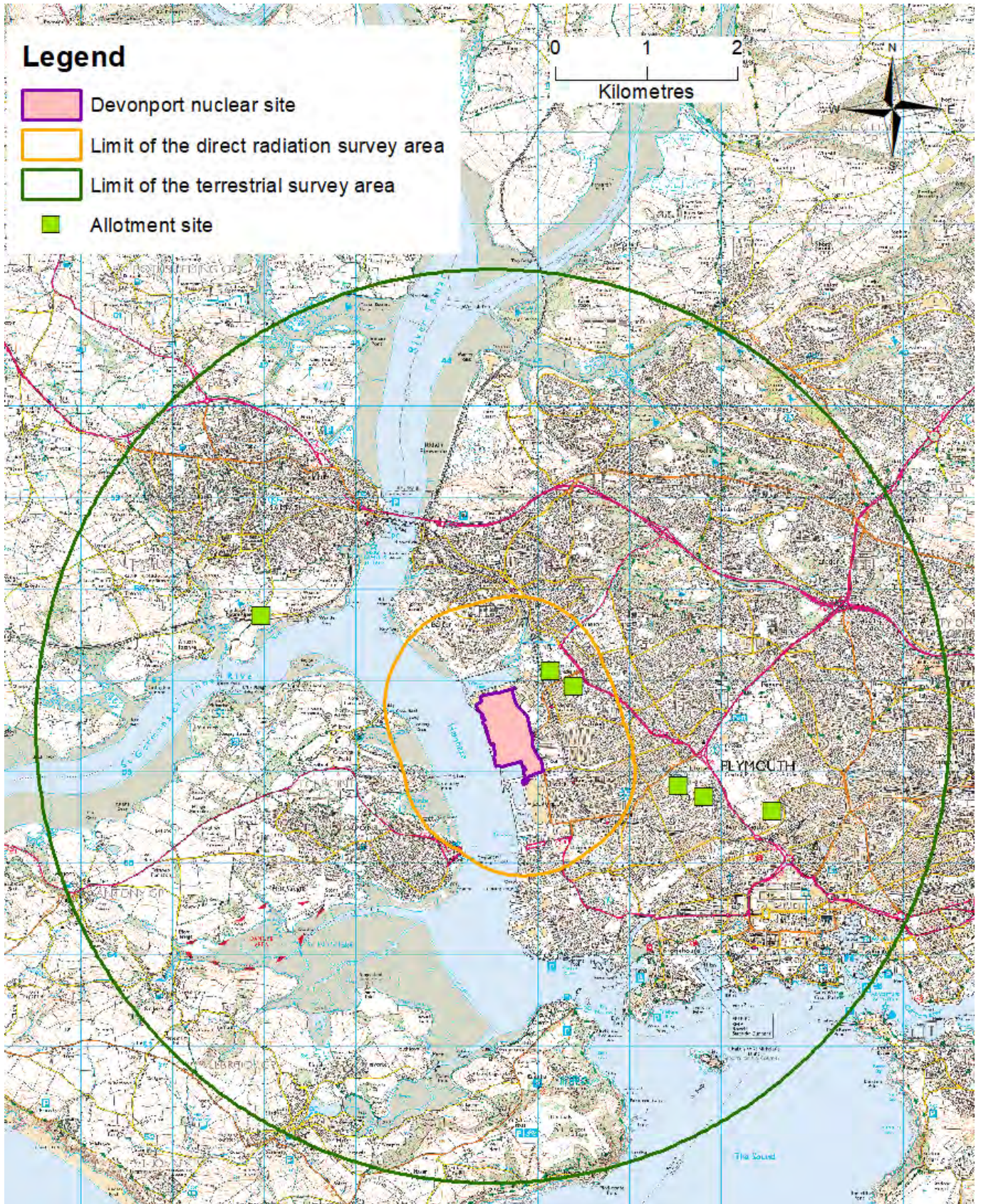


Figure 2. The Devonport terrestrial and direct radiation survey areas

2.4 Conduct of the survey

As part of the pre-survey preparation, the Environment Agency, the Food Standards Agency and the Office for Nuclear Regulation were contacted to identify any additional site-specific requirements. Information relating to the activities of people in the aquatic and terrestrial survey areas was obtained from Internet searches, Ordnance Survey maps and from previous habits surveys undertaken around the Devonport nuclear site. People with local knowledge of the survey area were contacted for information relevant to the various exposure pathways. These included Devon and Severn Inshore Fisheries and Conservation Authority (IFCA) fisheries officers who provided information on fishing permits and restrictions, a representative of the local beekeeping association who provided information about beekeeping, and Plymouth City Council who provided information on allotment sites.

A proposed programme for fieldwork was distributed to the Environment Agency, the Food Standards Agency, and the Office for Nuclear Regulation before the fieldwork commenced, for their comment.

The fieldwork was carried out from the 15th – 25th August 2017 according to techniques described by Leonard *et al.* (1982). During the fieldwork a meeting was held between members of the survey team and representatives from the Devonport Royal Dockyard and HMNB Devonport. This discussion provided details about current site activities, local information, potential exposure pathways and activities in the area, and the potential for transfer of contamination off-site by wildlife.

The following information was obtained during the meeting:

- At the time of the habits survey fieldwork, in addition to routine operations on the Devonport site, docks were being upgraded as part of a construction project.
- Part of the South Yard area of the Devonport Royal Dockyard had been sold to a private company.
- Some of the land in the South Yard area has been allocated as part of the Plymouth and South West Peninsula City Deal, to provide a location for a new commercial development for the marine industry and scientific research. The plans are for office and industrial space, docks and jetties.
- Other companies are currently based on the Devonport site but they are outside the nuclear licenced boundary.
- Wildlife could not enter controlled areas on the Devonport site. Wildlife populations are controlled by using a falconer with a bird of prey to deter seagulls, pigeons and other birds. Rodent traps are also used around site for vermin control.
- There is an aquatic exclusion zone of 50 meters around the Devonport site to keep civilian boat users away from the area.
- Information about potential exposure pathways and activities in the area included: a new waste incinerator which has been built near Camel's Head to the north of the site. Popular activities include sea angling in Plymouth Sound, sailing in the Tamar Estuary, angling at a small beach

to the south of the site, swimming at an outdoor tidal pool at Firestone Bay on the north shore of Plymouth Sound, and sub-aqua diving from the shore at Eastern Kings and Firestone Bay.

Interviews were conducted with individuals who were identified in the pre-survey preparation and others that were identified during the fieldwork. These included, for example, commercial fishermen, anglers, people spending time on intertidal substrates, farmers, allotment holders, beekeepers and people spending time within the direct radiation survey area. Interviews were used to establish individuals' consumption, occupancy and handling rates relevant to the aquatic, terrestrial and direct radiation survey areas. Any other information of possible use to the survey was also obtained. Gamma dose rate measurements were taken over intertidal substrates in the aquatic area, and indoors and outdoors at most properties in the direct radiation survey area where interviews were conducted. Background gamma dose rates were taken at a distance beyond 5 km from the site centre. All gamma dose rate measurements were taken using a Mini 600 Series Type 6-81 Environmental Radiation Meter with a compensated Geiger-Müller tube.

For practical and resource reasons, the survey did not involve the whole population in the vicinity of the Devonport site, but targeted subsets or groups, chosen in order to identify those individuals potentially most exposed to radiation pathways. However, it is possible that even within a subset or group there may have been people not interviewed during the survey. Therefore, to aid interpretation, the number of people for whom data were obtained in each group as a percentage of the estimated complete coverage for that group (where it was possible to make such an estimate) has been calculated. The results are summarised in Table 1. These 'groups' are described and quantified, and the numbers of people for whom data were obtained are given as percentages of the totals. For certain groups, such as anglers, it can be virtually impossible to calculate the total number of people who undertake the activity in the survey area because it is difficult to quantify visitors from outside the area or occasional visitors during the year. Based on UK Office of National Statistics residential data for electoral wards (www.ons.gov.uk) there were approximately 166,000 people living in the terrestrial survey area, although information was obtained for a significantly smaller number than this. The survey did not include employees or contractors at the nuclear licensed sites while they were at work. This is because dose criteria applicable to these people whilst at work and the dose assessment methods are different from those for members of the public. However, data were collected for employees and contractors while outside work if these people were encountered during the survey.

People were initially questioned about their habits relating to the survey area that their first identified activity occurred in and, where possible, they were also asked about their habits relating to the other two survey areas. For example, people in the terrestrial survey were initially questioned because it was known that they grew or produced significant quantities of terrestrial foodstuffs. However, they were also asked about habits that might lead to exposure to liquid discharges or direct radiation. During interviews with representatives from organisations such as local businesses it was not possible to collect data for all pathways (for example consumption of local foods) for each person. In these cases,

the data were limited to those relating to the primary reason for the interview, for example, in the case of a business within the direct radiation survey area, the occupancy rates for the employees.

3 METHODS FOR DATA ANALYSIS

3.1 Data recording and presentation

Data collected during the fieldwork were recorded in logbooks. On return to the laboratory, the data were examined and any notably high rates were double-checked, where possible, by way of a follow-up phone call. In cases where follow-up phone calls were not possible (e.g. interviewees who wished to remain anonymous), the data were accepted at face value. The raw data were entered into a data capture application and then uploaded to a habits survey database where each individual for whom information was obtained was given a unique identifier (the Person ID number) to assist in maintaining data quality and traceability.

Where generalised data for groups of people were collected, such as occupancy rates in the direct radiation survey area for employees at businesses, only a limited number of representative individuals were included in the data entered into the database.

The results of the individuals' consumption, occupancy and handling rates collected during the survey were grouped and presented in tables with the high-rate group members indicated in bold and with the calculated mean rates for the high-rate group and 97.5th percentile rates. The consumption rates, occupancy rates and handling rates for all groups are presented in Annex 1 for adults and Annex 2 for children and infants, with the high-rate group members indicated in bold.

Where quantifiable data cannot be obtained from interviews, but pathways are believed to exist, it is sometimes necessary to provide estimated habits data for use in dose assessments. These data are presented in Annex 3.

3.2 Data conversion

During the interviews, people could not always provide consumption rates in kilograms per year for food or litres per year for milk. In these circumstances, interviewees were asked to provide the information in a different format. For example, some estimated the size and number of items (e.g. eggs) consumed per year, whereas others gave the number of plants in a crop or the length and number of rows in which the crop was grown per year. The habits survey database converted these data into consumption rates (kg y^{-1} for food and l y^{-1} for milk) using a variety of conversion factors. These factors included produce weights (Hessayon, 1990 and 1997 and Good Housekeeping, 1994), edible fraction data researched by Cefas, and information supplied by the Meat and Livestock Commission.

3.3 Rounding and grouping of data

The consumption and occupancy data in the text of this report are rounded to two significant figures, except for values less than 1.0, which are rounded to one decimal place. This method of presentation reflects the authors' judgement on the accuracy of the methods used. In the tables and annexes, the consumption rate data are presented to one decimal place. Occasionally, this rounding process causes the computed values (row totals, mean rates and 97.5th percentiles), which are based on un-rounded data, to appear slightly erroneous. Consumption rates less than 0.05 kg y⁻¹ are presented to two decimal places in order to avoid the value of 0.0 kg y⁻¹. External exposure data are quoted as integer numbers of hours per year.

For the purpose of data analysis, foodstuffs were aggregated into food groups as identified in Table 2. Specific food types relevant to this survey are presented in the subsequent tables. The data are structured into groups when it is reasonable to assume that consistent concentrations or dose rates would apply within the group. For example, when considering terrestrial food consumption, all types of root vegetables are grouped together in a food group called 'root vegetables'. Similarly, for aquatic food consumption, all crustacean species are grouped as 'crustaceans'. For external exposure over intertidal sediments, occupancies over the same substrate (e.g. sand) are grouped together.

Data were structured into age groups because different dose coefficients (i.e. the factors which convert intakes of radioactivity into dose) can apply to different ages. The International Commission on Radiological Protection (ICRP) revised its recommendations for the age groupings to be used in radiological assessments and these recommendations were adopted in the 2010 habits survey reports and thereafter. Consequently, the age ranges used in the habits survey reports prior to 2010 differ from those used currently. The age ranges used in this report and the names used for the age groups, based on the recommendations in ICRP 101 (ICRP, 2007), are shown in Table A below, together with those used in reports prior to 2010, for comparison.

Table A. Names of age groups and range of ages within each age group			
Age ranges used from 2010 onwards		Age ranges used prior to 2010	
Name of age group^a	Age range in group	Name of age group	Age range in group
Infant	0 to 5-year-old	3-month-old	Under 1-year-old
		1-year-old	1-year-old
		5-year-old	2-year-old to 6-year-old
Child	6-year-old to 15-year-old	10-year-old	7-year-old to 11-year-old
		15-year-old	12-year-old to 16-year-old
Adult	16-year-old and over	Adult	17-year-old and over

^a In the 2010 reports only, the infant age group was called the 1-year-old age group and the child age group was called the 10-year-old age group.

Since there are fewer age groups for children in the current regime, there should, in general, be more observations in each group, resulting in greater robustness in the data. However, data since 2010 will

not be directly comparable with data prior to 2010, since the age ranges in the age groups will be different.

For direct radiation pathways, the data were grouped into distance zones from the nuclear site boundary as a coarse indication of the potential dose rate distribution due to this source of exposure. The bands used in this report were: 0 - 0.25 km; >0.25 - 0.5 km; >0.5 - 1.0 km. These distance bands are also useful when assessing exposure to gaseous discharges.

3.4 Approaches for the identification of high rates

The habits data have been analysed to identify high rates of consumption, occupancy and handling, which are suitable for use in radiological assessments. Two approaches have been used:

Firstly, the 'cut-off' method described by Hunt *et al.* (1982) was used. 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. In this report, the term 'high-rate group' is used to represent the individuals derived by the 'cut-off' method. The mean of the high-rate group was calculated for each food group, intertidal substrate and handling pathway identified in the survey. In certain cases, using the 'cut-off' method resulted in only one person being in the high-rate group. In these cases, expert judgement was used to decide whether the high-rate group should remain as one individual or whether others should be included. If others were included, the second highest rate was divided by three and all observations above this secondary 'cut-off' were included in the high-rate group.

Secondly, the 97.5th percentile rate was calculated for each group. The use of percentiles accords with precedents used in risk assessments of the safety of food consumption. It should be noted that the interviewees in this study are often selected and, therefore, the calculated percentiles are not based on random data.

Mean and 97.5th percentile consumption rates for adults, based on national statistics, are provided as a baseline for comparison with the observed rates. The rates based on national statistics are referred to as generic rates in this report and have been taken from Byrom *et al.*, 1995.

The mean rates for the high-rate groups for children and infants for consumption, intertidal occupancy and handling pathways, have been calculated. However, in cases where few child or infant observations were identified, an alternative approach that may be used for assessments is to estimate the mean rates for the high-rate groups for children and infants by applying scaling ratios to the mean rates for the high-rate groups for adults. Ratios for this purpose for the consumption and intertidal occupancy pathways, based on generic 97.5th percentile rates, are provided in Annex 4. The age ranges within the age groups in Annex 4 do not correspond exactly with the age ranges within the age

groups used throughout the rest of this report, but these ratios are the best available data for estimating child rates and infant rates from adult rates. Adult to child and adult to infant ratios are not available for handling pathways.

For use in assessments of foetal dose, consumption and occupancy rates are provided in Annex 5 for women of childbearing age. The age range used in this report for women of childbearing age is 15 – 44 years old, which is based on the classification used by the Office of National Statistics (www.ons.gov.uk).

For the direct radiation pathway, mean occupancy rates and 97.5th percentile rates have not been calculated. Such an analysis is of limited value without a detailed knowledge of the spatial extent of dose rates due to direct radiation.

3.5 Profiles of habits survey data for use in total dose assessments

The survey data have been analysed to produce profiles of consumption and occupancy rates according to the method described by Camplin *et. al.*, 2005. The profiles for adults are used to assess total dose integrated across all pathways of exposure in the RIFE reports (e.g. EA, FSA, FSS, NRW, NIEA, and SEPA, 2017).

Matrices of profiles for adults, children, infants and women of childbearing age are presented in Annexes 6 to 9 respectively. Within each matrix the means for the high-rate groups, as determined by the 'cut-off' method, are presented on the diagonal. Except for the direct radiation pathway the figures across the rows are the means of the consumption and occupancy rates for the other pathways for the individuals within that profile. For the direct radiation pathway the figure denotes the proportion of the individuals within that profile who spend time within the direct radiation survey area.

3.6 Data quality

To ensure the quality of the data collected during the survey fieldwork and presented in the report, the following procedures have been employed:

- Experienced scientific staff were used for the fieldwork and data analysis. They had been trained in the techniques of interviewing and obtaining data for all pathways that were relevant to the survey being conducted. Where individuals offered information during interview that was considered unusual, they were questioned further in order to double-check the validity of their claims.
- Where possible, interviewees were contacted again to confirm the results of the initial interview if, when final consumption or occupancy rates were calculated, observations were found to be high in relation to our experience of other surveys. Local factors were taken into account in these cases.

- Data were processed in a purpose-built habits survey database using a consistent set of conversion factors.
- Data were stored in a database in order to minimise transcription and other errors.
- Draft reports were reviewed by the Environment Agency, the Food Standards Agency and the Office for Nuclear Regulation.
- Final reports were only issued when the Environment Agency, the Food Standards Agency and the Office for Nuclear Regulation were entirely satisfied with the format and content of the draft report.

4 AQUATIC RADIATION PATHWAYS

4.1 Aquatic survey area

The aquatic survey area (shown in Figure 1, page 22) covered all tidal waters and intertidal areas north of a line extending from Cawsand to the western end of the Plymouth Breakwater, along the breakwater and from the eastern end of the breakwater to Staddon Point. The survey area included Plymouth Sound, the Hamoaze and the tidal stretches of the rivers Lynher, Plym, Tamar and Tavy.

Plymouth Sound is a deep inlet of the English Channel, which is approximately 5 km across at the widest point. The River Plym enters into Plymouth Sound from the north-east through a narrow estuary, and the rivers Tavy, Tamar and Lynher enter into the Hamoaze, which flows into Plymouth Sound from the north-west. The shore around Plymouth Sound is predominantly rocky and the shore of the Hamoaze and the tidal reaches of the rivers are predominantly mud and sand or mud with areas of stones or salt marsh. Numerous yachts and pleasure boats were moored at many marinas, harbours and quays throughout the survey area. A large number of recreational water activities and associated clubs were identified in the survey area. However, there were restrictions on recreational activities in designated areas in Plymouth Sound and the Hamoaze as well as restrictions on fishing activities in many places throughout the survey area. The main locations where people were identified undertaking activities in the aquatic survey area are described below, ordered from the south-western limit of the survey area to the south-eastern limit.

Cawsand, Kingsand, Cremyll, Millbrook Lake and St John's Lake

The village of Cawsand marks the south-western extent of the aquatic survey area. Cawsand and the adjacent twin village of Kingsand have sand and stone beaches separated by rocks. Both villages were popular locations for swimming and watersports, such as kayaking and paddle boarding. A passenger ferry operated all year round between Cawsand beach (see Figure 3, page 33) and the northern shore of Plymouth Sound. The rocky shore around the villages was popular with people rock pooling and foraging, and the collection of winkles, common prawns, sea lettuce and *Porphyra umbilicalis* for consumption was identified. North-east of Kingsand towards Picklecombe Point, people were walking along the rocky shore to access small beaches where families were playing, sitting on the beach and swimming.

The village of Cremyll is a popular tourist destination for people visiting the nearby country park. The upper shore at Cremyll is sand and stones and the lower shore is mud, sand, stones and seaweed. There is a grass bank where anglers fished at high tide in 2011, but in 2017 a fence had been erected preventing access to this area. A passenger ferry operated all year round between Cremyll and

Stonehouse, which is located on the northern shore of Plymouth Sound. To the west of Cremyll, bait digging took place and common prawns were collected using a push net.



Figure 3. Cawsand

Further west of Cremyll there are two areas of shallow water called Millbrook Lake and St John's Lake where large areas of mud and sand are exposed at low at tide. Two marinas are located on the northern shore of Millbrook Lake. Many sail boats and small angling boats were moored around the shore. The activities identified taking place on the shore of Millbrook Lake were fixing moorings and angling. There was limited access to the shore around St John's Lake and no activities were identified.

Torpoint, the River Lynher and Saltash Waterside

The town of Torpoint is located on a peninsula, with St John's Lake to the south and the Hamoaze to the east. The southern shore at Torpoint has a strip of sand and stones on the upper shore, mud, sand and stones on the mid shore, and soft mud and stones with large quantities of seaweed on the lower shore (see Figure 4, page 34). This was a popular location for bait diggers, anglers and dog walkers to visit. There were two marinas at Torpoint, and a sailing club with a wind surfing and rowing section was based in one of the marinas. A small quantity of mussels were collected in this area by one individual. Many sailboats and angling boats were moored on the eastern shore of Torpoint. A car and passenger ferry operated daily from the eastern shore of Torpoint across to Devonport on the opposite side of the Hamoaze.



Figure 4. Torpoint with Devonport in the background

The mouth of the River Lynher is located to the north of Torpoint. Access to the mud, sand and salt marsh shores of the River Lynher was limited as the river is bordered by farmland or woodland. Two small harbours at Antony Passage and Wearde Quay are located near the mouth of the river where boats were moored or small dinghies were pulled up on the shore. Many sail boats were anchored offshore. At high tide the river was used by people who were boat angling and canoeing. Common prawns were collected on the River Lynher using a push net.

To the north of Wearde Quay, the mouth of the River Lynher opens into the River Tamar. On the western shore of the River Tamar is the town of Saltash, which has a waterfront area, Saltash Waterside (see Figure 5, page 35). This comprises a series of stone quays, pontoons, slipways and small sand and stone beaches. The area was popular with boat owners and there were many pleasure boats and angling boats moored on the shore and offshore. Angling was popular from the quays and pontoons and people were undertaking boat maintenance on the shore. A large sailing club was based in this area. Children were observed swimming and jumping off the jetties and families were crabbing from jetties.



Figure 5. Saltash Waterside

The River Tamar and the River Tavy

There was limited access to the mud, sand and salt marsh shore along the tidal sections of the River Tamar and the River Tavy as the surrounding area was predominantly farmland. Access to the shore was possible at villages or hamlets where there were quays and harbours such as at Berre Ferrers, Weir Quay and Calstock. Numerous yachts and pleasure craft were moored in the rivers at these locations. Activities being undertaken on the River Tamar were angling, bait digging, rowing, sailing and pleasure cruising. A nature reserve is located at Warleigh Point where dog walking was identified on the shore. A small amount of cockles were occasionally collected at low tide from the sand banks in the River Tamar by one individual. A wildfowling club had the shooting rights for a small area of shore along the east of the River Tamar and the River Tavy.

Riverside and Devonport

Riverside is located near the Tamar Bridge on the eastern side of the River Tamar. There is a small beach of sand and stones with seaweed covered mud and stones on the lower shore. Angling and boat maintenance were identified on the shore and boat angling and jet skiing were popular activities in the river. There were two slipways, a large sailing club and canoeing club, and a dinghy park. Many yachts, angling boats and pleasure boats were anchored offshore (see Figure 6, page 36).

There was limited access to the eastern shore of the Hamoaze to the south of Riverside since the land bordering the shore was occupied by the MOD. The Devonport dockyard facilities occupied approximately 4 km of this shoreline and there was a 50 metre exclusion zone around the site. There is access to the shore via two public roads that cut through the southern area of the dockyard, one of which led to the terminal of the car and passenger ferry which operated from Devonport across to Torpoint.



Figure 6. Riverside

Mutton Cove, Mount Wise, Devil's Point, Firestone Bay and The Hoe

East of the Devonport site, the northern shore of Plymouth Sound between Mutton Cove and the mouth of the River Plym, comprised many marinas, pontoons, boatyards, harbours, docks, piers and wharfs. There were many charter boats offering fishing trips and an array of cruises around Plymouth Sound and the Tamar Estuary. The shore was mainly rocky, with steep rocky headlands and small areas of sand and stones. At several locations, steps were cut out of the rock to allow access to the water and there were tidal sea water swimming pools at Firestone Bay and The Hoe. The following activities were identified (listed by location from west to east): boat maintenance at Mutton Cove; collecting mussels at Mount Wise; angling at Devil's Point; angling, swimming and paddling at Firestone Bay; angling, diving, playing and swimming at West Hoe; jet skiing at The Hoe.

The River Plym

A busy road ran parallel with the northern shore of the River Plym. Access to the River Plym was possible from north of Laira Bridge. The southern shore was accessible via a nature trail. The mud, sand and stone shore of the River Plym (see Figure 7, below) was a popular area for bait diggers at low tide and many watersports including rowing, paddleboarding and sailing were identified taking place in the river at high tide.



Figure 7. River Plym

Mount Batten Point and Jennycliff Bay

Mount Batten Point is a rocky peninsula located on the southern shore at the mouth of the River Plym. A large marina, a dive centre and a watersports centre offering activities such as canoeing, kayaking and power boating were located in this area. The man-made Mount Batten Breakwater extends over 200 m from the western side of the peninsula into Plymouth Sound (see Figure 8, page 38) and this was a popular location for anglers.

Between Mount Batten Point and the south-eastern limit of the survey area at Staddon Point, the shore has steep rocks and can only be accessed at Jennycliff Bay.



Figure 8. Mount Batten Breakwater

The sand and stone beach at Jennycliff Bay (see Figure 9, below) is accessed by steep steps from the clifftop. The activities identified at Jennycliff Bay were sunbathing, sitting on the beach, walking, dog walking and angling.



Figure 9. Jennycliff Bay

4.2 Commercial fisheries

A number of fishing restrictions apply to the aquatic survey area since the rivers are important nursery and conservation areas for commercially valuable fish species. The Hamoaze and Plymouth Sound also have a large amount of heavy shipping activity, naval activities and recreational activities. Various regulations enforced by organisations such as the Environment Agency, the Inshore Fisheries and Conservation Authority (IFCA) and the Port Authority overlap in the aquatic survey area and restrict commercial fisheries.

The following fishing restrictions were identified:

- No trawling was permitted north of the Plymouth Breakwater, including all estuaries.
- No 'fixed engines' (i.e. static fish traps) were permitted in the River Plym or in the River Tamar and its subsidiary estuaries from a line drawn from Devil's Point to Wilderness Point.
- Commercial salmon fishing was restricted to 23 fish landed per license per year on the River Tamar and six fish landed per license per year on the River Tavy. No licenses had been issued for the River Lynher.
- A designated bass nursery area covered the Tamar and its subsidiary estuaries and the River Plym to the north of a line from Mount Batten to Wilderness Point. Fishing for bass from a vessel was prohibited in these areas. However, bass fishing, of fish over 42 cm, from the shore was permitted in these areas.
- The Dockyard Port of Plymouth Order prohibited commercial and non-commercial fishing in designated areas in Plymouth Sound. This included the area to the north of a line from Mount Batten to Picklecombe Point, the main shipping channels and an area to the north of Plymouth Breakwater.
- Netting for eels was permitted in the rivers on application for a licence from the Environment Agency. No licences were issued in 2017.
- New permit byelaws were introduced by the Devon IFCA in 2015 for potting and diving for shellfish. Cornwall IFCA also introduced permit byelaws for lobster, crawfish and crab fishing in 2016.
- Sea fishing using sand-eels as bait, by any fishing boat, is prohibited all year.

Despite the restrictions, commercial fishing was identified within the aquatic survey area. This included potting for crabs and lobsters and netting for sardines, herring, bass, pollack, red mullet, thornback ray, turbot, plaice, sole and mackerel. Sutton Harbour in Plymouth is a large fishing port with a fish market and ice plant. Many large vessels are based in the harbour but they operated exclusively outside the survey area.

Devon and Severn IFCA were managing a short-term fishery, which included selling live wrasse to be used as biological control against fish lice and parasites on farmed salmon in Scotland. There were four small (<8 metres) inshore boats involved in the fishery within the aquatic survey area. The wrasse

were caught live in pots and there was a closed season for live wrasse potting between 1st April and 31st July 2017 (www.devonandsevernifca.gov.uk).

At the time of the last habits survey in 2011, there was one classified shellfish bed in the survey area where the commercial collection of mussels by hand was permitted. In 2017, this fishery was reported to have closed.

4.3 Destination of seafood originating from the aquatic survey area

Crab and lobster were being sold to a seafood processor in Cornwall. Fish including sardines, herring, bass, pollack, red mullet, thornback ray, turbot, plaice, sole and mackerel as well as crab and lobster were sold at a fish merchant at Sutton Harbour.

Live wrasse were sold to Scottish salmon farms. However, this was for biological control and not for human consumption.

4.4 Hobby fishing and angling and non-commercial shellfish collection

In this report, the term 'hobby fishing' is used to describe recreational fishing on a small scale with gear such as nets or pots. It is usually carried out by fishermen who do not have commercial fishing licences and therefore it is illegal to offer the catch for sale. Very little hobby fishing was identified in the survey area with only a few individuals catching common prawns using dip nets and push nets. Boat angling was very popular throughout the survey area with numerous angling boats based at harbours, marinas and moorings. Shore angling was also popular at many locations including Cawsand, Cremyll, Torpoint, Saltash Waterside, Devil's Point, Firestone Bay, West Hoe and the Mount Batten Breakwater.

Small quantities of shellfish were collected non-commercially from the survey area for consumption. One boat angler was identified collecting mussels from the Lynher twice per year for their own consumption. Cockles were collected occasionally from the sand banks in the River Tamar, winkles were collected from the shore near Cawsand and queen scallops were collected while someone was diving at West Hoe.

4.5 Local sewage treatment works

Activities at the local sewage treatment works were investigated because liquid waste from the Devonport site is discharged via the sewer pipes to this sewage treatment works where it undergoes treatment. Tankers were not used to transport liquid wastes from the Devonport site to the sewage treatment works.

Since the 2011 habits survey, the sewage treatment works has had significant works to replace the primary settlement tanks with new primary filtration technology and upgrade the sludge treatment process. Following the sewage treatment process, the liquid component is discharged via pipes into the Hamoaze and the dried sludge is transported by truck to holding barns. The dried sludge is used as a fertiliser on arable land. However, no farms in the terrestrial survey area were identified that used the dried sewage sludge on their land.

Employees at the sewage treatment works spent time in close proximity (<10 metres) to the liquid sewage sludge and dried sewage sludge during procedures such as debris removal, cleaning filters, unblocking pipes, sampling, and operating machinery. Occupancy rates for these employees are presented in Section 4.12. Activities taking place in the sewer between the Devonport site and the sewage treatment works were not considered as they were not undertaken by employees at the sewage treatment works.

4.6 Wildfowling

A small amount of wildfowling was identified in the aquatic survey area. One wildfowling club had the rights to shoot on the eastern shore of the rivers Tamar and Tavy. The club had 10 members who regularly went shooting on the foreshore between the low tide and high tide mark. The wildfowling season is from 1st September to 20th February. The species being shot included mallard, wigeon and teal.

4.7 Other pathways

One person was identified collecting and consuming large quantities of sea lettuce and *Porphyra umbilicalis* from the shore near Cawsand. One person collected sea spinach at Kinterbury Point (near Riverside) and sea lettuce from Saltash for consumption. Seaweed (bladder wrack) was collected from Riverside to use as a soil fertiliser on a vegetable garden and an allotment plot.

4.8 Food consumption data

Consumption data for aquatic foods are presented in Tables 3 to 7 for adults and in Table 8 for children and infants. The mean consumption rates for the high-rate groups and the observed 97.5th percentile rates, calculated as described in Section 3.4, are given at the foot of each table.

Adults' consumption rates of vegetables and fruit that were grown on land that had been fertilised with seaweed collected from the shore in the aquatic survey area are presented in Table 9, for use in studies of the potential dose arising from the possible transfer of radionuclides from sea to land.

Adults' consumption rates

The people consuming the greatest quantities of food from the aquatic survey area were commercial fishermen, anglers and the families and friends of these groups of people.

Table B (below) presents a summary of the adults' consumption rates for the following food groups: fish; crustaceans; molluscs; wildfowl; marine plants/algae. The table includes the mean consumption rates for the high-rate groups and the observed 97.5th percentile rates. For comparison, the table also includes mean consumption rates and 97.5th percentile consumption rates for fish, crustaceans and molluscs based on national data, which are referred to as 'generic' data in this report. No generic consumption rates are available for wildfowl or marine plants/algae.

Table B. Summary of adults' consumption rates of foods from the aquatic survey area

Food group	Number of observations	Number of high-rate consumers	Observed maximum for the high-rate group (kg y ⁻¹)	Observed minimum for the high-rate group (kg y ⁻¹)	Observed mean for the high-rate group (kg y ⁻¹)	Observed 97.5th percentile (kg y ⁻¹)	Generic mean* (kg y ⁻¹)	Generic 97.5th percentile* (kg y ⁻¹)
Fish	54	12	65.8	22.5	38.0	49.4	15.0	40.0
Crustaceans	23	12	5.2	1.8	3.4	5.2	3.5	10.0
Molluscs	6	5	1.6	0.7	1.2	1.5	3.5	10.0
Wildfowl	4	2	1.1	1.1	1.1	1.1	Not determined	Not determined
Marine plants/algae	4	1	7.3	7.3	7.3	6.9	Not determined	Not determined

(*Generic rates based on data from Byrom *et al.*, 1995.)

The predominant species of fish consumed by adults were mackerel, pollack, bass and cod with smaller quantities of bream, conger eel, flounder, grey mullet, herring, pouting, salmon, sea trout, thornback ray and whiting. The fish were caught throughout the aquatic survey area. Of the fish consumed by the 12 people in the high-rate group, the percentage breakdown of species, rounded to the nearest 5%, was

40% mackerel, 15% pollack, 15% bass, 10% cod, and 20% a mixture of bream, flounder, salmon and sea trout, whiting and grey mullet. No conger eel, herring, pouting or thornback ray were consumed by the members of the high-rate group.

The main species of crustaceans consumed by adults were common prawns, with smaller quantities of brown crab and common lobster. The common prawns were caught using a push net from shallow areas on the River Lynher and using pots at Mount Batten Pier. The common lobster and brown crab were caught using pots near Jennycliff Bay, Cawsand and Mount Batten Point. Of the crustaceans consumed by the 12 people in the high-rate group, the percentage breakdown of species, rounded to the nearest 5%, was 75% common prawn, 15% brown crab and 15% common lobster (this does not total 100% due to rounding).

The main species of mollusc consumed by adults were winkles and queen scallops, with smaller quantities of cockles and mussels. The winkles were collected near Cawsand, the queen scallops were collected whilst diving from West Hoe, the mussels were collected from Mount Batten Point and Cremyll, and the cockles were collected from the River Lynher. Of the molluscs consumed by the five people in the high-rate group, the percentage breakdown of species, rounded to the nearest 5%, was 35% winkle, 30% queen scallop, 20% cockle and 15% mussel.

The only species of wildfowl consumed by adults was mallard. These were shot on farmland located nearby to areas of saltmarsh within the survey area.

The main species of marine plants/algae consumed by adults were *Porphyra umbilicalis* (laverbread) and sea lettuce with smaller quantities of samphire and sea beet. The *Porphyra umbilicalis* and sea lettuce were both collected from the shore near Cawsand, the samphire was collected from the River Plym and the sea beet was collected from Kinterbury Point near Riverside. Of the marine plants/algae consumed by the only person in the high rate group, the percentage breakdown of species, rounded to the nearest 5%, was 50% *Porphyra umbilicalis* and 50% sea lettuce.

Children's and infants' consumption rates

Table C (see page 44) presents a summary of children's consumption rates of fish. No consumption of crustaceans, molluscs, wildfowl or marine plants/algae was identified for the child age group and no consumption of fish, crustaceans, molluscs, wildfowl or marine plants/algae was identified for the infant age group. The table includes the mean consumption rates for the high-rate group and the observed 97.5th percentile rates. No generic rates have been determined for the child or infant age groups.

Table C. Summary of children's consumption rates of foods from the aquatic survey area

Food group	Number of observations	Number of high-rate consumers	Observed maximum for the high-rate group (kg y ⁻¹)	Observed minimum for the high-rate group (kg y ⁻¹)	Observed mean for the high-rate group (kg y ⁻¹)	Observed 97.5 th percentile (kg y ⁻¹)
Child age group (6 – 15 years old)						
Fish	8	3	17.9	13.4	14.9	17.1

The species of fish consumed by the individuals in the child age group were mackerel and pollack.

Consumption of vegetables and domestic fruit grown on land where seaweed has been used as a fertiliser

Consumption rate data for foods grown in soil that had been fertilised with seaweed collected from the shore in the aquatic survey area are presented in Table 9. One person in the adult age group was identified consuming foods from the following food groups that were grown in seaweed fertilised soil: green vegetables, other vegetables, root vegetables and domestic fruit. These data are presented for use in studies of the potential dose arising from the possible transfer onto the land of radionuclides originating from liquid discharges made into the sea. However, these foods were grown in the terrestrial survey area and the primary reason for investigating them was to gain information about foods potentially subject to gaseous discharges. Therefore, they are also included in the terrestrial food tables presented later in this report, and, in order to avoid double accounting in assessments of total dose, are entered only once in the Annexes, where they are classified as terrestrial foods.

4.9 Intertidal occupancy

Intertidal occupancy rates for adults are presented in Table 10 and intertidal occupancy rates for children and infants are presented in Table 11. It should be noted that there are often more than one substrate at one named location and that substrates at a given location are liable to change over time. Activities were assigned to the predominant substrate over which they were taking place.

Adults' intertidal occupancy rates

Table D (see page 45) presents a summary of the adults' intertidal occupancy rates in the aquatic survey area. The table includes the mean occupancy rates for the high-rate groups and the observed 97.5th percentile rates.

Table D. Summary of adults' intertidal occupancy rates

Intertidal substrate	Number of observations	Number of people in the high-rate group	Maximum of the high-rate group (h y⁻¹)	Mean of the high-rate group (h y⁻¹)	97.5th percentile (h y⁻¹)
Mud	3	2	104	100	104
Mud and sand	4	2	252	174	240
Mud and stones	26	3	939	582	626
Mud, sand and stones	3	2	20	20	20
Rock	19	2	102	102	102
Salt marsh	4	4	35	35	35
Sand	7	1	109	109	94
Sand and stones	36	3	1680	977	757
Stones	9	4	78	46	73
Boat on mud	3	2	209	157	204

Notes

The estimated occupancy rate for living on board a boat while it is resting on mud is 4100 h y⁻¹. See Annex 3.

The activities undertaken by people in the adult high-rate groups for occupancy over each of the intertidal substrates were:

- For mud: bait digging at Cremyll; angling at St John's Lake.
- For mud and sand: fixing moorings and angling at Millbrook.
- For mud and stones: angling at Torpoint, River Lynher and River Tavy; bait digging at Riverside.
- For mud, sand and stones: dog walking at Torpoint.
- For rock: walking at Kingsand.
- For salt marsh: fixing fencing at St John's Lake.
- For sand: sunbathing at Jennycliff Bay.
- For sand and stones: working on the shore at Cawsand; dog walking and sitting on the beach at Mount Batten Point; angling at Cremyll and Cawsand.
- For stones: playing on the beach at Firestone Bay; dog walking at Warleigh Point.
- For boat on mud: boat maintenance at Riverside and Mutton Cove.

It was reported that people were living on boats in the aquatic survey area. However, the survey team could not obtain quantitative data. An estimated annual occupancy rate for people living on board a boat while it is resting on mud, based on occupancy rates obtained during the habits survey in the Devonport area in 2004, is presented in Annex 3 for use in dose assessments.

Children's and infants' intertidal occupancy rates

Table E (below) presents a summary of the children's and infants' intertidal occupancy rates in the aquatic survey area. The table includes the mean occupancy rates for the high-rate groups and the observed 97.5th percentile rates.

Table E. Summary of children's and infants' intertidal occupancy rates					
Intertidal substrate	Number of observations	Number of people in the high-rate group	Maximum of the high-rate group (h y⁻¹)	Mean of the high-rate group (h y⁻¹)	97.5th percentile (h y⁻¹)
Child age group (6 – 15 years old)					
Mud and stones	1	1	78	78	Not applicable
Rock	2	2	102	102	102
Sand and stones	4	3	102	86	102
Stones	3	3	26	17	26
Infant age group (0 – 5 years old)					
Mud, sand and stones	1	1	20	20	Not applicable
Sand and stones	6	3	52	32	49
Stones	1	1	26	26	Not applicable

The activities undertaken by individuals in the child age group high-rate groups for occupancy over each of the intertidal substrates were:

- For mud and stones: bait digging at Torpoint.
- For rock: walking at Kingsand.
- For sand and stones: sitting on the beach at Kingsand; playing at Mount Batten Point.
- For stones: playing at Firestone Bay.

The activities undertaken by individuals in the infant age group high-rate groups for occupancy over each of the intertidal substrates were:

- For mud, sand and stones: dog walking at Torpoint.
- For sand and stones: dog walking and walking at Jennycliff Bay; playing at Mount Batten Point.

4.10 Gamma dose rate measurements

Gamma dose rate measurements were taken over four intertidal substrates. All measurements were taken at a height of 1 metre above the substrate. The results are presented in Table 12 and are summarised in Table F (see page 47).

Table F. Summary of gamma dose rate measurements taken over intertidal substrates			
Substrate	Number of measurements taken	Minimum gamma dose rate at 1 metre^a ($\mu\text{Gy h}^{-1}$)	Maximum gamma dose rate at 1 metre^a ($\mu\text{Gy h}^{-1}$)
Mud, sand and stones	1	0.082 (one measurement only)	
Mud and stones	2	0.085	0.093
Sand and stones	4	0.066	0.093
Stones	2	0.054	0.084

Notes

^aThese measurements have not been adjusted for background dose rates.

For comparison, natural background levels have been estimated at 0.05 $\mu\text{Gy h}^{-1}$ over sand, 0.07 $\mu\text{Gy h}^{-1}$ over mud and over salt marsh, and 0.06 $\mu\text{Gy h}^{-1}$ over other substrates (EA, FSA, FSS, NRW, NIEA and SEPA, 2017).

4.11 Handling of fishing gear and sediment

Handling fishing gear that has become entrained with fine sediment particles, or handling sediment while undertaking activities such as bait digging or mollusc collecting, can potentially give rise to skin exposure from beta radiation. Doses to the skin are considered within the dose limitation system (ICRP, 1991).

Fishing gear can also be a source of gamma exposure due to occupancy in the vicinity of the gear. However, this pathway is minor compared with the exposure received during occupancy over intertidal areas and it has therefore been omitted from the report. Handling of angling equipment was not considered to be a significant pathway. Therefore, as in previous surveys, data for this pathway were not collected.

Handling rates of fishing gear and sediment for adults are presented in Table 13 and children's handling rates for sediment are presented in Table 14. No children were identified handling fishing gear and no infants were identified handling sediment or fishing gear.

Adults' handling rates of fishing gear and sediment

Table G (see page 48) presents a summary of the handling rates of fishing gear and sediment for adults. The table includes the mean handling rates for the high-rate groups and the observed 97.5th percentile rates.

Table G. Summary of adults' handling rates of fishing gear and sediment

Handling activity	Number of observations	Number of people in the high-rate group	Maximum of the high-rate group (h y ⁻¹)	Mean of the high-rate group (h y ⁻¹)	97.5 th percentile (h y ⁻¹)
Handling fishing gear	13	2	1492	1492	1492
Handling sediment	26	7	417	263	400

The activities undertaken by people in the adult high-rate groups for handling included:

- For handling fishing gear: handling pots and nets in Plymouth Sound.
- For handling sediment: bait digging at Riverside, River Plym, River Tamar and Torpoint; fixing moorings at Millbrook; collecting peeler crabs for bait at Torpoint.

Children's handling rates of sediment

Table H (below) presents a summary of the handling rates of sediment for children. No children were identified handling fishing gear. The table includes the mean handling rates for the high-rate groups and the observed 97.5th percentile rates.

Table H. Summary of children's handling rates of sediment

Handling activity	Number of observations	Number of people in the high-rate group	Maximum of the high-rate group (h y ⁻¹)	Mean of the high-rate group (h y ⁻¹)	97.5 th percentile (h y ⁻¹)
Child age group (6 – 15 years old)					
Handling sediment	1	1	78	78	Not applicable

The activity undertaken by person in the child high-rate group for handling was bait digging at Torpoint.

4.12 Exposure to liquid sewage sludge and dried sewage sludge

Activities at a local sewage treatment works were investigated because liquid waste from the Devonport site is discharged via the sewer pipes to this sewage treatment works where it undergoes treatment. Table 15 shows the occupancy rates in close proximity (<10 m) to liquid sewage sludge and dried sewage for the employees at the sewage treatment works.

Two employees undertaking the same activities had occupancy rates of 680 h y⁻¹ in close proximity (<10 m) to liquid sewage sludge and 460 h y⁻¹ in close proximity (<10 m) to dried sewage sludge. The duties included debris removal, cleaning filters, unblocking pipes and pumps, sampling, and operating machinery. These employees did not spend time inside the pipes or tanks.

Additional contractors cleaned the tanks several times per year. The time spent cleaning the tanks varied between 1 and 20 hours per time and different people undertook the work. The tanks were also cleaned using hoses twice per year by contractors, which took one person up to 1 hour per time.

4.13 Water based activities

Activities taking place in or on water can lead to ingestion of water and/or inhalation of spray. These pathways are generally considered to be of minor radiological importance in comparison with other exposure pathways such as the ingestion of foods produced in the vicinity of a nuclear site. However, relevant data have been collected for consideration in dose assessments. Mean occupancy rates for the high-rate groups and 97.5th percentile rates have not been calculated.

Activities where there is a high likelihood of the individual's face submerging under water have been classified as activities 'in water', as they are more likely to lead to ingestion of water. All other activities have been classified as activities 'on water'.

Occupancy rates for activities taking place 'in water' and 'on water' in the aquatic survey area are presented in Table 16 for adults and Table 17 for children and infants. Where generic data for groups of people were collected, for example members of sailing clubs, only representative examples have been included in the data presented.

Activities in water

The activities identified taking place in water in the aquatic survey area were jet skiing, windsurfing, surfing, swimming, kayaking, wakeboarding, paddleboarding and sub-aqua diving. Kayaking is classified as an 'in water' activity since it is likely to lead to the ingestion of seawater. Ninety-five observations were recorded for adults, seven observations were recorded for the child age group and two observations were recorded for the infant age group. The highest occupancy rate for an adult was 520 h y⁻¹ for an individual who was sub-aqua diving at West Hoe. The highest occupancy rate for the child age group was 120 h y⁻¹ for a group of children who were swimming at Saltash Waterside.

Activities on water

The activities taking place on water in the aquatic survey area were sailing, working on a boat, commercial fishing (including gill netting, seine netting, long lining and potting), angling, rescue duties, pleasure cruising, rowing, canoeing, push netting and paddling. Two hundred and seventy-two observations were recorded for adults, eight observations were recorded for the child age group and two observations were recorded for the infant age group. The highest occupancy rate for adults was 2400 h y⁻¹ for two individuals working on a boat. The highest occupancy rate for the child age group

was 65 h y^{-1} for two children who were paddling in Firestone Bay. The highest occupancy rate for the infant age group was 52 h y^{-1} for an infant who was paddling at Mount Batten Point.

5 TERRESTRIAL RADIATION PATHWAYS

5.1 Terrestrial survey area

The terrestrial survey area (see Figure 2, page 23) covered the land within 5 km of the site centre (National Grid Reference: SX 445 565).

The terrestrial survey area is densely populated. The various suburbs of Plymouth occupy the land to the north, east and south of the Devonport site and the towns of Saltash and Torpoint occupy the land to the north-west and south-west of the Devonport site, respectively. Areas of agricultural land are situated near the outer limit to the north of the survey area and in the western and southern sections of the survey area. The survey area is bisected from north to south by the River Tamar, the Hamoaze and Plymouth Sound and to the west by the River Lynher.

Seven working farms were identified in the Devonport terrestrial survey area. Of these farms:

- Two produced beef cattle
- Two produced beef cattle and lambs
- One produced beef cattle, lambs and arable crops
- Two produced arable crops

Wheat, oats, barley, potatoes and onions were produced and sold for human consumption. Lucerne, barley, oats, grass, wheat and beans were grown for use as animal feed on the farms where they were produced. Barley was also sold as animal feed for use on other local farms. Oil seed rape was also being grown. Farmers and their families were consuming beef and lamb produced commercially on their own farms.

Six large allotment sites, with a total of approximately 440 individual plots, and many private gardens were located in the survey area. A wide variety of fruit and vegetables were grown on the allotments and in the gardens and one person used small amounts of seaweed as fertiliser on their allotment plot.

Four beekeepers were identified with a total of 70 hives in the survey area. Two hives were located to the north-east of the survey area, four hives were located to the north, three hives were located to the east, one hive was located to the north-west, and 60 hives were located to the south of the survey area. The average production of honey per hive ranged from 5 kg y⁻¹ to 18 kg y⁻¹. The honey was consumed by the beekeepers, their families and friends. Mead and honeycomb toffee produced from the harvested honey was also consumed.

Wild foods that were collected from within the survey area and consumed included blackberries and mushrooms. Pennyworts and pickled pollen were also consumed but in very small quantities.

Several individuals were shooting on farmland within the survey area. One organised shoot was identified where pheasant, partridge, roe deer and fallow deer were shot. Partridge, pheasant, pigeon, rabbit and venison were shot and consumed. Wildfowl including mallard, wigeon and teal were shot on farmland in the terrestrial survey area, and are discussed in the aquatic section of this report.

Human and livestock consumption of spring water and borehole water was identified. The consumption rates of groundwater were not investigated since representative water intake values for assessment purposes are provided in Smith and Jones (2003). Arable crops were irrigated with groundwater or water from a surface reservoir.

The soil classification at farms where interviews were conducted in the terrestrial survey area included loam, shillet (free draining sandy loam) and silty clay loam.

5.2 Destination of food originating from the terrestrial survey area

Beef cattle and lambs were distributed nationally for slaughter or for further rearing by other farmers outside of the survey area. Beef and lamb were sold at national supermarket chains. The following arable crops were sold for human consumption: wheat was sold to a cereal merchant; potatoes, oats and barley and onions were sold to the food industry. Arable crops were sold to grain merchants and local farms for animal feed. Silage from one farm was sold to a dairy farm outside of the survey area. Deer were sold to a game dealer. Honey was sold from the door and at a local shop.

5.3 The potential transfer of contamination off-site by wildlife

The potential transfer of contamination off-site by wildlife was investigated as radionuclides could enter the food chain or contaminate the environment through this pathway. Representatives from the Devonport site reported that wildlife could not enter controlled areas on the Devonport site. Routine pest control was undertaken on site, including the use of rodent traps and the use of a falconer with birds of prey to deter pigeons and seagulls.

5.4 Food consumption data

Consumption data for locally produced foodstuffs potentially affected by deposition of gaseous discharges are presented in Tables 18 to 30 for adults and Tables 31 to 36 for children and infants. The mean consumption rates for the high-rate groups and the observed 97.5th percentile rates, calculated as described in Section 3.4, are given at the foot of each table.

In order to provide information relevant to monitoring and assessments studies, the consumption rate data collected during the survey were analysed to indicate the percentage that each food type contributed to each food group. The data are summarised in Table 37.

Adults' consumption rates

Consumption of locally produced foods was identified in the following 13 food groups: green vegetables; other vegetables; root vegetables; potato; domestic fruit; cattle meat; sheep meat; poultry; wild/free foods; rabbits/hares; honey; wild fungi; venison. No consumption of milk, pig meat or eggs was identified.

Table I (below) presents a summary of the adults' consumption rates for the foods consumed from the terrestrial survey area. The table includes the mean consumption rates for the high-rate groups and the observed 97.5th percentile rates. For comparison, the table also includes mean consumption rates and 97.5th percentile consumption rates based on national data, which are referred to as 'generic' data in this report.

Food group	Number of observations	Number of high-rate consumers	Observed maximum for the high-rate group (kg y ⁻¹)	Observed minimum for the high-rate group (kg y ⁻¹)	Observed mean for the high-rate group (kg y ⁻¹)	Observed 97.5 th percentile (kg y ⁻¹)	Generic mean* (kg y ⁻¹)	Generic 97.5 th percentile* (kg y ⁻¹)
Green vegetables	61	23	36.6	14.7	25.4	36.6	15.0	45.0
Other vegetables	64	18	42.4	16.3	28.2	42.4	20.0	50.0
Root vegetables	49	20	29.5	12.9	20.9	29.3	10.0	40.0
Potato	43	12	100.0	47.3	73.9	100.0	50.0	120.0
Domestic fruit	50	19	21.5	7.4	15.4	21.5	20.0	75.0
Cattle Meat	9	9	23.6	17.0	20.0	23.6	15.0	45.0
Sheep meat	9	7	4.5	2.3	2.9	4.5	8.0	25.0
Poultry	7	1	11.1	11.1	11.1	9.9	10.0	30.0
Wild/free foods	16	14	1.8	0.7	1.1	1.8	7.0	25.0
Rabbits/hares	1	1	5.4	5.4	5.4	Not Applicable	6.0	15.0
Honey	10	5	12.2	4.5	7.1	11.0	2.5	9.5
Wild fungi	2	2	0.7	0.7	0.7	0.7	3.0	10.0
Venison	10	8	18.8	11.8	14.0	18.8	Not determined	Not determined

(*Generic rates based on data from Byrom *et al.*, 1995.)

None of the observed mean consumption rates for the high-rate groups were greater than the generic 97.5th percentile consumption rates. Seven of the mean consumption rates for the high-rate groups

exceeded the generic mean consumption rates. These were for green vegetables, other vegetables, root vegetables, potato, cattle meat, poultry and honey. One of the observed 97.5th percentile consumption rates exceeded the generic 97.5th percentile consumption rates, which was for honey.

Children's and infants' consumption rates

Six individuals in the child age group and two individuals in the infant age group were identified consuming foods from the terrestrial survey area. Table J (below) presents a summary of children's and infants' consumption rates. The table includes the mean consumption rates for the high-rate groups and the observed 97.5th percentile rates. No generic data have been determined for the child or infant age groups. In the child age group, no consumption of foods from the following food groups was identified: milk; cattle meat; pig meat; sheep meat; poultry; eggs; wild/free foods; rabbits/hares; wild fungi; venison. In the infant age group, no consumption of foods from the following food groups was identified: root vegetables; potato; milk; cattle meat; pig meat; sheep meat; poultry; eggs; wild/free foods; rabbits/hares; honey; wild fungi; venison.

Table J. Summary of children's and infants' consumption rates of foods from the terrestrial survey area

Food group	Number of observations	Number of high-rate consumers	Observed maximum for the high-rate group (kg y⁻¹)	Observed minimum for the high-rate group (kg y⁻¹)	Observed mean for the high-rate group (kg y⁻¹)	Observed 97.5th percentile (kg y⁻¹)
Child age group (6 - 15 years old)						
Green vegetables	4	2	8.1	6.1	7.1	8.0
Other vegetables	4	4	6.9	2.7	4.3	6.7
Root vegetables	2	2	14.6	10.9	12.7	14.5
Potato	2	2	19.1	14.3	16.7	19.0
Domestic fruit	4	4	2.0	1.5	1.8	2.0
Honey	2	2	0.9	0.7	0.8	0.9
Infant age group (0 - 5 years old)						
Green vegetables	2	2	0.5	0.5	0.5	0.5
Other vegetables	2	2	2.7	2.7	2.7	2.7
Domestic fruit	2	2	1.8	1.8	1.8	1.8

6 DIRECT RADIATION PATHWAYS

6.1 Direct radiation survey area

The direct radiation survey area (see Figure 2, page 23) covered the land and sea within 1 km of the Devonport nuclear licensed site boundary. The occupancy data collected from the direct radiation survey area is also applicable to inhalation and external exposure pathways arising from gaseous releases from the site.

The Devonport nuclear licensed site occupies only a part of the Devonport dockyard area. Non-licensed areas of the dockyard extend to the north, east and south of the licensed site.

The densely populated residential area of Barne Barton is located to the north of the direct radiation survey area. This area is separated from the Devonport site by Weston Mill Lake; a rectangular body of water that opens into the Hamoaze, which is used to berth naval warships. A sewage treatment works is located immediately to the north-east of the Devonport site, beyond which, the survey area includes small sections of the residential areas of St Budeaux, Weston Mill and North Prospect.

Residential properties, shops, a nursery school, a primary school and a college are situated along the busy main road adjacent to the eastern side of the dockyard. The densely populated residential area of Keyham is located to the east of this road, which includes recreation grounds, a park, allotment sites and a train station. The residential area of Devonport is located beyond the dockyard to the south-east, which includes shops, a park and a train station.

Directly to the south of the Devonport dockyard basins, a road leading to the Torpoint ferry terminal cuts through a non-licensed area of the dockyard, along which there is a small residential area comprising low-rise flats and houses. Further south, a number of private companies operate their businesses within the non-licensed part of the dockyard.

The waters of the Hamoaze cover most of the western part of the direct radiation survey area. The edge of Torpoint and a small section of the MOD depot at Yonderberry Point were located near the outer limit of the survey area, on the western shore of the Hamoaze.

6.2 Residential activities

Due to the densely populated nature of the direct radiation survey area, it was not possible to conduct interviews at all of the houses in the area. Interviews were conducted at 20 residences, eight of which had children or infants. Nine of the properties where interviews were conducted were in the

0 – 0.25 km zone, five properties were in the >0.25 – 0.5 km zone and six properties were in the >0.5 - 1.0 km.

6.3 Leisure and educational activities

A wide range of leisure activities were undertaken in the direct radiation survey area. Many people were walking, jogging and cycling in the area around the site and there were recreation grounds and sports grounds where activities took place. Two popular allotment sites, one with 54 plots and the other with 32 plots, were located to the east of the Dockyard. Angling took place from a public pier near the ferry terminal between the Devonport North and South Yard. The Devonport Naval Heritage Centre, which is located on the non-licensed part of the Devonport site, offers tours around their museum and HMS Courageous, which is a decommissioned submarine. The Hamoaze, to the west of the dockyard, was a busy thoroughfare for recreational and commercial boating traffic between Plymouth Sound and the Tamar Estuary.

City College Plymouth is mostly located in the 0 – 0.25 km zone, with a small part of the campus in the >0.25 – 0.5 km zone. Over 18,500 part-time and full-time students attend the college and over 820 staff are employed. A children's centre attended by children from 2 years old to 5 years old is also located in the 0 – 0.25 km zone. Three primary schools are located in the >0.25 – 0.5 km zone.

6.4 Commercial activities

Shops and businesses were predominantly located to the east and south-east of the survey area in Keyham and Devonport. Many businesses were located on the main road directly adjacent to the eastern side of the dockyard.

Interviews were conducted at eight businesses, two of which were in the 0 – 0.25 km zone, one was in the >0.25 – 0.5 km zone and five were in the >0.5 – 1.0 km zone. The number of employees at these businesses ranged from one to 34. A sewage treatment works was located in the >0.5 – 1.0 km zone. The Torpoint ferry operated between Devonport and Torpoint in the >0.5 – 1.0 km zone to the south-west of the survey area. A new waste incinerator has been constructed in the >0.5 – 1.0 km zone, which produces heat energy and electrical energy from non-recyclable waste.

The activities of Devonport site employees and contractors while at work were not considered in the direct radiation survey, as radiation workers are subject to different radiation protection criteria.

6.5 Occupancy rates

Table 38 presents indoor, outdoor and total occupancy data for adults, children and infants. An analysis of the data by distance zones and occupancy rates is shown in Table 39. A summary of occupancy rates in the direct radiation survey area is presented in Table K (below). Where generic data for groups of people were collected, for example employees of businesses, only representative examples have been included in the data presented.

Table K. Summary of direct radiation occupancy rates				
Zone	Number of observations	Highest indoor occupancy (h y⁻¹)	Highest outdoor occupancy (h y⁻¹)	Highest total occupancy (h y⁻¹)
0 - 0.25 km	69	8760	1685	8760
>0.25 - 0.5 km	38	8696	1875	8760
>0.5 - 1.0 km	67	7561	1782	8656

0 - 0.25 km from the nuclear licensed site boundary

Occupancy data for 69 individuals in the 0 - 0.25 km zone were included in the analysis. The observations were for 31 residents, 22 people working in the area and 16 children attending childcare. The highest indoor occupancy rate and total occupancy rate was for an elderly resident who was housebound. Another elderly resident had the same total occupancy rate. Two different residents had the same highest outdoor occupancy rates.

>0.25 - 0.5 km from the nuclear licensed site boundary

Occupancy data for 38 individuals in the >0.25 - 0.5 km zone were included in the analysis. The observations were for 24 residents, six people who were working in the area and eight people were tending their allotment plots. The highest indoor occupancy rate was for a resident, the highest outdoor occupancy rate was for a different resident and the highest total occupancy rate was for two other residents who went to school in the area.

>0.5 - 1.0 km from the nuclear licensed site boundary

Occupancy data for 67 people in the >0.5 - 1.0 km zone were included in the analysis. The observations were for 13 residents, 52 people who were working in the area and two people working on their allotment plots. The highest indoor occupancy rate was for a resident, another resident had the highest total occupancy rates. Ten people who were working in the area had the highest outdoor occupancy rate.

6.6 Gamma dose rate measurements

Gamma dose rate measurements were taken indoors and outdoors at most properties where interviews were conducted in the Devonport direct radiation survey area. Where possible, outdoor measurements were taken approximately 5 to 10 metres from the nearest building and over grass. However, many of the outdoor measurements at residential properties were taken close to buildings and on concrete because the properties had small courtyard gardens. Gamma dose rate measurements over grass were taken at locations further than 5 km from the site centre to obtain background dose rates. All measurements were taken at a height of 1 metre above the substrate using a Mini 600 Series Type 6-81 Environmental Radiation Meter with a compensated Geiger-Müller tube. The indoor and outdoor measurements have not been adjusted for background dose rates. The results are presented in Table 41 and are summarised in Table L (below).

Table L. Summary of gamma dose rate measurements taken indoors and outdoors at properties in the direct radiation survey area			
Substrate	Number of measurements taken	Minimum gamma dose rate at 1 metre ($\mu\text{Gy h}^{-1}$)	Maximum gamma dose rate at 1 metre ($\mu\text{Gy h}^{-1}$)
Indoor measurements^a			
Wood	13	0.082	0.116
Concrete	6	0.057	0.098
Outdoor measurements^a			
Concrete	20	0.065	0.110
Stones	1	0.102 (one measurement only)	
Background measurements			
Grass	4	0.078	0.097

Notes

^a These measurements have not been adjusted for background dose rates.

Of the 19 measurements taken indoors at properties, 11 were higher than the maximum background reading, and of the 21 measurements taken outdoors at properties, three were higher than the maximum background reading. Since gamma dose rate measurements are influenced by the nature of building materials, the substrate over which they are taken, and many other factors, the measurements taken inside properties are expected to be higher than those taken outdoors.

The gamma dose rate measurements can be compared with readings taken by the RIMNET programme, which continuously monitors radiation levels at a network of 69 sampling stations distributed throughout the UK (www.gov.uk). The nearest RIMNET station to Devonport is at Plymouth Torpoint Ferry, which is approximately 0.6 km away. The ambient (*i.e.* background) gamma dose rates at Plymouth Torpoint Ferry from July to September, which includes the period of the habits survey, ranged from 0.080 $\mu\text{Gy h}^{-1}$ to 0.110 $\mu\text{Gy h}^{-1}$. All the outdoor readings taken during the Devonport habits survey were within, or below, this range. All of the indoor measurements taken were within 5% of the RIMNET range, and well within the margin of error.

7 USES OF HABITS DATA FOR DOSE ASSESSMENTS

7.1 Combined pathways

In determining habits data for the purposes of assessing radiological doses to the public, it may be necessary to consider a combination of pathways. Data are provided in Annex 1 and Annex 2 so that the full effect of combining pathways can be assessed for individual observations, given the concentrations and dose rates for a particular assessment. The rates for individuals in the high-rate groups are emboldened. In some circumstances, it will be possible to make simplifying assumptions and define the consumption and external exposure rates appropriate to a series of potential high-rate groups.

The most extensive combinations of pathways for adult dose assessment are shown in Table 41. Each of the 19 combinations shown in Table 41 represents an actual individual (or individuals) from Annex 1 who has positive data (irrespective of the magnitude), for each pathway marked with a cross. Other individuals from Annex 1 have combinations that are not listed in Table 41 because they have fewer pathways and a dose assessment for them would be adequately covered by one of the 19 listed combinations.

7.2 Foetal dose assessment

Dose assessment of the foetus was introduced routinely for the first time in the Radioactivity in Food and the Environment report for 2005 (EA, EHS, FSA and SEPA, 2006), following the publication of recommendations by the Radiation Protection Division of the Health Protection Agency (National Radiological Protection Board, 2005). The adopted approach is to use the consumption and occupancy data for women of childbearing age in order to calculate the potential dose to the foetus. Therefore, consumption and occupancy data collected during the Devonport habits survey for females of childbearing age are presented in Annex 5. The Office of National Statistics classifies women to be of childbearing age if they are between 15 – 44 years old (www.ons.gov.uk); this age range has been used in Annex 5. It was not possible to collect ages for all female observations during the habits survey. However, these females with unknown ages have been included in Annex 5 as they might be women of childbearing age.

7.3 Total dose assessment

The UK environment agencies and the Food Standards Agency have considered ways of using habits data to estimate total dose retrospectively. The adopted approach is to use the adult consumption and occupancy data collected in each habits survey to create a matrix with a series of habits profiles for each site. The National Dose Assessment Working Group (NDAWG) considered this approach to

assessing retrospective total doses (Camplin *et al*, 2005) and agreed that using habits profiles is an appropriate approach. The method used to estimate total dose integrated across pathways is provided in the RIFE reports (e.g. EA, FSA, FSS, NRW, NIEA and SEPA, 2017).

The relevant matrix for the adults' profiled habits data is shown in Annex 6. Additionally, profiles have been created for the child and infant age groups, and for women of childbearing age. These are shown in Annexes 7, 8, and 9 respectively. Most of the groups used for the pathways in the matrices are exactly analogous to the groups used throughout this habits survey report, although the names used are slightly different, for example 'Fruit – Domestic' rather than 'Domestic fruit'. However, in order to increase the robustness of the total dose assessments, some of the groups that are used throughout the rest of this report have been amalgamated together for use in the matrices. These are indicated in the notes at the foot of each matrix, where applicable. The 'Plume pathways' are related to inhalation and external exposure arising from gaseous discharges and use the total of the individuals' indoor and outdoor occupancy rates for each of the direct radiation zones. The 'Direct' pathway is expressed as the proportion of the profile members who are exposed to direct radiation.

During the survey it was reported that people were living on boats in private marinas in the aquatic survey area. However, the survey team could not obtain quantitative data. In order to account for this pathway in the profiles, an estimated annual rate for occupancy on board a boat that is resting on mud (using occupancy rates for this pathway obtained during the habits survey in the Devonport area in 2004) has been incorporated into the adult profile and the women of childbearing age profile. See Annex 3 for the estimated occupancy rate.

8 COMPARISONS WITH THE PREVIOUS SURVEY

The results from this 2017 survey are compared below with results from the last combined habits survey undertaken at Devonport in 2011. The aquatic, terrestrial and direct radiation survey areas in the 2017 survey were the same as those in the 2011 survey. The comparison of occupancy rates in the direct radiation area is for all age groups combined. All other comparisons are for adults only.

8.1 Aquatic survey area

Activities in the aquatic survey area in 2017 were broadly similar to those in 2011. The main differences were that the commercial mussel fishery identified in 2011 had ceased operating by 2017 and salmon licences had been issued for the River Tamar and River Tavy, whereas in 2011 no salmon licenses were issued due to a net limitation order. Also in 2017, there was a live wrasse fishery but this was used for biological control against fish lice and parasites on farmed salmon and was not for consumption.

The main species of fish consumed by the adult high-rate group in 2017 were mackerel, pollack, bass and cod, and the main species of fish consumed by the adult high-rate group in 2011 were bass, cod, mackerel, pollack, thornback ray and grey mullet. The main species of crustaceans consumed by the adult high-rate group in 2011 and 2017 were brown crab, common prawn and common lobster. The only species of mollusc consumed by the adult high-rate group in 2011 was queen scallops, but in 2017 the main species consumed by the adult high-rate group were winkles, queen scallops, cockles, and mussels. The main species of wildfowl consumed by the adult high-rate group in 2011 was mallard, Canada goose and teal, and the only species of wildfowl consumed by the adult high-rate group in 2017 was mallard. The only species of marine plants/algae consumed by the adult high-rate group in 2011 was samphire, whereas in 2017 the main species were *Porphyra umbilicalis* and sea lettuce.

A comparison between the 2011 and 2017 data for the consumption of aquatic foods is presented in Table M (see page 62).

Table M. Comparison between 2011 and 2017 consumption rates of aquatic food groups for adults						
Food group	2011			2017		
	Number in high-rate group	Maximum consumption rate (kg y⁻¹)	Mean consumption rate for the high-rate group (kg y⁻¹)	Number in high-rate group	Maximum consumption rate (kg y⁻¹)	Mean consumption rate for the high-rate group (kg y⁻¹)
Fish	20	41.3	30.1	12	65.8	38.0
Crustaceans	9	3.9	2.4	12	5.2	3.4
Molluscs	2	0.1	0.1	5	1.6	1.2
Wildfowl	7	2.1	1.5	2	1.1	1.1
Marine plants/algae	1	0.5	0.5	1	7.3	7.3

In 2017, compared with 2011, there was an increase in the mean consumption rate for the adult high-rate group for fish, crustaceans, molluscs and marine plants/algae, and there was a decrease in the mean consumption rate for the adult high-rate group for wildfowl. Most of the changes were relatively small, except for a significant increase in molluscs and marine plants/algae which was due to the identification of one individual who was collecting and consuming winkles and large amounts of sea lettuce and *Porphyra umbilicalis*. No specific reasons for the other changes were identified.

In 2011, intertidal occupancy for adults was recorded over the following seven substrates: mud; mud and sand; mud, sand and stones; rock; salt marsh; sand; sand and stones. In 2017, activities were recorded over similar substrates, with the addition of the following: mud and stones; stones; boat on mud.

The following activities were undertaken by the individuals in the adult high-rate groups for occupancy over intertidal substrates:

- In 2011: bait digging, angling, dog walking, collecting mussels, netting for common prawns, wildfowling and boat maintenance.
- In 2017: bait digging, angling, fixing moorings, dog walking, walking, fixing fencing, sunbathing, working on the shore, sitting on the beach, playing and boat maintenance.

The following activities were undertaken by the individuals in the adult high-rate groups for handling fishing gear:

- In 2011: handling pots.
- In 2017: handling pots and nets.

The following activities were undertaken by the individuals in the adult high-rate groups for handling sediment:

- In 2011: collecting mussels and bait digging.
- In 2017: bait digging, collecting peeler crabs for bait and fixing moorings.

A comparison between the 2011 and 2017 data for adult occupancy over intertidal substrates, handling fishing gear and handling sediment is shown in Table N (below).

Table N. Comparison between 2011 and 2017 intertidal occupancy rates and handling rates of fishing gear and sediment for adults

Intertidal substrate or handling pathway	2011			2017		
	Number in high-rate group	Maximum occupancy or handling rate (h y ⁻¹)	Mean occupancy or handling rate for the high-rate group (h y ⁻¹)	Number in high-rate group	Maximum occupancy or handling rate (h y ⁻¹)	Mean occupancy or handling rate for the high-rate group (h y ⁻¹)
Mud	1	520	520	2	104	100
Mud and sand	2	245	227	2	252	174
Mud and stones	Not identified			3	939	582
Mud, sand and stones	4	548	400	2	20	20
Rock	3	66	52	2	102	102
Salt marsh	3	6	6	4	35	35
Sand	4	52	42	1	109	109
Sand and stones	4	365	246	3	1680	977
Stones	Not identified			4	78	46
Boat on mud	Not identified			2	209	157
Handling fishing gear	1	820	820	2	1492	1492
Handling sediment	5	540	344	7	417	263

In 2017, compared to 2011, the mean intertidal occupancy rate for the adult high-rate group increased significantly over rock, salt marsh, sand, and sand and stones; decreased significantly over mud, and mud, sand and stones; and decreased slightly over mud and sand. Occupancy over mud and stones, stones and boat on mud was identified in 2017 but not in 2011.

The increase in the occupancy rate over rock was due to the identification in 2017 of several walkers and dog walkers at Kingsand. The increase in the occupancy rate over salt marsh was due to people fixing fencing on farmland next to saltmarsh. The increase in the occupancy rate over sand and stones is due to the identification in 2017 of an individual working on the shore in the survey area. Intertidal occupancy rates decreased over mud and increased over mud and stones in 2017 compared with 2011 due to changes in the substrate where bait diggers at Torpoint were digging. In 2017, individuals were observed playing on stones at Firestone Bay and dog walking on stones at Warleigh Point, which was not observed in 2011. In 2017, an individual was undertaking boat maintenance whilst the boat was resting on mud at Mutton Cove, which was not observed in 2011.

In 2011 and in 2017 it was reported that people were living on boats in the aquatic survey area. However, in both years it was not possible to collect quantitative data. An estimated annual occupancy rate for people living on board a houseboat while it is resting on mud is presented in Annex 3 for use in dose assessments.

The mean rates for the adult high-rate groups for handling fishing gear increased significantly in 2017 compared to 2011 and handling sediment decreased slightly in 2017 compared to 2011. The increase in the handling rate for fishing gear in 2017 was due to the identification of new fishermen who were predominantly fishing in the survey area.

Occupancy rates in close proximity to liquid sewage sludge and dried sewage sludge were obtained in 2011 and 2017. The occupancy rates decreased slightly in 2017.

For activities taking place in the water in the aquatic survey area, the maximum adult occupancy rate increased significantly from 200 h y⁻¹ in 2011, for an individual who was swimming and kayaking in the River Tamar, to 520 h y⁻¹ in 2017, for one individual who was sub-aqua diving at West Hoe.

For activities taking place on the water in the aquatic survey area, the maximum adult occupancy rate in both years was 2400 h y⁻¹ for people working on a boat.

The use of seaweed as a fertiliser on allotment plots was recorded in 2011 and 2017, with a wider variety of vegetables being grown by one individual in 2017. The use of seaweed as an animal feed was not identified in either year.

8.2 Terrestrial survey area

Activities in the terrestrial survey area in 2017 were broadly similar to those in 2011 and the principal types of farm produce within the area continued to be a mix of arable crops, beef cattle and lambs. However, there was a reduction in the number of farms in the survey area as several farms had been sold or were being farmed by other local farmers which resulted in some changes. The main differences

were: pigs were no longer kept in the area, since the only farm that had produced pigs in 2011 had been sold to a farm that no longer kept pigs in 2017; a dairy farm that was producing milk in 2011 had been taken over by another farmer who did not keep dairy cattle; a farm that was producing eggs in 2011 had stopped keeping chickens by 2017; a farm previously producing a small number of chickens in 2011 was taken over by another farmer in 2017 who did not keep chickens.

The growing of fruit and vegetables in gardens and on allotment sites, beekeeping, shooting on farmland and the collection of wild/free foods were identified in both surveys.

The mean consumption rates for the adult high-rate groups for terrestrial food groups from the 2011 and 2017 surveys are shown in Table O (below).

Table O. Comparison between 2011 and 2017 mean consumption rates for the adult high-rate groups for terrestrial food groups (kg y⁻¹ and l y⁻¹)		
Food group	2011	2017
Green vegetables	41.7	25.4
Other vegetables	44.8	28.2
Root vegetables	18.6	20.9
Potato	108.4	73.9
Domestic fruit	81.1	15.4
Milk	207.4	Not identified during the survey
Cattle meat	37.9	20.0
Pig meat	50.6	Not identified during the survey
Sheep meat	9.6	2.9
Poultry	6.1	11.1
Eggs	22.6	Not identified during the survey
Wild/free foods	4.9	1.1
Rabbits/hares	2.8	5.4
Honey	3.9	7.1
Wild fungi	1.3	0.7
Venison	9.1	14.0

In 2017, compared to 2011, the mean consumption rates for the adult high-rate groups decreased in the following eight food groups: green vegetables; other vegetables; potatoes; domestic fruit; cattle meat; sheep meat; wild/free foods; wild fungi. The mean consumption rates for the adult high-rate groups increased in 2017 in the following five food groups: root vegetables; poultry; rabbits/hares; honey; venison. The most significant decreases in the consumption rates were for domestic fruit and potatoes, while the most significant increases were for poultry, venison and honey.

Milk, pig meat and eggs were consumed in 2011 but were not consumed in 2017 because the farms on which they were produced in 2011 had all been sold and the new owners did not keep dairy cattle, pigs or chickens. No specific reasons were identified for the other changes in consumption rates.

Human and livestock consumption of groundwater was identified in 2011 and 2017.

8.3 Direct radiation survey area

Activities identified in the direct radiation survey area in 2011 and 2017 were similar and included people residing, working and undertaking recreational activities.

A comparison between the 2011 and 2017 direct radiation occupancy rates for all age groups combined, by zone, is presented in Table P (below).

Table P. Comparison between 2011 and 2017 direct radiation occupancy rates for all age groups combined ($h\ y^{-1}$)		
	2011	2017
0 - 0.25 km zone		
Highest indoor	8096	8760
Highest outdoor	798	1685
Highest total	8500	8760
>0.25 - 0.5 km zone		
Highest indoor	8318	8696
Highest outdoor	1748	1875
Highest total	8500	8760
>0.5 - 1.0 km zone		
Highest indoor	8136	7561
Highest outdoor	1782	1782
Highest total	8240	8656

Except for the outdoor occupancy rate in the >0.5 – 1.0 km zone, the highest indoor, outdoor and total occupancy rates in all three zones in both 2011 and 2017 were for residents. The highest outdoor occupancy rate in the >0.5 – 1.0 km zone in both years was for people working in the area.

In the Devonport direct radiation survey area, three sets of gamma dose measurements taken in 2017 can be compared with those taken at the same properties in 2011. These data are shown in Table Q (below).

Table Q. Comparison between 2011 and 2017 gamma dose rates ($\mu Gy\ h^{-1}$)				
	Indoor		Outdoor	
Location	2011	2017	2011	2017
Residence 9	0.060	0.058	0.088	0.079
Residence 10	0.058	0.096	0.076	0.109
Residence 20	0.113	0.103	0.078	0.081

Notes

These measurements have not been adjusted for background dose rates.
The locations correspond to those in Table 40.

There was no consistent pattern in the differences in the gamma dose rates between 2011 and 2017. Two of the indoor readings were lower in 2017 than in 2011, and one was higher. For the outdoor readings, one was lower in 2017 than in 2011, and two were higher.

9 MAIN FINDINGS

The survey investigated three potential sources of public radiation exposure from the Devonport site, which were:

- Discharges of liquid radioactive waste into the Hamoaze and the local sewer
- Discharges of gaseous radioactive waste to the atmosphere
- Emissions of direct radiation

Information was obtained by conducting interviews with members of the public including, for example, commercial fishermen, anglers, people spending time on intertidal substrates, farmers, allotment holders, beekeepers and people spending time within the direct radiation survey area. These people were targeted because their diet and habits may cause them to be exposed to radioactivity from the site. However, it should be noted that the most exposed people can only be defined with the outcome of a dose assessment. Data for 684 individuals are presented in this report. All consumption rates recorded are only for foods produced, collected or caught from within the aquatic and terrestrial survey areas as defined in Section 2.3. The consumption and occupancy rates in this section are presented to two significant figures.

9.1 Aquatic survey area

The mean consumption rates for the adult high-rate groups (as defined in Section 3.4) for the separate aquatic consumption pathways for foods potentially affected by liquid discharges were:

- 38 kg y⁻¹ for fish
- 3.4 kg y⁻¹ for crustaceans
- 1.2 kg y⁻¹ for molluscs
- 1.1 kg y⁻¹ for wildfowl
- 7.3 kg y⁻¹ for marine plants/algae

The predominant foods consumed by the people in the adult high-rate groups were:

- For fish: mackerel, pollack, bass and cod
- For crustaceans: common prawn, common lobster and brown crab
- For molluscs: winkle, queen scallop, cockle, and mussel
- For wildfowl: mallard
- For marine plants/algae: *Porphyra umbilicalis* and sea lettuce

Seaweed was used as a fertiliser on allotment plots where fruit and vegetables were grown. The use of seaweed as an animal feed was not identified.

The mean occupancy rates for the adult high-rate groups over the separate intertidal substrates were:

- 100 h y⁻¹ for mud
- 170 h y⁻¹ for mud and sand
- 580 h y⁻¹ for mud and stones
- 20 h y⁻¹ for mud, sand and stones
- 100 h y⁻¹ for rock
- 35 h y⁻¹ for salt marsh
- 110 h y⁻¹ for sand
- 980 h y⁻¹ for sand and stones
- 46 h y⁻¹ for stones
- 160 h y⁻¹ for boat on mud

The mean rates for the adult high-rate groups for handling were:

- 1500 h y⁻¹ for handling fishing gear (nets)
- 260 h y⁻¹ for handling sediment

For workers at the local sewage treatment plant, which receives liquid waste from the Devonport site, the maximum occupancy rates in close proximity (<10 m) to sewage sludge were:

- 680 h y⁻¹ for liquid sewage sludge
- 460 h y⁻¹ for dried sewage sludge

The maximum adult occupancy rates for water based activities were:

- 520 h y⁻¹ for 'in water'
- 2400 h y⁻¹ for 'on water'

Individuals in the child and infant age groups were recorded consuming aquatic foods and undertaking activities in the aquatic survey area.

9.2 Terrestrial survey area

The mean consumption rates for the adult high-rate groups for the separate consumption pathways for foods potentially affected by gaseous discharges were:

- 25 kg y⁻¹ for green vegetables
- 28 kg y⁻¹ for other vegetables
- 21 kg y⁻¹ for root vegetables
- 74 kg y⁻¹ for potato
- 15 kg y⁻¹ for domestic fruit
- 20 kg y⁻¹ for cattle meat
- 2.9 kg y⁻¹ for sheep meat

- 11 kg y⁻¹ for poultry
- 1.1 kg y⁻¹ for wild/free foods
- 5.4 kg y⁻¹ for rabbits/hares
- 7.1 kg y⁻¹ for honey
- 0.7 kg y⁻¹ for wild fungi
- 14 kg y⁻¹ for venison

The consumption of terrestrial foodstuffs by individuals in the child and infant age groups was also recorded.

No consumption of pig meat, eggs or milk from the survey area was identified.

Human and livestock consumption of groundwater was identified.

9.3 Direct radiation survey area

The highest indoor, outdoor and total occupancy rates recorded for each zone were:

0 - 0.25 km zone

- 8760 h y⁻¹ for the indoor occupancy rate
- 1700 h y⁻¹ for the outdoor occupancy rate
- 8760 h y⁻¹ for the total occupancy rate

>0.25 - 0.5 km zone

- 8700 h y⁻¹ for the indoor occupancy rate
- 1900 h y⁻¹ for the outdoor occupancy rate
- 8760 h y⁻¹ for the total occupancy rate

>0.5 - 1.0 km zone

- 7600 h y⁻¹ for the indoor occupancy rate
- 1800 h y⁻¹ for the outdoor occupancy rate
- 8700 h y⁻¹ for the total occupancy rate

In the 0 - 0.25 km zone, the highest indoor occupancy rate and total occupancy rate was for a resident. Another resident shared the same total occupancy rate. The highest outdoor occupancy rate was for a different resident.

In the >0.25 - 0.5 km zone, the highest indoor occupancy rate was for a resident, the highest outdoor occupancy rate was for a different resident and the highest total occupancy rate were shared by two other residents who went to school in the area.

In the >0.5 - 1.0 km zone, the highest indoor occupancy rate was for a resident, another resident had the highest total occupancy rates. Ten people who were working in the area had the highest outdoor occupancy rate.

10 HABITS SURVEY INFORMATION FOR CONSIDERATION IN THE SELECTION OF SAMPLES AND MEASUREMENTS FOR MONITORING PROGRAMMES

Habits surveys provide site-specific information on the consumption of locally produced foods and the location and types of activities which may affect the public's exposure to radiation. This information can be used to help in the selection of samples and measurements for the monitoring programmes by identifying foods that are consumed at high rates and the locations where people spend high amounts of time.

In England and Wales, the monitoring programme for radioactivity in food is undertaken by the Food Standards Agency, and the monitoring programme for radioactivity in the environment is conducted by the Environment Agency. The results of these programmes are published annually in the RIFE reports (e.g. EA, FSA, FSS, NRW, NIEA and SEPA, 2017).

In 2013 the Food Standards Agency completed a public consultation to review the way that they monitor radioactivity in food (FSA, 2012 and 2013). The outcome of the consultation was to implement a revised monitoring programme in 2014, with reductions in sampling and analysis of some foods that were considered to represent a very low radiological risk.

10.1 Summary of the monitoring programmes for Devonport

The 2016 monitoring programmes relevant to the Devonport area included the samples and measurements listed below. The location names, foods and substrate classifications are taken directly from RIFE 22 (EA, FSA, FSS, NRW, NIEA and SEPA, 2017). Some of the samples and measurements taken for the monitoring programmes may be from outside the survey areas used for the 2017 Devonport habits survey.

Aquatic samples

Food and environmental samples

Sample	Location
Ballan wrasse	Plymouth Sound
Crabs	Plymouth Sound
Shrimp	River Lynher
Mussels	River Lynher
Seaweed	Kinterbury
Sediment	Kinterbury
Sediment	Torpoint South
Sediment	Lopwell
Seawater	Torpoint South
Seawater	Millbrook Lake

Gamma dose rate measurements over intertidal sediments

Location	Substrate
Torpoint South	Mud and rock
Kinterbury Access Gate	Mud
Lopwell	Mud
Lopwell	Mud and stones

Terrestrial samples

Sludge from Camel's Head Sewage Treatment Works
Potatoes
Grass

10.2 Information from the 2017 Devonport habits survey for use in the selection of samples and measurements for monitoring programmes**Food Standards Agency monitoring**

The following foods were either consumed in the largest quantities in their food groups or were the only food in their food group and could be considered when selecting samples for the Food Standards Agency monitoring programme.

Food	Food Group
Mackerel	Fish
Common prawn	Crustacean
Winkle	Mollusc
Mallard	Wildfowl
<i>Porphyra umbilicalis</i>	Marine plants/algae
Cabbage	Green vegetables
Runner bean	Other vegetables
Swede	Root vegetables
Potato	Potato
Apple	Domestic fruit
Beef	Cattle meat
Lamb	Sheep meat
Pheasant	Poultry
Blackberry	Wild/free foods
Rabbit	Rabbits/hares
Honey	Honey
Mushroom	Wild fungi
Venison	Venison

Environment Agency monitoring

The current environmental monitoring programme adequately covers the Devonport area and no changes to this are suggested.

11 ACKNOWLEDGEMENTS

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Table 1. Survey coverage

Group	Criteria	Estimate of complete coverage	Number for whom positive data was obtained	Coverage for positive observations	Notes
SUMMARY OF ALL PATHWAYS					
All potential interviewees in the Devonport aquatic, terrestrial and direct radiation survey areas.	Number of people resident in the terrestrial survey area (excluding those resident in the direct radiation survey area) (See (B) TERRESTRIAL PATHWAYS)	166000 ^a	84 ^b	0.05%	The survey targeted individuals who were potentially the most exposed, mostly producers of local foods such as farmers and allotment holders.
	Number of people resident in the direct radiation survey area (See (C) DIRECT RADIATION PATHWAYS)	10100	67 ^b	0.66%	Interviews were conducted at 20 residences out of an estimated total of 10100 permanent residences.
	Number of people working, visiting and undertaking recreational activities in the direct radiation survey area (See (C) DIRECT RADIATION PATHWAYS)	U	106 ^b	U	Excluding employees and contractors at the nuclear licensed site. Where generalised data for groups of people were obtained, for example employees at some businesses, only a limited number of representative individuals have been included.
	Number of people effected by liquid discharges (excluding those assigned to other categories above) (See (A) AQUATIC PATHWAYS)	U	427 ^b	U	Where generalised data for groups of people were obtained, for example members of sailing clubs, only a limited number of representative individuals have been included.
	Total for aquatic, terrestrial and direct radiation survey areas	U	684 ^b	U	
(A) AQUATIC PATHWAYS					
Commercial and hobby fishermen	Number of commercial and hobby fishermen fishing in the aquatic survey area	U	36	U	
People undertaking activities in or on water (e.g. swimmers, surfers, boat anglers, commercial and hobby fishermen etc.)	Number of people undertaking activities in or on water in the aquatic survey area	U	53	U	Where generalised data for groups of people were obtained, for example members of sailing clubs, only a limited number of representative individuals have been included.
People using the shore (e.g. dog walkers, shore anglers, people playing, etc.)	Number of people undertaking intertidal activities in the aquatic survey area	U	106	U	
Fish consumers	Number of people consuming fish from the aquatic survey area	U	62	U	
Crustacean consumers	Number of people consuming crustaceans from the aquatic survey area	U	23	U	
Mollusc consumers	Number of people consuming molluscs from the aquatic survey area	U	6	U	
(B) TERRESTRIAL PATHWAYS					
Farmers	Number of farmers and their family members consuming food from the terrestrial survey area	7	7	100%	Interviews were conducted at 7 farms out of a total of 7 farms in the terrestrial survey area.

Table 1. Survey coverage

Group	Criteria	Estimate of complete coverage	Number for whom positive data was obtained	Coverage for positive observations	Notes
Allotment holders and gardeners	Number of allotment holders and gardeners and their family members consuming food from the terrestrial survey area	U	72	U	
Honey consumers	Number of people consuming honey produced in the survey area	U	12	U	Four beekeepers who kept hives in the survey area were interviewed.
(C) DIRECT RADIATION PATHWAYS					
Residents	Number of residents in the survey area	10100	67	0.66%	Interviews were conducted at 21 residences.
Employees	Number of people working in the survey area	U	80	U	Excluding people who were living in the direct radiation survey area and employees and contractors at the nuclear licensed site. Where generalised data for groups of people were obtained, for example employees at some businesses, only a limited number of representative individuals have been included.
Visitors (people undertaking recreational activities or visiting relatives)	Number of people visiting the survey area	U	10	U	
BREAKDOWN OF AGE GROUPS FOR PEOPLE RESIDENT IN THE 5 km TERRESTRIAL SURVEY AREA					
Adult	16-year-old and over	137107 ^a	621	0.4529	
Child	6-year-old to 15-year-old	17179 ^a	36	0.0263	
Infant	0 to 5-year-old	12028 ^a	28	0.0204	

Notes

^a Estimate of the number of people resident in the 5 km terrestrial survey area based on data from www.ons.gov.uk.

^b The number of people for whom positive data was obtained for pathways (A) and (B) and (C) will usually not equal the relevant totals in the summary of all pathways. This is because in sections (A), (B) and (C) some individuals may be counted two or more times, for example someone who goes shore angling and consumes the catch.

U - Unknown

Table 2. Typical food groups used in habits surveys

Food group	Examples of foods within the group
Green vegetables	Asparagus, broccoli, Brussels sprout, cabbage, calabrese, cauliflower, chard, courgette, cucumber, gherkin, globe artichoke, herbs, kale, leaf beet, lettuce, marrow, spinach
Other vegetables	Aubergine, broad bean, chilli pepper, French bean, kohlrabi, mangetout, pea, pepper, pumpkin, runner bean, sweetcorn, tomato
Root vegetables	Beetroot, carrot, celeriac, celery, chicory, fennel, garlic, Jerusalem artichoke, leek, onion, parsnip, radish, shallot, spring onion, swede, turnip
Potato	Potato
Domestic fruit	Apple, apricot, blackberry, blackcurrant, boysenberry, cherry, damson, fig, gooseberry, grape, greengage, huckleberry, loganberry, melon, nectarine, peach, pear, plum, raspberry, redcurrant, rhubarb, rowanberry, strawberry, tayberry, whitecurrant
Milk	Cows' milk, cream, goats' milk, yoghurt
Cattle meat ^a	Beef
Pig meat ^a	Pork
Sheep meat ^a	Lamb, mutton
Poultry ^b	Chicken, duck, goose, grouse, guinea fowl, partridge, pheasant, pigeon, turkey, woodcock
Eggs	Chicken egg, duck egg, goose egg
Wild/free foods	Blackberry, chestnut, crab apple, damson, dandelion root, elderberry, nettle, rowanberry, sloe
Honey	Honey
Wild fungi	Mushrooms, other edible fungi
Rabbits/Hares	Hare, rabbit
Venison ^a	Venison
Fish (sea)	Bass, brill, cod, ling, dab, Dover sole, flounder, gurnard, haddock, hake, herring, lemon sole, mackerel, monkfish, mullet, plaice, pollack, rays, saithe, salmon, sea trout, sprat, turbot, whitebait, whiting, witch, cuttlefish ^c , squid ^c
Fish (freshwater)	Brown trout, eel (river), perch, pike, rainbow trout, salmon (river)
Crustaceans	Brown crab, common lobster, crawfish, <i>Nephrops</i> , prawn, shrimp, spider crab, squat lobster, velvet swimming crab
Molluscs	Cockles, limpets, mussels, oysters, razor clam, scallops, whelks, winkles
Wildfowl ^b	Canada goose, greylag goose, mallard, pink-footed goose, pintail, shoveler, teal, wigeon

Notes

^a Including offal

^b Domesticated ducks and geese are classified as poultry. Wild ducks and geese are classified as wildfowl.

^c Although squid and cuttlefish are molluscs, radiologically they are more akin to fish.

Table 3. Adults' consumption rates of fish from the Devonport aquatic survey area (kg y⁻¹)

Person ID number	Bass	Bream	Cod	Conger eel	Flounder	Grey mullet	Herring	Mackerel	Mixed fish	Pollack	Pouting	Salmon	Sea trout	Thornback ray	Whiting	Total
1629/2/1	-	-	26.4	-	-	-	-	14.6	-	24.8	-	-	-	-	-	65.8
1631/1/1	9.6	-	1.7	-	-	-	-	6.9	-	25.3	-	-	-	-	6.4	49.9
1628/1/1	24.5	-	24.0	-	-	-	-	-	-	-	-	-	-	-	-	48.5
1542/1/1	4.2	-	-	-	-	4.2	-	16.5	-	16.7	-	-	-	-	-	41.7
1585/1/1	-	-	-	-	-	-	-	34.7	-	6.8	-	-	-	-	-	41.5
1644/1/1	5.9	6.0	-	-	5.7	-	-	5.9	-	-	-	5.9	5.9	-	-	35.5
1644/2/1	5.9	6.0	-	-	5.7	-	-	5.9	-	-	-	5.9	5.9	-	-	35.5
1630/1/1	13.0	-	-	-	-	-	-	16.7	-	3.0	-	-	-	-	-	32.7
1630/2/1	13.0	-	-	-	-	-	-	16.7	-	3.0	-	-	-	-	-	32.7
1526/1/1	-	-	-	-	-	-	-	27.5	-	-	-	-	-	-	-	27.5
1477/1/1	-	-	-	-	-	-	-	22.5	-	-	-	-	-	-	-	22.5
1477/2/1	-	-	-	-	-	-	-	22.5	-	-	-	-	-	-	-	22.5
1600/2/1	3.2	-	3.2	-	-	-	-	3.2	-	3.2	-	-	-	3.2	3.2	19.2
1600/2/2	3.2	-	3.2	-	-	-	-	3.2	-	3.2	-	-	-	3.2	3.2	19.2
1600/2/3	3.2	-	3.2	-	-	-	-	3.2	-	3.2	-	-	-	3.2	3.2	19.2
1570/1/1	-	-	-	-	-	-	-	4.8	-	4.8	4.8	-	-	-	4.8	19.2
1637/1/1	-	-	-	-	-	-	-	4.8	-	4.8	4.8	-	-	-	4.8	19.2
1637/2/1	-	-	-	-	-	-	-	4.8	-	4.8	4.8	-	-	-	4.8	19.2
1657/1/1	-	-	-	-	-	-	9.9	8.9	-	-	-	-	-	-	-	18.7
1657/2/1	-	-	-	-	-	-	9.9	8.9	-	-	-	-	-	-	-	18.7
1657/3/1	-	-	-	-	-	-	9.9	8.9	-	-	-	-	-	-	-	18.7
1620/1/1	-	-	-	-	-	-	-	3.5	-	14.4	-	-	-	-	-	17.9
1620/2/1	-	-	-	-	-	-	-	3.5	-	14.4	-	-	-	-	-	17.9
1473/1/1	2.8	-	-	-	-	-	-	4.6	-	3.7	-	-	-	-	-	11.1
1473/2/1	2.8	-	-	-	-	-	-	4.6	-	3.7	-	-	-	-	-	11.1
1563/1/1	1.1	1.1	1.5	-	-	-	-	2.8	-	2.8	-	-	-	-	-	9.2
1657/4/1	-	-	-	-	-	-	-	8.9	-	-	-	-	-	-	-	8.9
1657/5/1	-	-	-	-	-	-	-	8.9	-	-	-	-	-	-	-	8.9
1493/1/1	-	-	-	-	-	-	-	8.0	-	-	-	-	-	-	-	8.0
1564/1/1	2.4	-	-	-	-	-	-	2.4	-	2.4	-	-	-	-	-	7.2
1647/1/1	-	1.1	1.5	1.5	-	-	-	-	-	-	-	-	-	1.5	1.3	6.8

Table 3. Adults' consumption rates of fish from the Devonport aquatic survey area (kg y⁻¹)

Person ID number	Bass	Bream	Cod	Conger eel	Flounder	Grey mullet	Herring	Mackerel	Mixed fish	Pollack	Pouting	Salmon	Sea trout	Thornback ray	Whiting	Total
1560/1/1	-	-	-	-	-	-	-	1.8	-	-	-	-	-	-	4.5	6.3
1560/2/1	-	-	-	-	-	-	-	1.8	-	-	-	-	-	-	4.5	6.3
1511/1/1	0.6	-	-	-	-	-	-	4.3	-	0.8	-	-	-	-	-	5.8
1653/1/1	-	-	-	-	-	-	-	-	5.2	-	-	-	-	-	-	5.2
1653/2/1	-	-	-	-	-	-	-	-	5.2	-	-	-	-	-	-	5.2
1598/1/1	-	-	-	-	-	-	-	5.2	-	-	-	-	-	-	-	5.2
1600/1/1	-	-	3.2	-	-	-	-	-	-	-	-	-	-	-	-	3.2
1614/1/1	-	-	-	-	-	-	-	1.6	-	-	-	-	-	-	-	1.6
1614/2/1	-	-	-	-	-	-	-	1.6	-	-	-	-	-	-	-	1.6
1606/1/1	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5
1606/2/1	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5
1599/1/1	-	-	-	-	-	-	-	1.4	-	-	-	-	-	-	-	1.4
1599/2/1	-	-	-	-	-	-	-	1.4	-	-	-	-	-	-	-	1.4
1451/1/1	0.6	-	-	-	-	-	-	-	-	0.7	-	-	-	-	-	1.3
1451/2/1	0.6	-	-	-	-	-	-	-	-	0.7	-	-	-	-	-	1.3
1451/2/2	0.6	-	-	-	-	-	-	-	-	0.7	-	-	-	-	-	1.3
1451/2/3	0.6	-	-	-	-	-	-	-	-	0.7	-	-	-	-	-	1.3
1451/2/4	0.6	-	-	-	-	-	-	-	-	0.7	-	-	-	-	-	1.3
1534/2/1	-	-	-	-	-	-	-	1.0	-	-	-	-	-	-	-	1.0
1444/1/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	0.9
1425/1/1	-	-	-	-	-	-	-	0.7	-	-	-	-	-	-	-	0.7
1425/2/1	-	-	-	-	-	-	-	0.7	-	-	-	-	-	-	-	0.7
1482/1/1	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of fish for adults based on the 12 high-rate consumers is 38.0 kg y⁻¹

The observed 97.5th percentile rate based on 54 observations is 49.4 kg y⁻¹

Table 4. Adults' consumption rates of crustaceans from the Devonport aquatic survey area (kg y⁻¹)

Person ID number	Brown crab	Common lobster	Common prawn	Total
1637/1/1	-	-	5.2	5.2
1637/2/1	-	-	5.2	5.2
1564/1/1	2.4	2.4	-	4.8
1450/1/1	-	-	4.6	4.6
1450/2/1	-	-	4.6	4.6
1587/1/1	-	-	3.6	3.6
1587/2/1	-	-	3.6	3.6
1653/1/1	0.8	1.3	-	2.1
1653/2/1	0.8	1.3	-	2.1
1657/1/1	0.5	0.2	1.1	1.8
1657/2/1	0.5	0.2	1.1	1.8
1657/3/1	0.5	0.2	1.1	1.8
1445/1/1	-	-	1.5	1.5
1445/2/1	-	-	1.5	1.5
1445/2/2	-	-	1.5	1.5
1445/2/3	-	-	1.5	1.5
1445/2/4	-	-	1.5	1.5
1445/2/5	-	-	1.5	1.5
1445/2/6	-	-	1.5	1.5
1482/1/1	-	0.9	-	0.9
1585/1/1	-	-	0.8	0.8
1657/4/1	0.5	0.2	-	0.7
1657/5/1	0.5	0.2	-	0.7

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of crustaceans for adults based on the 12 high-rate consumers is 3.4 kg y⁻¹

The observed 97.5th percentile rate based on 23 observations is 5.2 kg y⁻¹

Table 5. Adults' consumption rates of molluscs from the Devonport aquatic survey area (kg y⁻¹)

Person ID number	Cockle	Mussel	Queen scallop	Winkle	Total
1637/1/1	0.7	-	-	0.9	1.6
1657/1/1	-	0.5	0.9	-	1.4
1657/2/1	-	0.5	0.9	-	1.4
1585/1/1	-	-	-	1.2	1.2
1637/2/1	0.7	-	-	-	0.7
1570/1/1	0.1	-	-	-	0.1

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of molluscs for adults based on the 5 high-rate consumers is 1.2 kg y⁻¹

The observed 97.5th percentile rate based on 6 observations is 1.5 kg y⁻¹

Table 6. Adults' consumption rates of wildfowl from the Devonport aquatic survey area (kg y⁻¹)

Person ID number	Mallard
1512/1/1	1.1
1512/2/1	1.1
1512/3/1	0.3
1512/4/1	0.3

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of wildfowl for adults based on the 2 high-rate consumers is 1.1 kg y⁻¹

The observed 97.5th percentile rate based on 4 observations is 1.1 kg y⁻¹

Table 7. Adults' consumption rates of marine plants/algae from the Devonport aquatic survey area (kg y⁻¹)

Person ID number	<i>Porphyra umbilicalis</i>	Samphire	Sea beet	Sea lettuce	Total
1585/1/1	3.7	-	-	3.7	7.3
1533/1/1	-	-	1.4	-	1.4
1657/1/1	-	0.5	-	-	0.5
1657/2/1	-	0.5	-	-	0.5

Notes

The emboldened observation is the high-rate consumer

The mean consumption rate of marine plants/algae for adults based on the 1 high-rate consumer is 7.3 kg y⁻¹

The observed 97.5th percentile rate based on 4 observations is 6.9 kg y⁻¹

Table 8. Children's and infants' consumption rates of fish from the Devonport aquatic survey area (kg y⁻¹)

Child age group (6 - 15 years old)

Person ID number	Age	Mackerel	Pollack	Total
1620/3/1	10	3.5	14.4	17.9
1620/4/1	7	2.7	10.8	13.4
1620/5/1	8	2.7	10.8	13.4
1598/2/1	12	5.2	-	5.2
1599/3/1	15	1.4	-	1.4
1599/4/1	8	1.1	-	1.1
1425/3/1	10	0.7	-	0.7
1425/4/1	14	0.7	-	0.7

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of fish for the child age group based on the 3 high-rate consumers is 14.9 kg y⁻¹

The observed 97.5th percentile rate based on 8 observations is 17.1 kg y⁻¹

Infant age group (0 - 5 years old)

No consumption data obtained for this food group.

Table 9. Adults' consumption rates of vegetables and domestic fruit grown on land where seaweed has been used as a fertiliser (kg y⁻¹)

Green vegetables

Person ID number	Courgette	Total
1533/1/1	14.7	14.7

Other vegetables

Person ID number	French bean	Runner bean	Total
1533/1/1	3.6	10.2	13.8

Root vegetables

Person ID number	Garlic	Onion	Total
1533/1/1	1.8	4.5	6.4

Domestic fruit

Person ID number	Blackcurrant	Gooseberry	Strawberry	Total
1533/1/1	2.3	1.4	4.5	8.2

Notes

These data are presented for use in studies of the potential dose arising from the possible transfer onto the land of radionuclides originating from liquid discharges made into the sea. However, these foods were grown in the terrestrial survey area and the primary reason for investigating them was to gain information about foods potentially subject to gaseous discharges. Therefore, they are also included in the terrestrial food tables presented later in this report, and, in order to avoid double accounting in assessments of total dose, are entered only once in the Annexes, where they are classified as terrestrial foods.

Table 10. Adults' intertidal occupancy rates in the Devonport aquatic survey area ($h\ y^{-1}$)

Person ID number	Location	Activity	Mud	Mud and sand	Mud and stones	Mud, sand and stones	Rock	Salt marsh	Sand	Sand and stones	Stones	Boat on mud
1644/1/1	Cremyll	Bait digging	104	-	-	-	-	-	-	-	-	-
	Torpoint, River Lynher and River Tavy	Angling	-	-	939	-	-	-	-	-	-	-
	Cremyll and Cawsand	Angling	-	-	-	-	-	-	-	626	-	-
1540/1/1	St John's Lake	Angling	96	-	-	-	-	-	-	-	-	-
	Millbrook	Angling	-	96	-	-	-	-	-	-	-	-
	Torpoint	Bait digging	-	-	183	-	-	-	-	-	-	-
		Angling	-	-	-	-	-	-	-	-	-	-
	Cremyll and Saltash Waterside	Bait digging	-	-	-	-	-	-	-	115	-	-
	Cremyll	Angling	-	-	-	-	-	-	-	-	-	-
1569/1/1	River Lynher	Preparing guns for wildfowling	2	-	-	-	-	-	-	-	-	-
1557/1/1	Millbrook	Fixing moorings	-	252	-	-	-	-	-	-	-	-
1637/1/1	River Lynher	Collecting cockles	-	2	-	-	-	-	-	-	-	-
	Cawsand	Collecting winkles	-	-	-	-	-	-	-	1	-	-
1657/2/1	River Plym	Collecting samphire	-	1	-	-	-	-	-	-	-	-
	Mount Batten Point and Mount Wise	Collecting mussels	-	-	-	-	4	-	-	-	-	-
	Jennycliff Bay	Walking	-	-	-	-	-	-	10	-	-	-
	Cremyll	Collecting mussels	-	-	-	-	-	-	-	104	-	-
	Mount Batten Point		-	-	-	-	-	-	-	-	5	-
1620/1/1	Riverside	Bait digging	-	-	417	-	-	-	-	-	-	
1556/1/1	Torpoint	Angling	-	-	391	-	-	-	-	-	-	
1435/2/1	River Plym	Collecting crabs for bait	-	-	273	-	-	-	-	-	-	-
		Bait digging	-	-	-	-	-	-	-	-	-	-
1544/1/1	Torpoint	Collecting crabs for bait	-	-	235	-	-	-	-	-	-	
1518/1/1	Torpoint	Bait digging	-	-	156	-	-	-	-	-	-	
1520/1/1	Torpoint	Bait digging	-	-	156	-	-	-	-	-	-	
1545/1/1	Torpoint	Bait digging	-	-	78	-	-	-	-	-	-	
1545/2/1	Torpoint	Bait digging	-	-	78	-	-	-	-	-	-	
1566/1/1	River Tamar and River Tavy	Wildfowling	-	-	17	-	-	-	-	-	-	
1566/1/2	River Tamar and River Tavy	Wildfowling	-	-	17	-	-	-	-	-	-	
1566/1/3	River Tamar and River Tavy	Wildfowling	-	-	17	-	-	-	-	-	-	
1566/1/4	River Tamar and River Tavy	Wildfowling	-	-	17	-	-	-	-	-	-	
1566/1/5	River Tamar and River Tavy	Wildfowling	-	-	17	-	-	-	-	-	-	
1566/1/6	River Tamar and River Tavy	Wildfowling	-	-	17	-	-	-	-	-	-	
1566/1/7	River Tamar and River Tavy	Wildfowling	-	-	17	-	-	-	-	-	-	

Table 10. Adults' intertidal occupancy rates in the Devonport aquatic survey area ($h y^{-1}$)

Person ID number	Location	Activity	Mud	Mud and sand	Mud and stones	Mud, sand and stones	Rock	Salt marsh	Sand	Sand and stones	Stones	Boat on mud
1566/1/8	River Tamar and River Tavy	Wildfowling	-	-	17	-	-	-	-	-	-	-
1566/1/9	River Tamar and River Tavy	Wildfowling	-	-	17	-	-	-	-	-	-	-
1566/1/10	River Tamar and River Tavy	Wildfowling	-	-	17	-	-	-	-	-	-	-
1433/1/1	Riverside	Boat maintenance	-	-	12	-	-	-	-	-	-	-
1433/2/1	Riverside	Boat maintenance	-	-	12	-	-	-	-	-	-	-
1517/1/1	Torpoint	Bait digging	-	-	10	-	-	-	-	-	-	-
1560/1/1	River Lynher	Collecting mussels	-	-	9	-	-	-	-	-	-	-
1533/1/1	Kinterbury Point and Riverside	Collecting sea beet and sea lettuce	-	-	4	-	-	-	-	-	-	-
1614/1/1	Torpoint	Dog walking	-	-	-	20	-	-	-	-	-	-
	Jennycliff Bay	Dog walking	-	-	-	-	-	-	-	20	-	-
1614/2/1	Torpoint	Dog walking	-	-	-	20	-	-	-	-	-	-
	Jennycliff Bay	Dog walking	-	-	-	-	-	-	-	20	-	-
1451/1/1	Various locations within the survey area	Bait digging	-	-	-	6	-	-	-	-	-	-
1634/1/1	Kingsand	Walking	-	-	-	-	102	-	-	-	-	-
	Kingsand	Sitting on the beach	-	-	-	-	-	-	-	102	-	-
1634/2/1	Kingsand	Walking	-	-	-	-	102	-	-	-	-	-
	Kingsand	Sitting on the beach	-	-	-	-	-	-	-	102	-	-
1523/1/1	Mount Batten Point	Beach cleaning and rock pooling	-	-	-	-	18	-	-	-	-	-
1523/2/1	Mount Batten Point	Beach cleaning and rock pooling	-	-	-	-	18	-	-	-	-	-
1523/3/1	Mount Batten Point	Beach cleaning and rock pooling	-	-	-	-	18	-	-	-	-	-
1523/3/2	Mount Batten Point	Beach cleaning and rock pooling	-	-	-	-	18	-	-	-	-	-
1523/3/3	Mount Batten Point	Beach cleaning and rock pooling	-	-	-	-	18	-	-	-	-	-
1523/3/4	Mount Batten Point	Beach cleaning and rock pooling	-	-	-	-	18	-	-	-	-	-
1523/3/5	Mount Batten Point	Beach cleaning and rock pooling	-	-	-	-	18	-	-	-	-	-
1523/3/6	Mount Batten Point	Beach cleaning and rock pooling	-	-	-	-	18	-	-	-	-	-
1599/1/1	Devil's Point	Angling	-	-	-	-	6	-	-	-	-	-
1512/1/1	St John's Lake	Fixing fencing	-	-	-	-	-	35	-	-	-	-
1512/5/1	St John's Lake	Fixing fencing	-	-	-	-	-	35	-	-	-	-
1512/5/2	St John's Lake	Fixing fencing	-	-	-	-	-	35	-	-	-	-
1512/5/3	St John's Lake	Fixing fencing	-	-	-	-	-	35	-	-	-	-
1535/1/1	Jennycliff Bay	Sunbathing	-	-	-	-	-	-	109	-	-	-
1656/1/1	Jennycliff Bay	Walking	-	-	-	-	-	-	10	-	-	-
1534/1/1	Jennycliff Bay	Sitting on the beach	-	-	-	-	-	-	3	-	-	-
1534/2/1	Jennycliff Bay	Sitting on the beach	-	-	-	-	-	-	3	-	-	-
1450/1/1	Mount Batten Point	Collecting common prawns	-	-	-	-	-	-	1	-	-	-

Table 10. Adults' intertidal occupancy rates in the Devonport aquatic survey area ($h\ y^{-1}$)

Person ID number	Location	Activity	Mud	Mud and sand	Mud and stones	Mud, sand and stones	Rock	Salt marsh	Sand	Sand and stones	Stones	Boat on mud
1536/1/1	Jennycliff Bay	Angling	-	-	-	-	-	-	-	-	2	-
1536/2/1	Jennycliff Bay	Angling	-	-	-	-	-	-	-	-	2	-
1655/1/1	Riverside	Boat maintenance	-	-	-	-	-	-	-	-	-	209
1437/1/1	Mutton Cove	Boat maintenance	-	-	-	-	-	-	-	-	-	104
1630/1/1	Riverside	Boat maintenance	-	-	-	-	-	-	-	-	-	6

Notes

Emboldened observations are the high-rate individuals

The mean intertidal occupancy rate over mud for adults based on 2 high-rate observations is $100\ h\ y^{-1}$

The observed 97.5th percentile rate based on 3 observations is $104\ h\ y^{-1}$

The mean intertidal occupancy rate over mud and sand for adults based on 2 high-rate observations is $174\ h\ y^{-1}$

The observed 97.5th percentile rate based on 4 observations is $240\ h\ y^{-1}$

The mean intertidal occupancy rate over mud and stones for adults based on 3 high-rate observations is $582\ h\ y^{-1}$

The observed 97.5th percentile rate based on 26 observations is $626\ h\ y^{-1}$

The mean intertidal occupancy rate over mud, sand and stones for adults based on 2 high-rate observations is $20\ h\ y^{-1}$

The observed 97.5th percentile rate based on 3 observations is $20\ h\ y^{-1}$

The mean intertidal occupancy rate over rock for adults based on 2 high-rate observations is $102\ h\ y^{-1}$

The observed 97.5th percentile rate based on 19 observations is $102\ h\ y^{-1}$

The mean intertidal occupancy rate over salt marsh for adults based on 4 high-rate observations is $35\ h\ y^{-1}$

The observed 97.5th percentile rate based on 4 observations is $35\ h\ y^{-1}$

The mean intertidal occupancy rate over sand for adults based on 1 high-rate observations is $109\ h\ y^{-1}$

The observed 97.5th percentile rate based on 7 observations is $94\ h\ y^{-1}$

The mean intertidal occupancy rate over sand and stones for adults based on 3 high-rate observations is $977\ h\ y^{-1}$

The observed 97.5th percentile rate based on 36 observations is $757\ h\ y^{-1}$

The mean intertidal occupancy rate over stones for adults based on 4 high-rate observations is $46\ h\ y^{-1}$

The observed 97.5th percentile rate based on 9 observations is $73\ h\ y^{-1}$

The mean intertidal occupancy rate over boat on mud for adults based on 2 high-rate observations is $157\ h\ y^{-1}$

The observed 97.5th percentile rate based on 3 observations is $204\ h\ y^{-1}$

Table 11. Children's and infants' intertidal occupancy rates in the Devonport aquatic survey area ($h\ y^{-1}$)

Child age group (6 - 15 years old)

Person ID number	Age	Location	Activity	Mud and stones	Mud, sand and stones	Rock	Sand and stones	Stones
1520/2/1	14	Torpoint	Bait digging	78	-	-	-	-
1634/3/1	13	Kingsand	Walking	-	-	102	-	-
			Sitting on the beach	-	-	-	102	-
1634/4/1	11	Kingsand	Walking	-	-	102	-	-
			Sitting on the beach	-	-	-	102	-
1430/2/1	8	Mount Batten Point	Playing	-	-	-	52	-
1598/2/1	12	Cremyll	Sitting on the beach	-	-	-	2	-
1502/4/1	6	Firestone Bay	Playing	-	-	-	-	26
1485/2/1	7	Firestone Bay	Playing	-	-	-	-	13
1485/3/1	10	Firestone Bay	Playing	-	-	-	-	13

Notes

Emboldened observations are the high-rate individuals

The mean intertidal occupancy rate over mud and stones for the child age group based on 1 high-rate observation is $78\ h\ y^{-1}$

The observed 97.5th percentile is not applicable for 1 observation

The mean intertidal occupancy rate over rock for the child age group based on 2 high-rate observations is $102\ h\ y^{-1}$

The observed 97.5th percentile rate based on 2 observations is $102\ h\ y^{-1}$

The mean intertidal occupancy rate over sand and stones for the child age group based on 3 high-rate observations is $86\ h\ y^{-1}$

The observed 97.5th percentile rate based on 4 observations is $102\ h\ y^{-1}$

The mean intertidal occupancy rate over stones for the child age group based on 3 high-rate observations is $17\ h\ y^{-1}$

The observed 97.5th percentile rate based on 3 observations is $26\ h\ y^{-1}$

Infant age group (0 - 5 years old)

Person ID number	Age	Location	Activity	Mud and stones	Mud, sand and stones	Rock	Sand and stones	Stones
1614/3/1	1	Torpoint	Dog walking	-	20	-	-	-
		Jennycliff Bay		-	-	-	20	-
1430/3/1	3	Mount Batten Point	Playing	-	-	-	52	-
1455/3/1	2	Jennycliff Bay	Walking	-	-	-	24	-
1426/2/1	4	Jennycliff Bay	Playing	-	-	-	9	-
1440/3/1	5	Mount Batten Point	Playing	-	-	-	6	-
1440/4/1	2	Mount Batten Point	Playing	-	-	-	6	-
1502/3/1	4	Firestone Bay	Playing	-	-	-	-	26

Notes

Emboldened observations are the high-rate individuals

The mean intertidal occupancy rate over mud, sand and stones for the infant age group based on 1 high-rate observation is $20\ h\ y^{-1}$

The observed 97.5th percentile is not applicable for 1 observation

The mean intertidal occupancy rate over sand and stones for the infant age group based on 3 high-rate observations is $32\ h\ y^{-1}$

The observed 97.5th percentile rate based on 6 observations is $49\ h\ y^{-1}$

The mean intertidal occupancy rate over stones for the infant age group based on 1 high-rate observation is $26\ h\ y^{-1}$

The observed 97.5th percentile is not applicable for 1 observation

Table 12. Gamma dose rate measurements over intertidal substrates in the Devonport aquatic survey area (μGyh^{-1})

Location	National Grid Reference	Substrate	Gamma dose rate at 1metre^a
Cawsand	SX 434 502	Sand and stones	0.066
Torpoint	SX 438 545	Mud and stones	0.085
Torpoint	SX 437 545	Mud, sand and stones	0.082
Torpoint	SX 437 546	Sand and stones	0.093
Saltash Waterside	SX 433 587	Sand and stones	0.072
Riverside	SX 436 586	Mud and stones	0.093
River Plym (East)	SX 505 545	Stones	0.054
River Plym (West)	SX 502 549	Stones	0.084
Jennycliff Bay	SX 491 522	Sand and stones	0.084

Notes

^a These measurements have not been adjusted for background dose rates

Table 13. Adults' handling rates of fishing gear and sediment in the Devonport aquatic survey area ($h\ y^{-1}$)

Person ID number	Location	Activity	Fishing gear	Sediment
1564/2/1	Plymouth Sound	Handling nets and pots	1492	-
1564/1/1	Plymouth Sound	Handling nets and pots	1492	-
1579/1/1	Plymouth Sound and Plymouth Breakwater	Handling pots	360	-
	River Lynher	Push netting	129	-
1637/1/1	Cawsand	Collecting cockles	-	3
	River Lynher	Collecting winkles	-	-
1653/1/1	Plymouth Sound	Handling nets	72	-
1653/2/1	Plymouth Sound	Handling nets	72	-
1435/2/1	River Plym	Handling pots	39	-
		Bait digging	-	234
1560/1/1	River Lynher	Handling nets	5	-
		Collecting mussels	-	9
1657/2/1	Mount Batten Point	Handling pots	5	-
	Mount Wise and Cremyll	Collecting mussels	-	6
1585/1/1	Cawsand	Push netting	3	-
1450/1/1	Mount Batten Point	Handling pots	1	-
1450/2/1	Mount Batten Point	Handling pots	1	-
		Push netting	1	-
1644/1/1	Cremyll	Bait digging	-	104
1620/1/1	Riverside	Bait digging	-	417
1435/1/1	River Plym and River Tamar	Bait digging	-	390
1557/1/1	Millbrook	Fixing moorings	-	252
1544/1/1	Torpoint	Collecting peeler crabs for bait	-	235
1520/1/1	Torpoint	Bait digging	-	156
1518/1/1	Torpoint	Bait digging	-	156
1540/1/1	Torpoint, Cremyll and Saltash Waterside	Bait digging	-	106
1545/1/1	Torpoint	Bait digging	-	78
1545/2/1	Torpoint	Bait digging	-	78
1566/1/1	River Tamar and River Tavy	Wildfowling	-	17
1566/1/5	River Tamar and River Tavy	Wildfowling	-	17
1566/1/8	River Tamar and River Tavy	Wildfowling	-	17
1566/1/4	River Tamar and River Tavy	Wildfowling	-	17
1566/1/6	River Tamar and River Tavy	Wildfowling	-	17
1566/1/9	River Tamar and River Tavy	Wildfowling	-	17
1566/1/10	River Tamar and River Tavy	Wildfowling	-	17
1566/1/7	River Tamar and River Tavy	Wildfowling	-	17
1566/1/3	River Tamar and River Tavy	Wildfowling	-	17
1566/1/2	River Tamar and River Tavy	Wildfowling	-	17
1517/1/1	Torpoint	Bait digging	-	10
1451/1/1	Various locations within the survey area	Bait digging	-	6

Notes

Emboldened observations are the high-rate individuals

The mean handling rate of fishing gear for adults based on 2 high-rate observations is $1492\ h\ y^{-1}$

The observed 97.5th percentile rate based on 13 observations is $1492\ h\ y^{-1}$

The mean handling rate of sediments for adults based on 7 high-rate observations is $263\ h\ y^{-1}$

The observed 97.5th percentile rate based on 26 observations is $400\ h\ y^{-1}$

Table 14. Children's handling rates of fishing gear and sediment in the Devonport aquatic survey area ($h\ y^{-1}$)

Child age group (6 - 15 years old)

Person ID number	Age	Location	Activity	Fishing gear	Sediment
1520/2/1	14	Torpoint	Bait digging	-	78

Notes

Emboldened observations are the high-rate consumers

The mean handling rate of sediments for the child age group based on 1 high-rate observation is $78\ h\ y^{-1}$

The observed 97.5th percentile is not applicable for 1 observation

Table 15. Adults occupancy rates in close proximity to liquid sewage sludge and dried sewage sludge ($h\ y^{-1}$)

Observation number	Activity	Occupancy in close proximity (<10 m) to liquid sewage sludge	Occupancy in close proximity (<10 m) to dried sewage sludge
1654/1/1	Debris removal, cleaning filters, unblocking pumps and pipes, sampling and operating machinery	684	456
1654/2/1	Debris removal, cleaning filters, unblocking pumps and pipes, sampling and operating machinery	684	456

Notes

Occupancy rates were also obtained for contractors at the sewage treatment works. See Section 4.12.

Table 16. Adults' occupancy rates in and on water in the Devonport aquatic survey area ($h\ y^{-1}$)

Person ID number	Location	Activity	In water	On water
1613/1/1	West Hoe	Sub-aqua diving	522	-
1611/1/1	The Hoe	Windsurfing	460	-
		Sailing	-	767
1611/1/2	The Hoe	Windsurfing	460	-
		Sailing	-	767
1611/1/3	The Hoe	Windsurfing	460	-
		Sailing	-	767
1611/1/4	The Hoe	Windsurfing	460	-
		Sailing	-	767
1611/1/5	The Hoe	Windsurfing	460	-
		Sailing	-	767
1611/1/6	The Hoe	Windsurfing	460	-
		Sailing	-	767
1611/1/7	The Hoe	Windsurfing	460	-
		Sailing	-	767
1611/1/8	The Hoe	Windsurfing	460	-
		Sailing	-	767
1611/1/9	The Hoe	Windsurfing	460	-
		Sailing	-	767
1611/1/10	The Hoe	Windsurfing	460	-
		Sailing	-	767
1611/1/11	The Hoe	Windsurfing	460	-
		Sailing	-	767
1611/1/12	The Hoe	Windsurfing	460	-
		Sailing	-	767
1611/1/13	The Hoe	Windsurfing	460	-
		Sailing	-	767
1611/1/14	The Hoe	Windsurfing	460	-
		Sailing	-	767
1611/1/15	The Hoe	Windsurfing	460	-
		Sailing	-	767
1611/1/16	The Hoe	Windsurfing	460	-
		Sailing	-	767
1611/1/17	The Hoe	Windsurfing	460	-
		Sailing	-	767
1611/1/18	The Hoe	Windsurfing	460	-
		Sailing	-	767
1611/1/19	The Hoe	Windsurfing	460	-
		Sailing	-	767
1611/1/20	The Hoe	Windsurfing	460	-
		Sailing	-	767
1419/1/1	Hamoaze and Plymouth Sound	Kayaking	366	-
1396/1/1	The Hoe	Sub-aqua diving	191	-
1396/1/2	The Hoe	Sub-aqua diving	191	-
1634/1/1	Kingsand	Kayaking	102	-
1634/2/1	Kingsand	Kayaking	102	-
1599/1/1	The Hoe	Swimming	90	-
1613/2/1	West Hoe	Sub-aqua diving	70	-
1613/3/1	West Hoe	Sub-aqua diving	70	-
1613/4/1	West Hoe	Sub-aqua diving	70	-
1613/5/1	West Hoe	Sub-aqua diving	70	-
1613/6/1	West Hoe	Sub-aqua diving	70	-
1523/2/1	Plymouth Sound	Paddleboarding and swimming	54	-
1526/1/1	Plymouth Sound	Kayaking	46	-
1535/1/1	Jennycliff Bay	Swimming and kayaking	43	-
1552/3/1	Torpoint	Windsurfing	31	-
1552/3/2	Torpoint	Windsurfing	31	-
1552/3/3	Torpoint	Windsurfing	31	-
1552/3/4	Torpoint	Windsurfing	31	-
1552/3/5	Torpoint	Windsurfing	31	-
1552/3/6	Torpoint	Windsurfing	31	-
1552/3/7	Torpoint	Windsurfing	31	-
1552/3/8	Torpoint	Windsurfing	31	-
1552/3/9	Torpoint	Windsurfing	31	-
1552/3/10	Torpoint	Windsurfing	31	-
1534/2/1	Mount Batten Point	Surfing and kayaking	24	-
1533/1/1	The Hoe and River Tamar	Swimming and kayaking	19	-
1443/1/1	Various locations within the survey area	Swimming	16	-
1458/1/1	River Plym	Paddleboarding	12	-
1458/1/2	River Plym	Paddleboarding	12	-

Table 16. Adults' occupancy rates in and on water in the Devonport aquatic survey area ($h\ y^{-1}$)

Person ID number	Location	Activity	In water	On water
1614/1/1	Plymouth Sound	Wakeboarding	10	-
		Angling	-	2
1434/1/1	The Hoe, Mount Batten Point and Riverside	Jet skiing	9	-
1434/2/1	The Hoe, Mount Batten Point and Riverside	Jet skiing	9	-
1434/3/1	The Hoe, Mount Batten Point and Riverside	Jet skiing	9	-
1434/4/1	The Hoe, Mount Batten Point and Riverside	Jet skiing	9	-
1436/1/1	Riverside	Kayaking	8	-
1436/1/2	Riverside	Kayaking	8	-
1436/1/3	Riverside	Kayaking	8	-
1436/1/4	Riverside	Kayaking	8	-
1436/1/5	Riverside	Kayaking	8	-
1436/1/6	Riverside	Kayaking	8	-
1436/1/7	Riverside	Kayaking	8	-
1436/1/8	Riverside	Kayaking	8	-
1436/1/9	Riverside	Kayaking	8	-
1436/1/10	Riverside	Kayaking	8	-
1436/1/11	Riverside	Kayaking	8	-
1436/1/12	Riverside	Kayaking	8	-
1436/1/13	Riverside	Kayaking	8	-
1436/1/14	Riverside	Kayaking	8	-
1436/1/15	Riverside	Kayaking	8	-
1436/1/16	Riverside	Kayaking	8	-
1436/1/17	Riverside	Kayaking	8	-
1436/1/18	Riverside	Kayaking	8	-
1436/1/19	Riverside	Kayaking	8	-
1436/1/20	Riverside	Kayaking	8	-
1436/1/21	Riverside	Kayaking	8	-
1436/1/22	Riverside	Kayaking	8	-
1436/1/23	Riverside	Kayaking	8	-
1436/1/24	Riverside	Kayaking	8	-
1436/1/25	Riverside	Kayaking	8	-
1436/1/26	Riverside	Kayaking	8	-
1436/1/27	Riverside	Kayaking	8	-
1436/1/28	Riverside	Kayaking	8	-
1436/1/29	Riverside	Kayaking	8	-
1436/1/30	Riverside	Kayaking	8	-
1436/1/31	Riverside	Kayaking	8	-
1436/1/32	Riverside	Kayaking	8	-
1436/1/33	Riverside	Kayaking	8	-
1436/1/34	Riverside	Kayaking	8	-
1436/1/35	Riverside	Kayaking	8	-
1436/2/1	Riverside	Kayaking	8	-
1436/2/2	Riverside	Kayaking	8	-
1436/2/3	Riverside	Kayaking	8	-
1440/1/1	Mount Batten Point	Swimming	6	-
1440/2/1	Mount Batten Point	Swimming	6	-
1572/1/1	Cremyll, Stonehouse and Plymouth Sound	Working on a boat	-	2376
1572/1/2	Cremyll, Stonehouse and Plymouth Sound	Working on a boat	-	2376
1565/1/1	Hamoaze	Working on a boat	-	2020
1565/2/1	Hamoaze	Working on a boat	-	2020
1565/2/2	Hamoaze	Working on a boat	-	2020
1565/2/3	Hamoaze	Working on a boat	-	2020
1565/2/4	Hamoaze	Working on a boat	-	2020
1565/2/5	Hamoaze	Working on a boat	-	2020
1565/2/6	Hamoaze	Working on a boat	-	2020
1565/2/7	Hamoaze	Working on a boat	-	2020
1565/2/8	Hamoaze	Working on a boat	-	2020
1565/2/9	Hamoaze	Working on a boat	-	2020
1564/1/1	Plymouth Sound	Commercial fishing	-	1762
1564/2/1	Plymouth Sound	Commercial fishing	-	1762
1620/1/1	River Tamar	Angling	-	1251
1637/1/1	Plymouth Sound, River Tamar and River Lynher	Push netting and angling	-	1064
1631/1/1	River Lynher, Plymouth Sound and River Tamar	Angling	-	1043
1462/1/1	River Plym, River Tamar, Plymouth Sound and Hamoaze	Sailing and angling	-	900
1577/1/1	Plymouth Sound	Working on a boat	-	728
1577/1/2	Plymouth Sound	Working on a boat	-	728
1577/1/3	Plymouth Sound	Working on a boat	-	728
1577/1/4	Plymouth Sound	Working on a boat	-	728
1577/1/5	Plymouth Sound	Working on a boat	-	728
1577/1/6	Plymouth Sound	Working on a boat	-	728
1577/1/7	Plymouth Sound	Working on a boat	-	728
1577/1/8	Plymouth Sound	Working on a boat	-	728

Table 16. Adults' occupancy rates in and on water in the Devonport aquatic survey area ($h\ y^{-1}$)

Person ID number	Location	Activity	In water	On water
1570/1/1	Plymouth Sound and River Tamar	Angling	-	521
1560/1/1	River Lynher, Plymouth Sound, Cawsand, River Tavy, River Tamar and within the survey area	Netting and angling and sailing	-	497
1542/1/1	Various locations within the survey area	Angling	-	465
1579/1/1	Plymouth Sound and Plymouth Breakwater	Potting	-	439
1629/2/1	River Tamar	Sailing	-	417
1463/1/1	River Tamar	Sailing	-	367
1581/1/1	River Tamar and River Tavy	Pleasure cruising	-	366
1581/2/1	River Tavy and River Tamar	Pleasure cruising	-	366
1600/1/1	Hamoaze, Plymouth Sound and River Tamar	Angling	-	365
1456/1/1	Plymouth Sound	Sailing	-	350
1528/1/1	River Tamar	Sailing	-	314
1563/1/1	River Tamar and River Tavy	Angling	-	313
1630/1/1	Riverside	Angling	-	261
1585/1/1	Cawsand	Angling and push netting	-	240
1653/1/1	Plymouth Sound	Netting and long lining	-	216
1653/2/1	Plymouth Sound	Netting and long lining	-	216
1559/1/1	Plymouth Sound, River Tamar and River Tavy	Pleasure cruising	-	209
1559/2/1	Plymouth Sound, River Tamar and River Tavy	Pleasure cruising	-	209
1544/1/1	Plymouth Sound	Angling	-	208
1552/1/2	Plymouth Sound and Torpoint	Sailing	-	196
1552/1/5	Plymouth Sound and Torpoint	Sailing	-	196
1552/1/9	Plymouth Sound and Torpoint	Sailing	-	196
1552/1/13	Plymouth Sound and Torpoint	Sailing	-	196
1552/1/14	Plymouth Sound and Torpoint	Sailing	-	196
1552/1/16	Plymouth Sound and Torpoint	Sailing	-	196
1552/1/17	Plymouth Sound and Torpoint	Sailing	-	196
1552/1/1	Plymouth Sound and Torpoint	Sailing	-	196
1552/1/3	Plymouth Sound and Torpoint	Sailing	-	196
1552/1/4	Plymouth Sound and Torpoint	Sailing	-	196
1552/1/6	Plymouth Sound and Torpoint	Sailing	-	196
1552/1/7	Plymouth Sound and Torpoint	Sailing	-	196
1552/1/8	Plymouth Sound and Torpoint	Sailing	-	196
1552/1/10	Plymouth Sound and Torpoint	Sailing	-	196
1552/1/11	Plymouth Sound and Torpoint	Sailing	-	196
1552/1/12	Plymouth Sound and Torpoint	Sailing	-	196
1552/1/15	Plymouth Sound and Torpoint	Sailing	-	196
1552/1/18	Plymouth Sound and Torpoint	Sailing	-	196
1552/1/19	Plymouth Sound and Torpoint	Sailing	-	196
1552/1/20	Plymouth Sound and Torpoint	Sailing	-	196
1547/1/1	Various locations within the survey area	Sailing	-	171
1547/1/2	Various locations within the survey area	Sailing	-	171
1547/1/3	Various locations within the survey area	Sailing	-	171
1547/1/4	Various locations within the survey area	Sailing	-	171
1547/1/5	Various locations within the survey area	Sailing	-	171
1547/1/6	Various locations within the survey area	Sailing	-	171
1547/1/7	Various locations within the survey area	Sailing	-	171
1547/1/8	Various locations within the survey area	Sailing	-	171
1547/1/9	Various locations within the survey area	Sailing	-	171
1547/1/10	Various locations within the survey area	Sailing	-	171
1547/1/11	Various locations within the survey area	Sailing	-	171
1547/1/12	Various locations within the survey area	Sailing	-	171
1547/1/13	Various locations within the survey area	Sailing	-	171
1547/1/14	Various locations within the survey area	Sailing	-	171
1547/1/15	Various locations within the survey area	Sailing	-	171
1547/1/16	Various locations within the survey area	Sailing	-	171
1547/1/17	Various locations within the survey area	Sailing	-	171
1547/1/18	Various locations within the survey area	Sailing	-	171
1547/1/19	Various locations within the survey area	Sailing	-	171
1547/1/20	Various locations within the survey area	Sailing	-	171
1547/1/21	Various locations within the survey area	Sailing	-	171
1547/1/22	Various locations within the survey area	Sailing	-	171
1547/1/23	Various locations within the survey area	Sailing	-	171
1547/1/24	Various locations within the survey area	Sailing	-	171
1547/1/25	Various locations within the survey area	Sailing	-	171
1560/2/1	Various locations within the survey area	Sailing	-	162
1422/1/1	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157
1422/1/2	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157
1422/1/3	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157
1422/1/4	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157
1422/1/5	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157
1422/1/6	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157

Table 16. Adults' occupancy rates in and on water in the Devonport aquatic survey area ($h\ y^{-1}$)

Person ID number	Location	Activity	In water	On water
1422/1/7	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157
1422/1/8	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157
1422/1/9	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157
1422/1/10	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157
1422/2/1	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157
1422/2/2	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157
1422/2/3	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157
1422/2/4	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157
1422/2/5	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157
1422/2/6	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157
1422/2/7	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157
1422/2/8	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157
1422/2/9	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157
1422/2/10	River Plym, Plymouth Sound, River Tamar and Hamoaze	Rowing	-	157
1552/2/1	Plymouth Sound	Rowing	-	153
1552/2/2	Plymouth Sound	Rowing	-	153
1552/2/3	Plymouth Sound	Rowing	-	153
1552/2/4	Plymouth Sound	Rowing	-	153
1552/2/5	Plymouth Sound	Rowing	-	153
1552/2/6	Plymouth Sound	Rowing	-	153
1552/2/7	Plymouth Sound	Rowing	-	153
1552/2/8	Plymouth Sound	Rowing	-	153
1552/2/9	Plymouth Sound	Rowing	-	153
1552/2/10	Plymouth Sound	Rowing	-	153
1550/1/1	River Tamar	Sailing	-	117
1428/1/1	River Plym	Rowing	-	104
1428/1/2	River Plym	Rowing	-	104
1428/1/3	River Plym	Rowing	-	104
1428/1/4	River Plym	Rowing	-	104
1428/1/5	River Plym	Rowing	-	104
1428/1/6	River Plym	Rowing	-	104
1428/1/7	River Plym	Rowing	-	104
1428/1/8	River Plym	Rowing	-	104
1428/1/9	River Plym	Rowing	-	104
1428/1/10	River Plym	Rowing	-	104
1428/1/11	River Plym	Rowing	-	104
1428/1/12	River Plym	Rowing	-	104
1428/1/13	River Plym	Rowing	-	104
1428/1/14	River Plym	Rowing	-	104
1428/1/15	River Plym	Rowing	-	104
1428/1/16	River Plym	Rowing	-	104
1428/1/17	River Plym	Rowing	-	104
1428/1/18	River Plym	Rowing	-	104
1428/2/1	River Plym	Rowing	-	104
1428/2/2	River Plym	Rowing	-	104
1428/2/3	River Plym	Rowing	-	104
1428/2/4	River Plym	Rowing	-	104
1428/2/5	River Plym	Rowing	-	104
1428/2/6	River Plym	Rowing	-	104
1428/2/7	River Plym	Rowing	-	104
1428/2/8	River Plym	Rowing	-	104
1428/2/9	River Plym	Rowing	-	104
1428/2/10	River Plym	Rowing	-	104
1428/2/11	River Plym	Rowing	-	104
1428/2/12	River Plym	Rowing	-	104
1529/1/1	River Tamar	Sailing	-	101
1529/2/1	River Tamar	Sailing	-	101
1529/2/2	River Tamar	Sailing	-	101
1529/2/3	River Tamar	Sailing	-	101
1529/2/4	River Tamar	Sailing	-	101
1529/2/5	River Tamar	Sailing	-	101
1529/2/6	River Tamar	Sailing	-	101
1529/2/7	River Tamar	Sailing	-	101
1529/2/8	River Tamar	Sailing	-	101
1529/2/9	River Tamar	Sailing	-	101
1529/2/10	River Tamar	Sailing	-	101
1529/2/11	River Tamar	Sailing	-	101
1529/2/12	River Tamar	Sailing	-	101
1529/2/13	River Tamar	Sailing	-	101
1529/2/14	River Tamar	Sailing	-	101
1529/2/15	River Tamar	Sailing	-	101
1529/2/16	River Tamar	Sailing	-	101

Table 16. Adults' occupancy rates in and on water in the Devonport aquatic survey area ($h\ y^{-1}$)

Person ID number	Location	Activity	In water	On water
1442/2/13	Plymouth Sound, River Plym, River Tamar, River Lynher, River Tavy, Riverside and Hamoaze	Rescue duties	-	90
1442/2/14	Plymouth Sound, River Plym, River Tamar, River Lynher, River Tavy, Riverside and Hamoaze	Rescue duties	-	90
1442/2/15	Plymouth Sound, River Plym, River Tamar, River Lynher, River Tavy, Riverside and Hamoaze	Rescue duties	-	90
1442/2/16	Plymouth Sound, River Plym, River Tamar, River Lynher, River Tavy, Riverside and Hamoaze	Rescue duties	-	90
1442/2/17	Plymouth Sound, River Plym, River Tamar, River Lynher, River Tavy, Riverside and Hamoaze	Rescue duties	-	90
1442/2/18	Plymouth Sound, River Plym, River Tamar, River Lynher, River Tavy, Riverside and Hamoaze	Rescue duties	-	90
1442/2/19	Plymouth Sound, River Plym, River Tamar, River Lynher, River Tavy, Riverside and Hamoaze	Rescue duties	-	90
1442/2/20	Plymouth Sound, River Plym, River Tamar, River Lynher, River Tavy, Riverside and Hamoaze	Rescue duties	-	90
1433/1/1	Hamoaze and Plymouth Sound	Sailing	-	87
1433/2/1	Plymouth Sound and Hamoaze	Sailing	-	87
1497/1/1	River Plym and River Tamar	Angling	-	80
1552/4/1	Plymouth Sound and Torpoint	Sailing	-	78
1552/4/2	Plymouth Sound and Torpoint	Sailing	-	78
1552/4/3	Plymouth Sound and Torpoint	Sailing	-	78
1552/4/4	Plymouth Sound and Torpoint	Sailing	-	78
1552/4/5	Plymouth Sound and Torpoint	Sailing	-	78
1552/4/6	Plymouth Sound and Torpoint	Sailing	-	78
1552/4/7	Plymouth Sound and Torpoint	Sailing	-	78
1552/4/8	Plymouth Sound and Torpoint	Sailing	-	78
1552/4/9	Plymouth Sound and Torpoint	Sailing	-	78
1552/4/10	Plymouth Sound and Torpoint	Sailing	-	78
1430/1/1	Mount Batten Point	Paddling	-	52
1493/1/1	River Tamar	Pleasure cruising	-	52
1647/1/1	River Tamar	Boat angling	-	48
1441/1/1	Various locations within the survey area	Canoeing	-	48
1421/1/1	Hamoaze and Plymouth Sound	Pleasure cruising	-	39
1502/1/1	Firestone Bay	Paddling	-	26
1502/2/1	Firestone Bay	Paddling	-	26
1657/2/1	Drakes Island	Angling	-	12
1598/1/1	Cremyll	Canoeing	-	10
1587/1/1	Cremyll	Push netting	-	2

Table 17. Children's and infants' occupancy rates in and on water in the Devonport aquatic survey area ($h\ y^{-1}$)

Child age group (6 - 15 years old)

Person ID number	Age	Location	Activity	In water	On water
1558/1/1	11	Saltash Waterside	Swimming	120	-
1558/2/1	12	Saltash Waterside	Swimming	120	-
1558/3/1	13	Saltash Waterside	Swimming	120	-
1558/4/1	12	Saltash Waterside	Swimming	120	-
1558/5/1	12	Saltash Waterside	Swimming	120	-
1634/3/1	13	Kingsand	Kayaking	102	-
1634/4/1	11	Kingsand	Kayaking	102	-
1485/2/1	7	Firestone Bay	Paddling	-	65
1485/3/1	10	Firestone Bay	Paddling	-	65
1430/2/1	8	Mount Batten Point	Paddling	-	52
1441/2/1	14	Various locations	Canoeing	-	48
1448/1/1	15	Various locations	Canoeing	-	48
1502/4/1	6	Firestone Bay	Paddling	-	26
1598/2/1	12	Cremyll	Canoeing	-	10
1495/3/1	7	Firestone Bay	Paddling	-	5

Infant age group (0-5 years old)

Person ID number	Age	Location	Activity	In water	On water
1440/3/1	5	Mount Batten Point	Swimming	6	-
1440/4/1	2	Mount Batten Point	Swimming	6	-
1430/3/1	3	Mount Batten Point	Paddling	-	52
1502/3/1	4	Firestone Bay	Paddling	-	26

Table 18. Adults' consumption rates of green vegetables from the Devonport terrestrial survey area (kg y⁻¹)

Person ID number	Asparagus	Broccoli	Brussels sprout	Cabbage	Cauliflower	Chard	Courgette	Cucumber	Globe artichoke	Kale	Lettuce	Spinach	Total
1657/1/1	-	-	9.0	24.0	-	-	3.6	-	-	-	-	-	36.6
1657/2/1	-	-	9.0	24.0	-	-	3.6	-	-	-	-	-	36.6
1657/3/1	-	-	9.0	24.0	-	-	3.6	-	-	-	-	-	36.6
1657/4/1	-	-	9.0	24.0	-	-	3.6	-	-	-	-	-	36.6
1657/5/1	-	-	9.0	24.0	-	-	3.6	-	-	-	-	-	36.6
1605/1/1	-	4.6	1.5	-	-	-	3.1	23.1	-	-	2.0	1.0	35.5
1481/1/1	-	-	5.5	21.3	-	-	-	-	-	-	5.0	-	31.7
1481/2/1	-	-	5.5	21.3	-	-	-	-	-	-	5.0	-	31.7
1632/1/1	1.6	-	-	-	2.6	-	-	16.3	-	0.5	0.4	0.6	22.0
1632/2/1	1.6	-	-	-	2.6	-	-	16.3	-	0.5	0.4	0.6	22.0
1632/2/2	1.6	-	-	-	2.6	-	-	16.3	-	0.5	0.4	0.6	22.0
1632/2/3	1.6	-	-	-	2.6	-	-	16.3	-	0.5	0.4	0.6	22.0
1632/2/4	1.6	-	-	-	2.6	-	-	16.3	-	0.5	0.4	0.6	22.0
1646/1/1	-	-	9.6	8.9	-	-	2.6	-	-	-	-	-	21.1
1646/2/1	-	-	9.6	8.9	-	-	2.6	-	-	-	-	-	21.1
1608/1/1	1.0	-	-	-	-	2.4	3.7	2.6	-	10.2	-	-	19.9
1608/2/1	1.0	-	-	-	-	2.4	3.7	2.6	-	10.2	-	-	19.9
1608/3/1	1.0	-	-	-	-	2.4	3.7	2.6	-	10.2	-	-	19.9
1608/4/1	1.0	-	-	-	-	2.4	3.7	2.6	-	10.2	-	-	19.9
1388/1/1	-	2.2	1.1	7.3	-	-	2.2	1.4	-	1.9	1.6	1.0	18.8
1499/1/1	-	4.1	1.1	4.6	0.8	1.0	5.5	-	-	-	1.0	-	18.0
1533/1/1	-	-	-	-	-	-	14.7	-	-	-	-	-	14.7
1522/1/1	-	5.4	3.3	-	-	-	3.3	-	-	-	2.7	-	14.7
1503/1/1	0.3	-	-	9.7	1.5	-	-	-	-	-	-	-	11.6
1503/2/1	0.3	-	-	9.7	1.5	-	-	-	-	-	-	-	11.6
1476/1/1	-	-	4.6	6.4	-	-	-	-	-	-	-	-	10.9
1476/2/1	-	-	4.6	6.4	-	-	-	-	-	-	-	-	10.9
1498/1/1	-	-	1.4	-	-	1.9	0.09	6.1	-	-	1.0	-	10.4
1498/2/1	-	-	1.4	-	-	1.9	0.09	6.1	-	-	1.0	-	10.4
1549/1/1	-	-	-	-	-	3.6	-	-	1.9	-	-	3.8	9.3
1549/2/1	-	-	-	-	-	3.6	-	-	1.9	-	-	3.8	9.3
1472/1/1	-	-	-	-	-	-	-	8.5	-	-	0.3	-	8.8
1472/2/1	-	-	-	-	-	-	-	8.5	-	-	0.3	-	8.8
1599/1/1	-	1.2	3.5	-	-	-	1.6	-	-	-	-	0.1	8.1
1599/2/1	-	1.2	3.5	-	-	-	1.6	-	-	-	-	0.1	8.1

Table 18. Adults' consumption rates of green vegetables from the Devonport terrestrial survey area (kg y⁻¹)

Person ID number	Asparagus	Broccoli	Brussels sprout	Cabbage	Cauliflower	Chard	Courgette	Cucumber	Globe artichoke	Kale	Lettuce	Spinach	Total
1596/1/1	-	-	2.0	2.9	-	-	2.5	-	-	-	-	-	7.4
1596/2/1	-	-	2.0	2.9	-	-	2.5	-	-	-	-	-	7.4
1596/3/1	-	-	2.0	2.9	-	-	2.5	-	-	-	-	-	7.4
1596/4/1	-	-	2.0	2.9	-	-	2.5	-	-	-	-	-	7.4
1596/5/1	-	-	2.0	2.9	-	-	2.5	-	-	-	-	-	7.4
1596/6/1	-	-	2.0	2.9	-	-	2.5	-	-	-	-	-	7.4
1596/7/1	-	-	2.0	2.9	-	-	2.5	-	-	-	-	-	7.4
1596/8/1	-	-	2.0	2.9	-	-	2.5	-	-	-	-	-	7.4
1539/1/1	-	-	1.8	-	-	-	5.5	-	-	-	-	-	7.3
1539/2/1	-	-	1.8	-	-	-	5.5	-	-	-	-	-	7.3
1385/1/1	-	-	-	0.6	-	1.1	-	2.2	2.2	-	-	-	6.1
1475/1/1	-	-	3.6	-	-	-	-	-	-	-	-	-	3.6
1387/1/1	-	-	-	-	-	0.6	2.9	-	-	-	-	-	3.6
1606/1/1	-	-	-	-	-	-	-	2.7	-	-	-	-	2.7
1606/2/1	-	-	-	-	-	-	-	2.7	-	-	-	-	2.7
1394/1/1	-	-	-	-	-	-	-	2.5	-	-	-	-	2.5
1394/2/1	-	-	-	-	-	-	-	2.5	-	-	-	-	2.5
1606/3/1	-	-	-	-	-	-	-	0.7	-	-	-	-	0.7
1606/4/1	-	-	-	-	-	-	-	0.7	-	-	-	-	0.7
1594/1/1	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5
1594/2/1	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5
1594/2/2	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5
1594/2/3	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5
1594/2/4	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5
1385/2/1	-	-	-	-	-	0.2	-	-	0.3	-	-	-	0.5
1385/3/1	-	-	-	-	-	0.2	-	-	0.3	-	-	-	0.5

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of green vegetables for adults based on the 23 high-rate consumers is 25.4 kg y⁻¹

The observed 97.5th percentile rate based on 61 observations is 36.6 kg y⁻¹

Table 19. Adults' consumption rates of other vegetables from the Devonport terrestrial survey area (kg y⁻¹)

Person ID number	Aubergine	Broad bean	Chilli pepper	French bean	Pea	Pepper	Pumpkin	Runner bean	Squash	Sweetcorn	Tomato	Total
1657/1/1	-	9.0	-	-	1.8	-	-	5.4	8.0	-	18.1	42.4
1657/2/1	-	9.0	-	-	1.8	-	-	5.4	8.0	-	18.1	42.4
1657/3/1	-	9.0	-	-	1.8	-	-	5.4	8.0	-	18.1	42.4
1657/4/1	-	9.0	-	-	1.8	-	-	5.4	8.0	-	18.1	42.4
1657/5/1	-	9.0	-	-	1.8	-	-	5.4	8.0	-	18.1	42.4
1606/1/1	-	-	-	-	-	-	-	20.4	-	4.6	4.3	29.3
1606/2/1	-	-	-	-	-	-	-	20.4	-	4.6	4.3	29.3
1539/1/1	-	-	-	-	-	-	3.0	3.4	-	2.3	18.0	26.7
1539/2/1	-	-	-	-	-	-	3.0	3.4	-	2.3	18.0	26.7
1608/1/1	-	-	-	-	-	-	1.5	19.6	0.5	0.7	-	22.2
1608/2/1	-	-	-	-	-	-	1.5	19.6	0.5	0.7	-	22.2
1608/3/1	-	-	-	-	-	-	1.5	19.6	0.5	0.7	-	22.2
1608/4/1	-	-	-	-	-	-	1.5	19.6	0.5	0.7	-	22.2
1394/1/1	-	5.0	-	-	1.0	-	-	15.0	-	-	-	21.0
1394/2/1	-	5.0	-	-	1.0	-	-	15.0	-	-	-	21.0
1385/1/1	1.4	-	-	-	0.03	0.6	12.4	-	1.2	1.2	2.5	19.4
1646/1/1	-	-	-	-	-	-	-	16.3	-	-	-	16.3
1646/2/1	-	-	-	-	-	-	-	16.3	-	-	-	16.3
1533/1/1	-	-	-	3.6	-	-	-	10.2	-	-	-	13.8
1499/1/1	-	-	-	-	0.4	-	-	-	-	0.6	12.4	13.5
1594/1/1	-	-	-	-	-	-	12.0	-	-	-	-	12.0
1594/2/1	-	-	-	-	-	-	12.0	-	-	-	-	12.0
1594/2/2	-	-	-	-	-	-	12.0	-	-	-	-	12.0
1594/2/3	-	-	-	-	-	-	12.0	-	-	-	-	12.0
1594/2/4	-	-	-	-	-	-	12.0	-	-	-	-	12.0
1632/1/1	-	-	-	1.7	0.7	0.2	-	0.5	-	1.3	6.3	10.8
1632/2/1	-	-	-	1.7	0.7	0.2	-	0.5	-	1.3	6.3	10.8
1632/2/2	-	-	-	1.7	0.7	0.2	-	0.5	-	1.3	6.3	10.8
1632/2/3	-	-	-	1.7	0.7	0.2	-	0.5	-	1.3	6.3	10.8
1632/2/4	-	-	-	1.7	0.7	0.2	-	0.5	-	1.3	6.3	10.8
1503/1/1	-	-	-	5.2	-	-	-	5.4	-	-	-	10.6
1503/2/1	-	-	-	5.2	-	-	-	5.4	-	-	-	10.6
1605/1/1	-	1.4	0.9	1.2	0.5	1.8	2.6	-	1.5	-	-	9.9
1387/1/1	-	-	-	-	-	-	4.8	1.6	1.5	-	1.4	9.3
1606/3/1	-	-	-	-	-	-	-	5.1	-	1.2	1.1	7.3
1606/4/1	-	-	-	-	-	-	-	5.1	-	1.2	1.1	7.3

Table 19. Adults' consumption rates of other vegetables from the Devonport terrestrial survey area (kg y⁻¹)

Person ID number	Aubergine	Broad bean	Chilli pepper	French bean	Pea	Pepper	Pumpkin	Runner bean	Squash	Sweetcorn	Tomato	Total
1599/1/1	-	-	0.02	-	0.04	0.5	5.1	-	1.2	-	-	6.9
1599/2/1	-	-	0.02	-	0.04	0.5	5.1	-	1.2	-	-	6.9
1388/1/1	-	-	-	2.2	-	-	2.4	-	0.7	0.7	-	6.0
1623/1/1	-	-	-	-	-	0.6	-	-	-	0.1	4.6	5.3
1623/2/1	-	-	-	-	-	0.6	-	-	-	0.1	4.6	5.3
1622/1/1	-	-	-	-	1.0	-	-	4.1	-	-	-	5.0
1622/2/1	-	-	-	-	1.0	-	-	4.1	-	-	-	5.0
1522/1/1	1.8	-	-	-	-	-	-	-	-	3.1	-	4.9
1596/1/1	-	-	-	-	2.5	-	-	1.1	-	1.2	-	4.8
1596/2/1	-	-	-	-	2.5	-	-	1.1	-	1.2	-	4.8
1596/3/1	-	-	-	-	2.5	-	-	1.1	-	1.2	-	4.8
1596/4/1	-	-	-	-	2.5	-	-	1.1	-	1.2	-	4.8
1596/5/1	-	-	-	-	2.5	-	-	1.1	-	1.2	-	4.8
1596/6/1	-	-	-	-	2.5	-	-	1.1	-	1.2	-	4.8
1596/7/1	-	-	-	-	2.5	-	-	1.1	-	1.2	-	4.8
1596/8/1	-	-	-	-	2.5	-	-	1.1	-	1.2	-	4.8
1498/1/1	-	-	-	-	-	0.6	-	-	-	1.4	2.2	4.1
1498/2/1	-	-	-	-	-	0.6	-	-	-	1.4	2.2	4.1
1481/1/1	-	-	-	-	-	-	-	-	-	3.5	-	3.5
1481/2/1	-	-	-	-	-	-	-	-	-	3.5	-	3.5
1385/2/1	0.2	-	-	-	-	-	1.9	-	-	0.2	0.4	2.7
1385/3/1	0.2	-	-	-	-	-	1.9	-	-	0.2	0.4	2.7
1476/1/1	-	-	-	-	0.8	-	-	1.5	-	-	-	2.3
1476/2/1	-	-	-	-	0.8	-	-	1.5	-	-	-	2.3
1472/1/1	-	-	-	-	-	-	-	1.3	-	-	-	1.3
1472/2/1	-	-	-	-	-	-	-	1.3	-	-	-	1.3
1549/1/1	-	-	-	-	1.0	-	-	-	-	-	-	1.0
1549/2/1	-	-	-	-	1.0	-	-	-	-	-	-	1.0

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of other vegetables for adults based on the 18 high-rate consumers is 28.2 kg y⁻¹

The observed 97.5th percentile rate based on 64 observations is 42.4 kg y⁻¹

Table 20. Adults' consumption rates of root vegetables from the Devonport terrestrial survey area (kg y⁻¹)

Person ID number	Beetroot	Carrot	Celery	Garlic	Jerusalem artichoke	Kohl rabi	Leek	Onion	Parsnip	Radish	Spring onion	Swede	Sweet potato	Turnip	Total
1622/1/1	9.0	1.4	-	-	-	-	-	3.9	-	-	-	15.2	-	-	29.5
1622/2/1	9.0	1.4	-	-	-	-	-	3.9	-	-	-	15.2	-	-	29.5
1623/1/1	-	-	-	-	-	-	4.1	-	-	-	-	24.5	-	-	28.5
1623/2/1	-	-	-	-	-	-	4.1	-	-	-	-	24.5	-	-	28.5
1632/1/1	3.5	8.2	0.8	-	-	0.6	0.8	1.7	-	0.1	-	10.5	-	-	26.1
1632/2/1	3.5	8.2	0.8	-	-	0.6	0.8	1.7	-	0.1	-	10.5	-	-	26.1
1632/2/2	3.5	8.2	0.8	-	-	0.6	0.8	1.7	-	0.1	-	10.5	-	-	26.1
1632/2/3	3.5	8.2	0.8	-	-	0.6	0.8	1.7	-	0.1	-	10.5	-	-	26.1
1632/2/4	3.5	8.2	0.8	-	-	0.6	0.8	1.7	-	0.1	-	10.5	-	-	26.1
1503/1/1	-	-	-	-	2.9	-	-	-	-	-	-	16.3	-	4.3	23.5
1503/2/1	-	-	-	-	2.9	-	-	-	-	-	-	16.3	-	4.3	23.5
1522/1/1	6.5	-	-	-	-	-	-	2.6	-	1.8	-	-	-	3.9	14.8
1599/1/1	9.4	-	-	0.3	-	-	-	4.7	-	-	0.1	-	-	-	14.6
1599/2/1	9.4	-	-	0.3	-	-	-	4.7	-	-	0.1	-	-	-	14.6
1539/1/1	5.6	-	-	-	-	-	5.0	-	3.6	-	-	-	-	-	14.2
1539/2/1	5.6	-	-	-	-	-	5.0	-	3.6	-	-	-	-	-	14.2
1608/1/1	3.8	-	-	-	-	-	3.5	-	-	0.4	-	-	-	5.3	12.9
1608/2/1	3.8	-	-	-	-	-	3.5	-	-	0.4	-	-	-	5.3	12.9
1608/3/1	3.8	-	-	-	-	-	3.5	-	-	0.4	-	-	-	5.3	12.9
1608/4/1	3.8	-	-	-	-	-	3.5	-	-	0.4	-	-	-	5.3	12.9
1605/1/1	1.9	-	-	-	-	-	-	7.5	-	-	0.4	-	-	-	9.8
1596/1/1	2.5	-	-	-	-	1.7	2.0	-	0.7	-	-	1.8	1.0	-	9.8
1596/2/1	2.5	-	-	-	-	1.7	2.0	-	0.7	-	-	1.8	1.0	-	9.8
1596/3/1	2.5	-	-	-	-	1.7	2.0	-	0.7	-	-	1.8	1.0	-	9.8
1596/4/1	2.5	-	-	-	-	1.7	2.0	-	0.7	-	-	1.8	1.0	-	9.8
1596/5/1	2.5	-	-	-	-	1.7	2.0	-	0.7	-	-	1.8	1.0	-	9.8
1596/6/1	2.5	-	-	-	-	1.7	2.0	-	0.7	-	-	1.8	1.0	-	9.8
1596/7/1	2.5	-	-	-	-	1.7	2.0	-	0.7	-	-	1.8	1.0	-	9.8
1596/8/1	2.5	-	-	-	-	1.7	2.0	-	0.7	-	-	1.8	1.0	-	9.8
1388/1/1	2.7	0.5	-	-	-	-	4.1	-	1.1	-	-	-	-	-	8.4
1657/1/1	0.9	0.5	-	-	-	-	-	1.8	-	-	-	-	-	3.5	6.7
1657/2/1	0.9	0.5	-	-	-	-	-	1.8	-	-	-	-	-	3.5	6.7
1657/3/1	0.9	0.5	-	-	-	-	-	1.8	-	-	-	-	-	3.5	6.7
1657/4/1	0.9	0.5	-	-	-	-	-	1.8	-	-	-	-	-	3.5	6.7
1657/5/1	0.9	0.5	-	-	-	-	-	1.8	-	-	-	-	-	3.5	6.7
1533/1/1	-	-	-	1.8	-	-	-	4.5	-	-	-	-	-	-	6.4

Table 20. Adults' consumption rates of root vegetables from the Devonport terrestrial survey area (kg y⁻¹)

Person ID number	Beetroot	Carrot	Celery	Garlic	Jerusalem artichoke	Kohl rabi	Leek	Onion	Parsnip	Radish	Spring onion	Swede	Sweet potato	Turnip	Total
1602/1/1	-	-	-	-	-	-	0.5	5.3	0.4	-	-	-	-	-	6.2
1602/2/1	-	-	-	-	-	-	0.5	5.3	0.4	-	-	-	-	-	6.2
1387/1/1	0.3	-	-	-	-	-	-	3.6	-	1.1	0.4	-	-	-	5.4
1498/1/1	2.4	1.1	-	0.3	-	-	1.1	-	-	-	-	-	-	-	4.9
1498/2/1	2.4	1.1	-	0.3	-	-	1.1	-	-	-	-	-	-	-	4.9
1499/1/1	1.8	-	-	-	-	-	-	-	-	-	0.4	-	-	-	2.2
1594/1/1	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
1594/2/1	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
1594/2/2	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
1594/2/3	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
1594/2/4	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6
1549/1/1	-	-	-	0.03	-	-	-	0.4	-	-	-	-	-	-	0.5
1549/2/1	-	-	-	0.03	-	-	-	0.4	-	-	-	-	-	-	0.5

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of root vegetables for adults based on the 20 high-rate consumers is 20.9 kg y⁻¹

The observed 97.5th percentile rate based on 49 observations is 29.3 kg y⁻¹

Table 21. Adults' consumption rates of potato from the Devonport terrestrial survey area (kg y⁻¹)

Person ID number	Potato
1657/1/1	100.0
1657/2/1	100.0
1657/3/1	100.0
1657/4/1	100.0
1657/5/1	100.0
1605/1/1	76.1
1503/1/1	58.2
1503/2/1	58.2
1394/1/1	50.0
1394/2/1	50.0
1484/1/1	47.3
1484/2/1	47.3
1602/1/1	31.0
1602/2/1	31.0
1623/1/1	19.7
1623/2/1	19.7
1599/1/1	19.1
1599/2/1	19.1
1622/1/1	15.2
1622/2/1	15.2
1522/1/1	13.1
1539/1/1	12.5
1539/2/1	12.5
1481/1/1	7.6
1481/2/1	7.6
1476/1/1	6.8
1476/2/1	6.8
1596/1/1	6.1
1596/2/1	6.1
1596/3/1	6.1
1596/4/1	6.1
1596/5/1	6.1
1596/6/1	6.1
1596/7/1	6.1
1596/8/1	6.1
1388/1/1	2.7
1608/1/1	2.5
1608/2/1	2.5
1608/3/1	2.5
1608/4/1	2.5
1387/1/1	2.4
1549/1/1	1.1
1549/2/1	1.1

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of potato for adults based on the 12 high-rate consumers is 73.9 kg y⁻¹

The observed 97.5th percentile rate based on 43 observations is 100.0 kg y⁻¹

Table 22. Adults' consumption rates of domestic fruit from the Devonport terrestrial survey area (kg y⁻¹)

Person ID number	Apple	Blackberry	Blackcurrant	Blueberry	Cherry	Fig	Gooseberry	Loganberry	Pear	Plum	Raspberry	Redcurrant	Rhubarb	Strawberry	Tayberry	White currant	Total
1608/1/1	7.0	-	-	-	-	0.5	-	-	-	-	1.1	0.3	4.0	8.5	-	-	21.5
1608/2/1	7.0	-	-	-	-	0.5	-	-	-	-	1.1	0.3	4.0	8.5	-	-	21.5
1608/3/1	7.0	-	-	-	-	0.5	-	-	-	-	1.1	0.3	4.0	8.5	-	-	21.5
1608/4/1	7.0	-	-	-	-	0.5	-	-	-	-	1.1	0.3	4.0	8.5	-	-	21.5
1498/1/1	0.4	-	1.4	0.2	0.2	-	0.7	0.1	-	9.0	2.4	-	2.1	4.8	-	-	21.4
1498/2/1	0.4	-	1.4	0.2	0.2	-	0.7	0.1	-	9.0	2.4	-	2.1	4.8	-	-	21.4
1622/1/1	9.5	-	-	-	-	-	-	-	-	-	-	-	6.2	-	-	-	15.7
1622/2/1	9.5	-	-	-	-	-	-	-	-	-	-	-	6.2	-	-	-	15.7
1623/1/1	15.0	-	-	-	-	-	-	-	-	-	-	-	-	0.4	-	-	15.4
1623/2/1	15.0	-	-	-	-	-	-	-	-	-	-	-	-	0.4	-	-	15.4
1385/1/1	1.5	-	2.6	0.7	-	-	2.6	-	1.5	-	0.7	-	4.0	1.7	-	-	15.2
1605/1/1	-	8.5	-	2.0	-	-	-	-	-	-	2.6	-	-	1.7	-	-	14.8
1499/1/1	-	-	0.2	-	-	-	0.2	-	-	-	-	-	2.8	11.3	-	-	14.6
1646/1/1	-	2.0	2.1	-	-	-	-	-	-	-	-	2.1	-	4.2	-	-	10.4
1646/2/1	-	2.0	2.1	-	-	-	-	-	-	-	-	2.1	-	4.2	-	-	10.4
1549/1/1	-	-	-	-	-	-	1.0	-	-	-	6.0	1.0	1.1	-	-	-	9.1
1549/2/1	-	-	-	-	-	-	1.0	-	-	-	6.0	1.0	1.1	-	-	-	9.1
1533/1/1	-	-	2.3	-	-	-	1.4	-	-	-	-	-	-	4.5	-	-	8.2
1522/1/1	-	-	-	-	-	-	-	-	-	-	-	-	6.2	1.2	-	-	7.4
1596/1/1	3.9	-	-	-	-	-	-	-	-	-	2.2	-	0.5	-	-	-	6.7
1596/2/1	3.9	-	-	-	-	-	-	-	-	-	2.2	-	0.5	-	-	-	6.7
1596/3/1	3.9	-	-	-	-	-	-	-	-	-	2.2	-	0.5	-	-	-	6.7
1596/4/1	3.9	-	-	-	-	-	-	-	-	-	2.2	-	0.5	-	-	-	6.7
1596/5/1	3.9	-	-	-	-	-	-	-	-	-	2.2	-	0.5	-	-	-	6.7
1596/6/1	3.9	-	-	-	-	-	-	-	-	-	2.2	-	0.5	-	-	-	6.7
1596/7/1	3.9	-	-	-	-	-	-	-	-	-	2.2	-	0.5	-	-	-	6.7
1596/8/1	3.9	-	-	-	-	-	-	-	-	-	2.2	-	0.5	-	-	-	6.7
1503/1/1	-	-	0.3	-	-	-	0.3	-	-	-	0.6	0.6	3.7	0.6	-	-	6.2
1503/2/1	-	-	0.3	-	-	-	0.3	-	-	-	0.6	0.6	3.7	0.6	-	-	6.2
1484/1/1	1.8	1.0	0.7	0.1	-	-	-	-	-	0.2	-	0.1	0.5	0.9	0.4	-	5.7
1484/2/1	1.8	1.0	0.7	0.1	-	-	-	-	-	0.2	-	0.1	0.5	0.9	0.4	-	5.7
1657/1/1	-	-	-	-	-	-	-	-	-	-	2.3	-	-	2.3	-	-	4.5
1657/2/1	-	-	-	-	-	-	-	-	-	-	2.3	-	-	2.3	-	-	4.5
163573/1	-	-	-	-	-	-	-	-	-	-	2.3	-	-	2.3	-	-	4.5
1657/4/1	-	-	-	-	-	-	-	-	-	-	2.3	-	-	2.3	-	-	4.5
1632/1/1	1.5	-	0.2	0.2	-	-	0.5	-	-	-	-	0.4	-	1.3	-	0.4	4.3
1632/2/1	1.5	-	0.2	0.2	-	-	0.5	-	-	-	-	0.4	-	1.3	-	0.4	4.3
1632/2/2	1.5	-	0.2	0.2	-	-	0.5	-	-	-	-	0.4	-	1.3	-	0.4	4.3
1632/2/3	1.5	-	0.2	0.2	-	-	0.5	-	-	-	-	0.4	-	1.3	-	0.4	4.3
1632/2/4	1.5	-	0.2	0.2	-	-	0.5	-	-	-	-	0.4	-	1.3	-	0.4	4.3

Table 22. Adults' consumption rates of domestic fruit from the Devonport terrestrial survey area (kg y⁻¹)

Person ID number	Apple	Blackberry	Blackcurrant	Blueberry	Cherry	Fig	Gooseberry	Loganberry	Pear	Plum	Raspberry	Redcurrant	Rhubarb	Strawberry	Tayberry	White currant	Total
1539/1/1	-	-	1.1	-	-	-	-	-	-	-	-	1.1	-	2.0	-	-	4.3
1539/2/1	-	-	1.1	-	-	-	-	-	-	-	-	1.1	-	2.0	-	-	4.3
1599/1/1	-	0.5	0.1	0.2	-	-	-	-	-	-	0.1	-	1.0	0.2	-	-	2.0
1599/2/1	-	0.5	0.1	0.2	-	-	-	-	-	-	0.1	-	1.0	0.2	-	-	2.0
1385/2/1	-	-	0.4	-	-	-	0.4	-	-	-	0.1	-	0.6	0.3	-	-	1.8
1385/3/1	-	-	0.4	-	-	-	0.4	-	-	-	0.1	-	0.6	0.3	-	-	1.8
1388/1/1	-	-	-	-	-	-	-	-	-	-	-	-	0.9	-	-	-	0.9
1475/1/1	-	-	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-	0.8
1476/1/1	-	-	0.2	-	-	-	-	-	-	-	0.2	-	-	-	-	-	0.4
1476/2/1	-	-	0.2	-	-	-	-	-	-	-	0.2	-	-	-	-	-	0.4

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of domestic fruit for adults based on the 19 high-rate consumers is 15.4 kg y⁻¹

The observed 97.5th percentile rate based on 50 observations is 21.5 kg y⁻¹

Table 23. Adults' consumption rates of cattle meat from the Devonport terrestrial survey area (kg y⁻¹)

Person ID number	Beef
1513/1/1	23.6
1513/2/1	23.6
1513/3/1	23.6
1513/4/1	23.6
1391/1/1	17.0
1391/2/1	17.0
1391/3/1	17.0
1391/4/1	17.0
1391/5/1	17.0

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of cattle meat for adults based on the 9 high-rate consumers is 20.0 kg y⁻¹

The observed 97.5th percentile rate based on 9 observations is 23.6 kg y⁻¹

Table 24. Adults' consumption rates of sheep meat from the Devonport terrestrial survey area (kg y⁻¹)

Person ID number	Lamb
1512/1/1	4.5
1512/2/1	4.5
1391/1/1	2.3
1391/2/1	2.3
1391/3/1	2.3
1391/4/1	2.3
1391/5/1	2.3
1512/3/1	1.1
1512/4/1	1.1

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of sheep meat for adults based on the 7 high-rate consumers is 2.9 kg y⁻¹

The observed 97.5th percentile rate based on 9 observations is 4.5 kg y⁻¹

Table 25. Adults' consumption rates of poultry from the Devonport terrestrial survey area (kg y⁻¹)

Person ID number	Partridge	Pheasant	Pigeon	Total
1569/1/1	4.1	4.5	2.6	11.1
1569/2/1	-	-	2.6	2.6
1596/1/1	-	1.6	-	1.6
1512/1/1	-	1.1	-	1.1
1512/2/1	-	1.1	-	1.1
1512/3/1	-	0.3	-	0.3
1512/4/1	-	0.3	-	0.3

Notes

The emboldened observation is the high-rate consumer

The mean consumption rate of poultry for adults based on the 1 high-rate consumer is 11.1 kg y⁻¹

The observed 97.5th percentile rate based on 7 observations is 9.9 kg y⁻¹

Table 26. Adults' consumption rates of wild/free foods from the Devonport terrestrial survey area (kg y⁻¹)

Person ID number	Blackberry
1623/1/1	1.8
1623/2/1	1.8
1533/1/1	1.4
1657/1/1	1.1
1657/2/1	1.1
1657/3/1	1.1
1657/4/1	1.1
1622/1/1	1.1
1622/2/1	1.1
1512/1/1	0.7
1512/2/1	0.7
1610/1/1	0.7
1610/2/1	0.7
1610/3/1	0.7
1476/1/1	0.1
1476/2/1	0.1

Notes

Embodened observations are the high-rate consumers

The mean consumption rate of wild/free foods for adults based on the 14 high-rate consumers is 1.1 kg y⁻¹

The observed 97.5th percentile rate based on 16 observations is 1.8 kg y⁻¹

Table 27. Adults' consumption rates of rabbits/hares from the Devonport terrestrial survey area (kg y⁻¹)

Person ID number	Rabbit
1569/1/1	5.4

Notes

The emboldened observation is the high-rate consumer

The mean consumption rate of rabbits/hares for adults based on the 1 high-rate consumer is 5.4 kg y⁻¹

The observed 97.5th percentile is not applicable for 1 observation

Table 28. Adults' consumption rates of honey from the Devonport terrestrial survey area (kg y⁻¹)

Person ID number	Honey
1472/2/1	12.2
1606/1/1	6.8
1606/2/1	6.8
1582/2/1	5.2
1533/1/1	4.5
1512/1/1	1.6
1512/2/1	1.6
1567/1/1	0.9
1567/2/1	0.9
1582/1/1	0.2

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of honey for adults based on the 5 high-rate consumers is 7.1 kg y⁻¹

The observed 97.5th percentile rate based on 10 observations is 11.0 kg y⁻¹

Table 29. Adults' consumption rates of wild fungi from the Devonport terrestrial survey area (kg y⁻¹)

Person ID number	Mushrooms
1512/1/1	0.7
1512/2/1	0.7

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of wild fungi for adults based on the 2 high-rate consumers is 0.7 kg y⁻¹

The observed 97.5th percentile rate based on 2 observations is 0.7 kg y⁻¹

Table 30. Adults' consumption rates of venison from the Devonport terrestrial survey area (kg y⁻¹)

Person ID number	Venison
1512/1/1	18.8
1512/2/1	18.8
1569/1/1	13.8
1569/2/1	13.8
1513/1/1	11.8
1513/2/1	11.8
1513/3/1	11.8
1513/4/1	11.8
1512/3/1	4.7
1512/4/1	4.7

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of venison for adults based on the 8 high-rate consumers is 14.0 kg y⁻¹

The observed 97.5th percentile rate based on 10 observations is 18.8 kg y⁻¹

Table 31. Children's and infants' consumption rates of green vegetables from the Devonport terrestrial survey area (kg y⁻¹)

Child age group (6 - 15 years old)

Person ID number	Age	Broccoli	Brussels sprout	Chard	Courgette	Cucumber	Globe artichoke	Spinach	Total
1599/3/1	15	1.2	3.5	-	1.6	1.8	-	0.1	8.1
1599/4/1	8	0.9	2.6	-	1.2	1.4	-	0.08	6.1
1385/4/1	11	-	-	0.2	-	-	0.3	-	0.5
1385/5/1	9	-	-	0.2	-	-	0.3	-	0.5

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of green vegetables for the child age group based on the 2 high-rate consumers is 7.1 kg y⁻¹

The observed 97.5th percentile rate based on 4 observations is 8.0 kg y⁻¹

Infant age group (0 - 5 years old)

Person ID number	Age	Broccoli	Brussels sprout	Chard	Courgette	Cucumber	Globe artichoke	Spinach	Total
1385/6/1	5	-	-	0.2	-	-	0.3	-	0.5
1385/7/1	1	-	-	0.2	-	-	0.3	-	0.5

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of green vegetables for the infant age group based on the 2 high-rate consumers is 0.5 kg y⁻¹

The observed 97.5th percentile rate based on 2 observations is 0.5 kg y⁻¹

Table 32. Children's and infants' consumption rates of other vegetables from the Devonport terrestrial survey area (kg y⁻¹)

Child age group (6 - 15 years old)

Person ID number	Age	Aubergine	Chilli pepper	Pea	Pepper	Pumpkin	Squash	Sweetcorn	Tomato	Total
1599/3/1	15	-	0.02	0.04	0.5	5.1	1.2	-	-	6.9
1599/4/1	8	-	0.02	0.03	0.4	3.8	0.9	-	-	5.1
1385/4/1	11	0.2	-	-	-	1.9	-	0.2	0.4	2.7
1385/5/1	9	0.2	-	-	-	1.9	-	0.2	0.4	2.7

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of other vegetables for the child age group based on the 4 high-rate consumers is 4.3 kg y⁻¹

The observed 97.5th percentile rate based on 4 observations is 6.7 kg y⁻¹

Infant age group (0 - 5 years old)

Person ID number	Age	Aubergine	Chilli pepper	Pea	Pepper	Pumpkin	Squash	Sweetcorn	Tomato	Total
1385/6/1	5	0.2	-	-	-	1.9	-	0.2	0.4	2.7
1385/7/1	1	0.2	-	-	-	1.9	-	0.2	0.4	2.7

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of other vegetables for the infant age group based on the 2 high-rate consumers is 2.7 kg y⁻¹

The observed 97.5th percentile rate based on 2 observations is 2.7 kg y⁻¹

Table 33. Children's and infants' consumption rates of root vegetables from the Devonport terrestrial survey area (kg y⁻¹)

Child age group (6 - 15 years old)

Person ID number	Age	Beetroot	Garlic	Onion	Spring onion	Total
1599/3/1	15	9.4	0.3	4.7	0.1	14.6
1599/4/1	8	7.1	0.2	3.5	0.1	10.9

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of root vegetables for the child age group based on the 2 high-rate consumers is 12.7 kg y⁻¹

The observed 97.5th percentile rate based on 2 observations is 14.5 kg y⁻¹

Infant age group (0 - 5 years old)

No consumption data obtained for this food group.

Table 34. Children's and infants' consumption rates of potato from the Devonport terrestrial survey area (kg y⁻¹)

Child age group (6 - 15 years old)

Person ID number	Age	Potato
1599/3/1	15	19.1
1599/4/1	8	14.3

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of potato for the child age group based on the 2 high-rate consumers is 16.7 kg y⁻¹

The observed 97.5th percentile rate based on 2 observations is 19.0 kg y⁻¹

Infant age group (0 - 5 years old)

No consumption data obtained for this food group.

Table 35. Children's and infants' consumption rates of domestic fruit from the Devonport terrestrial survey area (kg y⁻¹)

Child age group (6 - 15 years old)

Person ID number	Age	Blackberry	Blackcurrant	Blueberry	Gooseberry	Raspberry	Rhubarb	Strawberry	Total
1599/3/1	15	0.5	0.1	0.2	-	0.1	1.0	0.2	2.0
1385/4/1	11	-	0.4	-	0.4	0.1	0.6	0.3	1.8
1385/5/1	9	-	0.4	-	0.4	0.1	0.6	0.3	1.8
1599/4/1	8	0.4	0.1	0.1	-	0.1	0.7	0.1	1.5

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of domestic fruit for the child age group based on the 4 high-rate consumers is 1.8 kg y⁻¹

The observed 97.5th percentile rate based on 4 observations is 2.0 kg y⁻¹

Infant age group (0 - 5 years old)

Person ID number	Age	Blackberry	Blackcurrant	Blueberry	Gooseberry	Raspberry	Rhubarb	Strawberry	Total
1385/6/1	5	-	0.4	-	0.4	0.1	0.6	0.3	1.8
1385/7/1	1	-	0.4	-	0.4	0.1	0.6	0.3	1.8

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of domestic fruit for the infant age group based on the 2 high-rate consumers is 1.8 kg y⁻¹

The observed 97.5th percentile rate based on 2 observations is 1.8 kg y⁻¹

Table 36. Children's and infants' consumption rates of honey from the Devonport terrestrial survey area (kg y⁻¹)

Child age group (6 - 15 years old)

Person ID number	Age	Honey
1567/3/1	14	0.9
1567/4/1	9	0.7

Notes

Emboldened observations are the high-rate consumers

The mean consumption rate of honey for the child age group based on the 2 high-rate consumers is 0.8 kg y⁻¹

The observed 97.5th percentile rate based on 2 observations is 0.9 kg y⁻¹

Infant age group (0 - 5 years old)

No consumption data obtained for this food group.

Table 37. Percentage contribution each food type makes to its terrestrial food group for adults

<p>Green vegetables</p> <p>Cabbage 31.1 % Brussels sprout 15.8 % Courgette 13.0 % Cucumber 20.2 % Kale 5.6 % Chard 2.9 % Lettuce 2.7 % Broccoli 2.3 % Cauliflower 2.1 % Spinach 1.9 % Asparagus 1.6 % Globe artichoke 0.8 %</p>	<p>Domestic fruit</p> <p>Apple 28.4 % Strawberry 22.8 % Rhubarb 15.0 % Raspberry 12.5 % Blackcurrant 4.5 % Plum 4.3 % Blackberry 3.7 % Redcurrant 3.2 % Gooseberry 2.7 % Blueberry 1.0 % Fig 0.5 % White currant 0.5 % Pear 0.3 % Cherry 0.3 % Tayberry 0.2 % Loganberry 0.1 %</p>	<p>Wild fungi</p> <p>Mushrooms 100.0 %</p>
<p>Other vegetables</p> <p>Runner bean 33.6 % Tomato 24.5 % Pumpkin 13.2 % Broad bean 6.9 % Sweetcorn 6.2 % Squash 6.0 % Pea 5.1 % French bean 3.2 % Pepper 0.8 % Aubergine 0.4 % Chilli pepper 0.1 %</p>	<p>Cattle meat</p> <p>Beef 100.0 %</p>	<p>Venison</p> <p>Venison 100.0 %</p>
<p>Root vegetables</p> <p>Swede 30.5 % Beetroot 21.5 % Onion 11.0 % Leek 10.1 % Turnip 8.7 % Carrot 8.3 % Kohl rabi 2.8 % Parsnip 2.5 % Sweet potato 1.4 % Jerusalem artichoke 1.0 % Radish 0.8 % Celery 0.7 % Garlic 0.5 % Spring onion 0.3 %</p>	<p>Sheep meat</p> <p>Lamb 100.0 %</p>	
<p>Potato</p> <p>Potato 100.0 %</p>	<p>Poultry</p> <p>Pheasant 48.9 % Pigeon 28.7 % Partridge 22.4 %</p>	
	<p>Wild/free foods</p> <p>Blackberry 100.0 %</p>	
	<p>Rabbits/hares</p> <p>Rabbit 100.0 %</p>	
	<p>Honey</p> <p>Honey 100.0 %</p>	

Notes

Percentages are based on the consumption of all adults in the survey consuming that particular food group

Table 38. Direct radiation occupancy rates for adults, children and infants in the Devonport area (h y⁻¹)

Person ID number	Main activity	Indoor occupancy	Outdoor occupancy	Total occupancy
0 - 0.25 km zone				
1546/1/1	Residing	8760	0	8760
1643/5/1	Residing	8739	21	8760
1642/2/1	Residing	8108	548	8656
1469/1/1	Residing	7727	913	8640
1516/1/1	Residing	8499	104	8604
1516/3/1	Residing	8499	104	8604
1548/1/1	Residing	8221	52	8273
1548/2/1	Residing	8221	52	8273
1548/3/1	Residing	8221	52	8273
1614/3/1	Residing	7568	688	8256
1548/4/1	Residing	8082	52	8134
1516/4/1	Residing	7776	72	7848
1643/1/1	Residing	7459	179	7638
1642/1/1	Residing	6527	43	6570
1642/4/1	Residing	6422	122	6544
1642/5/1	Residing	6422	122	6544
1516/2/1	Residing	6392	78	6470
1642/3/1	Residing	6252	122	6373
1642/6/1	Residing	6172	122	6293
1543/2/1	Residing	5933	358	6291
1643/3/1	Residing	6112	94	6205
1643/4/1	Residing	6112	94	6205
1610/2/1	Residing	4477	1685	6162
1610/3/1	Residing	4477	1685	6162
1546/2/1	Residing	5892	52	5944
1614/2/1	Residing	5182	688	5870
1610/1/1	Residing	5688	145	5833
1543/1/1	Residing	5772	51	5823
1515/1/1	Residing	4428	157	4585
1626/3/1	Working	4503	9	4512
1626/3/2	Working	4503	9	4512
1626/1/1	Working	3255	9	3264
1626/2/1	Working	2743	521	3264
1626/1/2	Working	3255	9	3264
1626/2/2	Working	2743	521	3264
1626/1/3	Working	3255	9	3264
1614/1/1	Residing	2618	238	2856
1643/2/1	Residing	2328	7	2335
1592/1/1	Working	1310	445	1755
1592/2/1	Working	1310	445	1755
1592/2/2	Working	1310	445	1755
1592/2/3	Working	1310	445	1755
1592/2/4	Working	1310	445	1755
1592/2/5	Working	1310	445	1755
1592/2/6	Working	1310	445	1755
1592/2/7	Working	1310	445	1755
1592/2/8	Working	1310	445	1755
1592/2/9	Working	1310	445	1755
1592/2/10	Working	1310	445	1755
1592/2/11	Working	1310	445	1755
1592/3/1	Attending childcare	1265	445	1710

Table 38. Direct radiation occupancy rates for adults, children and infants in the Devonport area ($h\ y^{-1}$)

Person ID number	Main activity	Indoor occupancy	Outdoor occupancy	Total occupancy
1592/4/1	Attending childcare	1265	445	1710
1592/7/1	Attending childcare	1265	445	1710
1592/9/1	Attending childcare	1265	445	1710
1592/3/2	Attending childcare	1265	445	1710
1592/4/2	Attending childcare	1265	445	1710
1592/7/2	Attending childcare	1265	445	1710
1592/9/2	Attending childcare	1265	445	1710
1592/5/1	Attending childcare	632	223	855
1592/6/1	Attending childcare	632	223	855
1592/8/1	Attending childcare	632	223	855
1592/10/1	Attending childcare	632	223	855
1592/5/2	Attending childcare	632	223	855
1592/6/2	Attending childcare	632	223	855
1592/8/2	Attending childcare	632	223	855
1592/10/2	Attending childcare	632	223	855
1592/11/1	Working	460	223	682
1592/11/2	Working	460	223	682
1592/11/3	Working	460	223	682
>0.25 - 0.5 km zone				
1635/2/1	Residing	8146	614	8760
1635/3/1	Residing	8146	614	8760
1635/1/1	Residing	8696	52	8748
1620/3/1	Residing	7873	783	8656
1620/4/1	Residing	7873	783	8656
1619/1/1	Residing	8499	52	8551
1619/2/1	Residing	8499	52	8551
1620/2/1	Residing	7769	783	8551
1506/1/1	Residing	7766	316	8082
1506/3/1	Residing	7766	316	8082
1506/4/1	Residing	7766	316	8082
1590/1/1	Residing	7366	358	7724
1590/2/1	Residing	6676	537	7213
1620/5/1	Residing	6373	783	7156
1629/2/1	Residing	5157	1875	7032
1619/3/1	Residing	5174	1412	6586
1619/4/1	Residing	5174	1412	6586
1619/5/1	Residing	5174	1412	6586
1619/6/1	Residing	5174	1412	6586
1590/3/1	Residing	5857	179	6036
1506/2/1	Residing	5403	72	5475
1629/1/1	Residing	4205	1051	5256
1620/1/1	Residing	3858	783	4641
1629/3/1	Residing	4077	291	4368
1617/1/1	Working	2442	9	2451
1617/2/1	Working	2442	9	2451
1654/1/1	Working	881	806	1687
1654/2/1	Working	881	806	1687
1622/1/1	Tending an allotment plot	-	856	856
1622/2/1	Tending an allotment plot	-	856	856
1623/1/1	Tending an allotment plot	-	679	679
1623/2/1	Tending an allotment plot	-	679	679
1617/3/1	Working	487	9	495

Table 38. Direct radiation occupancy rates for adults, children and infants in the Devonport area ($h\ y^{-1}$)

Person ID number	Main activity	Indoor occupancy	Outdoor occupancy	Total occupancy
1617/3/2	Working	487	9	495
1498/1/1	Tending an allotment plot	-	417	417
1498/2/1	Tending an allotment plot	-	417	417
1503/1/1	Tending an allotment plot	-	261	261
1503/2/1	Tending an allotment plot	-	261	261
>0.5 - 1.0 km zone				
1397/1/1	Residing	7497	1159	8656
1399/4/1	Residing	7217	669	7887
1415/1/1	Residing	7561	156	7717
1454/3/1	Residing	7095	448	7544
1454/2/1	Residing	7208	241	7449
1400/1/1	Residing	7264	157	7421
1456/1/1	Residing	6883	94	6977
1399/1/1	Residing	6023	335	6357
1399/2/1	Residing	6023	335	6357
1415/2/1	Residing	6153	156	6309
1454/1/1	Residing	5087	241	5328
1399/3/1	Residing	4814	168	4983
1400/2/1	Residing	4757	157	4914
1649/1/1	Working	1933	152	2086
1649/2/1	Working	1933	152	2086
1649/1/2	Working	1933	152	2086
1649/2/2	Working	1933	152	2086
1649/1/3	Working	1933	152	2086
1649/2/3	Working	1933	152	2086
1649/1/4	Working	1933	152	2086
1649/2/4	Working	1933	152	2086
1649/1/5	Working	1933	152	2086
1649/2/5	Working	1933	152	2086
1649/1/6	Working	1933	152	2086
1649/2/6	Working	1933	152	2086
1649/2/7	Working	1933	152	2086
1649/2/8	Working	1933	152	2086
1649/2/9	Working	1933	152	2086
1649/2/10	Working	1933	152	2086
1649/2/11	Working	1933	152	2086
1649/2/12	Working	1933	152	2086
1649/2/13	Working	1933	152	2086
1649/2/14	Working	1933	152	2086
1649/2/15	Working	1933	152	2086
1649/2/16	Working	1933	152	2086
1649/2/17	Working	1933	152	2086
1649/2/18	Working	1933	152	2086
1649/2/19	Working	1933	152	2086
1649/2/20	Working	1933	152	2086
1649/2/21	Working	1933	152	2086
1649/2/22	Working	1933	152	2086
1649/2/23	Working	1933	152	2086
1649/2/24	Working	1933	152	2086
1649/2/25	Working	1933	152	2086
1649/2/26	Working	1933	152	2086
1649/2/27	Working	1933	152	2086

Table 38. Direct radiation occupancy rates for adults, children and infants in the Devonport area ($h\ y^{-1}$)

Person ID number	Main activity	Indoor occupancy	Outdoor occupancy	Total occupancy
1649/2/28	Working	1933	152	2086
1565/1/1	Working	238	1782	2020
1565/2/1	Working	238	1782	2020
1565/2/2	Working	238	1782	2020
1565/2/3	Working	238	1782	2020
1565/2/4	Working	238	1782	2020
1565/2/5	Working	238	1782	2020
1565/2/6	Working	238	1782	2020
1565/2/7	Working	238	1782	2020
1565/2/8	Working	238	1782	2020
1565/2/9	Working	238	1782	2020
1480/1/1	Working	1892	102	1994
1480/2/1	Working	1892	102	1994
1480/3/1	Working	1892	102	1994
1480/4/1	Working	1892	102	1994
1480/5/1	Working	1892	102	1994
1480/6/1	Working	1892	102	1994
1522/1/1	Tending an allotment plot	-	418	418
1499/1/1	Tending an allotment plot	-	233	233
1624/2/1	Working	116	1	117
1624/1/1	Working	77	1	78

Table 39. Analysis of direct radiation occupancy rates for adults, children and infants in the Devonport area

0 - 0.25 km zone	
Number of hours	Number of observations
>8000 to 8760	11
>7000 to 8000	2
>6000 to 7000	11
>5000 to 6000	4
>4000 to 5000	3
>3000 to 4000	5
>2000 to 3000	2
>1000 to 2000	20
0 to 1000	11
0 to 8760	69

>0.25 - 0.5 km zone	
Number of hours	Number of observations
>8000 to 8760	11
>7000 to 8000	4
>6000 to 7000	5
>5000 to 6000	2
>4000 to 5000	2
>3000 to 4000	0
>2000 to 3000	2
>1000 to 2000	2
0 to 1000	10
0 to 8760	38

>0.5 - 1.0 km zone	
Number of hours	Number of observations
>8000 to 8760	1
>7000 to 8000	5
>6000 to 7000	4
>5000 to 6000	1
>4000 to 5000	2
>3000 to 4000	0
>2000 to 3000	44
>1000 to 2000	6
0 to 1000	4
0 to 8760	67

Notes

Where generalised data for groups of people were collected, for example employees at some businesses, only a limited number of representative individuals have been included.

Table 40. Gamma dose rate measurements for the Devonport direct radiation survey area (μGyh^{-1})

Location	Indoor substrate	Indoor gamma dose rate at 1 metre ^a	Outdoor substrate ^b	Outdoor gamma dose rate at 1 metre ^a
Residences				
Residence 1	Wood	0.113	Concrete	0.110
Residence 2	Wood	0.093	Concrete	0.094
Residence 3	Wood	0.100	Concrete	0.085
Residence 4	Wood	0.115	Concrete	0.087
Residence 5	Concrete	0.098	Concrete	0.095
Residence 6	Wood	0.108	Concrete	0.096
Residence 7	Wood	0.106	Concrete	0.080
Residence 8	Concrete	0.059	Concrete	0.079
Residence 9	Concrete	0.058	Concrete	0.079
Residence 10	Concrete	0.096	Concrete	0.109
Residence 11	Wood	0.102	Concrete	0.096
Residence 12	Wood	0.116	Stones	0.102
Residence 13	Wood	0.098	Concrete	0.081
Residence 14	Wood	0.103	Concrete	0.083
Residence 15	No measurement taken		Concrete	0.065
Residence 16	Concrete	0.057	Concrete	0.090
Residence 17	Concrete	0.065	Concrete	0.081
Residence 18	No measurement taken		Concrete	0.071
Residence 19	Wood	0.082	Concrete	0.088
Residence 20	Wood	0.103	Concrete	0.081
Joint residence and business				
Residence and business 1	Wood	0.084	Wood	0.075

Backgrounds				
	Location	National Grid Reference	Substrate	Background gamma dose rate at 1 metre
Background 1	Tamerton Foliot	SX 469 614	Grass	0.097
Background 2	Elmgate	SX 391 580	Grass	0.078
Background 3	Hemerdon	SX 557 572	Grass	0.078
Background 4	Wacker Quay	SX 389 551	Grass	0.086

Notes

^a These measurements have not been adjusted for background dose rates

^b For measurements taken over concrete, this was the only substrate available within the vicinity of the property

Table 41. Combinations of adult pathways for consideration in dose assessments in the Devonport area:

Combination number	Fish	Crustaceans	Molluscs	Wildfowl	Marine plants/algae	Green vegetables	Other vegetables	Root vegetables	Potato	Domestic fruit	Cattle meat	Sheep meat	Poultry	Wild/free foods	Rabbits/hares	Honey	Wild fungi	Venison	Intertidal occupancy over mud	Intertidal occupancy over mud and sand	Intertidal occupancy over mud and stones	Intertidal occupancy over mud, sand and stones	Intertidal occupancy over rock	Intertidal occupancy over salt marsh	Intertidal occupancy over sand	Intertidal occupancy over sand and stones	Intertidal occupancy over stones	Intertidal occupancy over boat on mud	Handling fishing gear	Handling sediment	Occupancy in water	Occupancy on water	Indoor occupancy within 1 km of the licensed site boundary	Outdoor occupancy within 1 km of the licensed site boundary				
1	X																										X											
2	X					X	X								X																							
3					X	X	X	X	X	X																									X		X	
4					X	X	X	X	X			X																										
5	X				X	X	X	X	X	X													X											X				
6	X																														X							
7	X																					X					X						X	X	X	X		
8																							X			X						X						
9	X																					X										X						
10	X																			X											X		X	X	X	X		
11																			X	X	X					X						X						
12	X	X																	X		X					X				X	X	X						
13											X	X																										
14											X								X																			
15													X	X					X	X																		
16					X	X	X	X		X					X	X							X									X						
17						X	X	X	X						X																						X	X
18	X	X	X		X	X	X	X	X	X					X					X			X		X	X	X		X	X		X						
19				X								X	X	X		X	X	X						X														

Notes

The food groups and external pathways marked with a cross are combined for the corresponding combination number. For example, combination number 1 represents an individual (or individuals) from Annex 1 who had positive data for the following pathways: fish, intertidal occupancy over boat on mud, occupancy on water.

Annex 1. Adults' consumption rates (kg y^{-1}) and occupancy rates (h y^{-1}) in the Devonport area

Person ID number	Fish	Crustaceans	Molluscs	Wildfowl	Marine plants/algae	Green vegetables	Other vegetables	Root vegetables	Potato	Domestic fruit	Cattle meat	Sheep meat	Poultry	Wild/free foods	Rabbits/hares	Honey	Wild fungi	Venison	Intertidal occupancy over mud	Intertidal occupancy over mud and sand	Intertidal occupancy over mud and stones	Intertidal occupancy over mud, sand and stones	Intertidal occupancy over rock	Intertidal occupancy over salt marsh	Intertidal occupancy over sand	Intertidal occupancy over sand and stones	Intertidal occupancy over stones	Intertidal occupancy over boat on mud	Handling fishing gear	Handling sediment	Occupancy in close proximity (<10 m) to liquid sewage sludge	Occupancy in close proximity (<10 m) to dried sewage sludge	Occupancy in water	Occupancy on water	Indoor occupancy within 1 km of the licensed site boundary	Outdoor occupancy within 1 km of the licensed site boundary			
1451/2/2	1.3																																						
1451/2/3	1.3																																						
1451/2/4	1.3																																						
1452/1/1																											15												
1452/2/1																											15												
1453/1/1																											24												
1453/2/1																											24												
1454/1/1																																				5087	241		
1454/2/1																																				7208	241		
1455/1/1																											24												
1455/2/1																										24													
1456/1/1																																			350	6883	94		
1458/1/1																																		12					
1458/1/2																																		12					
1462/1/1						8.8	1.3																												900				
1463/1/1						8.8	1.3									12.2																			367				
1469/1/1																																				7727	913		
1470/1/1																																							
1472/1/1						8.8	1.3																																
1472/2/1						8.8	1.3									12.2																							
1473/1/1	11.1																																						
1473/2/1	11.1																																						
1475/1/1					3.6					0.8																													
1476/1/1					10.9	2.3		6.8	0.4					0.1																									
1476/2/1					10.9	2.3		6.8	0.4					0.1																									
1477/1/1	22.5																																						
1477/2/1	22.5																																						
1480/1/1																																				1892	102		
1480/2/1																																				1892	102		
1480/3/1																																				1892	102		
1480/4/1																																				1892	102		
1480/5/1																																				1892	102		
1480/6/1																																				1892	102		
1481/1/1					31.7	3.5		7.6																															
1481/2/1					31.7	3.5		7.6																															
1482/1/1	0.2	0.9																																					
1483/1/1																																					52		
1484/1/1									47.3	5.7																													
1484/2/1									47.3	5.7																													
1485/1/1																																					78		
1493/1/1	8.0																																		52				
1494/1/1																																					78		
1494/2/1																																					78		
1494/3/1																																					78		
1495/1/1																																					5		

Annex 1. Adults' consumption rates (kg y⁻¹) and occupancy rates (h y⁻¹) in the Devonport area

Person ID number	Fish	Crustaceans	Molluscs	Wildfowl	Marine plants/algae	Green vegetables	Other vegetables	Root vegetables	Potato	Domestic fruit	Cattle meat	Sheep meat	Poultry	Wild/free foods	Rabbits/hares	Honey	Wild fungi	Venison	Intertidal occupancy over mud	Intertidal occupancy over mud and sand	Intertidal occupancy over mud and stones	Intertidal occupancy over mud, sand and stones	Intertidal occupancy over rock	Intertidal occupancy over salt marsh	Intertidal occupancy over sand	Intertidal occupancy over sand and stones	Intertidal occupancy over stones	Intertidal occupancy over boat on mud	Handling fishing gear	Handling sediment	Occupancy in close proximity (<10 m) to liquid sewage sludge	Occupancy in close proximity (<10 m) to dried sewage sludge	Occupancy in water	Occupancy on water	Indoor occupancy within 1 km of the licensed site boundary	Outdoor occupancy within 1 km of the licensed site boundary				
1547/1/5																																				171				
1547/1/6																																					171			
1547/1/7																																					171			
1547/1/8																																					171			
1547/1/9																																					171			
1547/1/10																																					171			
1547/1/11																																					171			
1547/1/12																																					171			
1547/1/13																																					171			
1547/1/14																																					171			
1547/1/15																																					171			
1547/1/16																																					171			
1547/1/17																																					171			
1547/1/18																																					171			
1547/1/19																																					171			
1547/1/20																																					171			
1547/1/21																																					171			
1547/1/22																																					171			
1547/1/23																																					171			
1547/1/24																																					171			
1547/1/25																																					171			
1548/1/1																																					8221	52		
1548/2/1																																					8221	52		
1548/3/1																																				8221	52			
1548/4/1																																				8082	52			
1549/1/1						9.3	1.0	0.5	1.1	9.1																														
1549/2/1						9.3	1.0	0.5	1.1	9.1																														
1550/1/1																																						117		
1552/1/1																																					196			
1552/1/2																																					196			
1552/1/3																																					196			
1552/1/4																																					196			
1552/1/5																																					196			
1552/1/6																																					196			
1552/1/7																																					196			
1552/1/8																																					196			
1552/1/9																																					196			
1552/1/10																																					196			
1552/1/11																																					196			
1552/1/12																																					196			
1552/1/13																																					196			
1552/1/14																																					196			
1552/1/15																																					196			
1552/1/16																																					196			
1552/1/17																																					196			

Annex 1. Adults' consumption rates (kg y⁻¹) and occupancy rates (h y⁻¹) in the Devonport area

Person ID number	Fish	Crustaceans	Molluscs	Wildfowl	Marine plants/algae	Green vegetables	Other vegetables	Root vegetables	Potato	Domestic fruit	Cattle meat	Sheep meat	Poultry	Wild/free foods	Rabbits/hares	Honey	Wild fungi	Venison	Intertidal occupancy over mud	Intertidal occupancy over mud and sand	Intertidal occupancy over mud and stones	Intertidal occupancy over mud, sand and stones	Intertidal occupancy over rock	Intertidal occupancy over salt marsh	Intertidal occupancy over sand	Intertidal occupancy over sand and stones	Intertidal occupancy over stones	Intertidal occupancy over boat on mud	Handling fishing gear	Handling sediment	Occupancy in close proximity (<10 m) to liquid sewage sludge	Occupancy in close proximity (<10 m) to dried sewage sludge	Occupancy in water	Occupancy on water	Indoor occupancy within 1 km of the licensed site boundary	Outdoor occupancy within 1 km of the licensed site boundary				
1552/1/18																																				196				
1552/1/19																																					196			
1552/1/20																																					196			
1552/2/1																																					153			
1552/2/2																																					153			
1552/2/3																																					153			
1552/2/4																																					153			
1552/2/5																																					153			
1552/2/6																																					153			
1552/2/7																																					153			
1552/2/8																																					153			
1552/2/9																																					153			
1552/2/10																																					153			
1552/3/1																																					31			
1552/3/2																																					31			
1552/3/3																																					31			
1552/3/4																																					31			
1552/3/5																																					31			
1552/3/6																																					31			
1552/3/7																																					31			
1552/3/8																																					31			
1552/3/9																																					31			
1552/3/10																																					31			
1552/4/1																																					78			
1552/4/2																																					78			
1552/4/3																																					78			
1552/4/4																																					78			
1552/4/5																																					78			
1552/4/6																																					78			
1552/4/7																																					78			
1552/4/8																																					78			
1552/4/9																																					78			
1552/4/10																																					78			
1556/1/1																																						391		
1557/1/1																																						252		
1559/1/1																																						209		
1559/2/1																																						209		
1560/1/1	6.3																																				497			
1560/2/1	6.3																																				162			
1563/1/1	9.2																																				313			
1564/1/1	7.2	4.8																																			1762			
1564/2/1																																					1762			
1565/1/1																																					2020	238	1782	
1565/2/1																																					2020	238	1782	
1565/2/2																																					2020	238	1782	

Annex 1. Adults' consumption rates (kg y⁻¹) and occupancy rates (h y⁻¹) in the Devonport area

Person ID number	Fish	Crustaceans	Molluscs	Wildfowl	Marine plants/algae	Green vegetables	Other vegetables	Root vegetables	Potato	Domestic fruit	Cattle meat	Sheep meat	Poultry	Wild/free foods	Rabbits/hares	Honey	Wild fungi	Venison	Intertidal occupancy over mud	Intertidal occupancy over mud and sand	Intertidal occupancy over mud and stones	Intertidal occupancy over mud, sand and stones	Intertidal occupancy over rock	Intertidal occupancy over salt marsh	Intertidal occupancy over sand	Intertidal occupancy over sand and stones	Intertidal occupancy over stones	Intertidal occupancy over boat on mud	Handling fishing gear	Handling sediment	Occupancy in close proximity (<10 m) to liquid sewage sludge	Occupancy in close proximity (<10 m) to dried sewage sludge	Occupancy in water	Occupancy on water	Indoor occupancy within 1 km of the licensed site boundary	Outdoor occupancy within 1 km of the licensed site boundary		
1565/2/3																																		2020	238	1782		
1565/2/4																																			2020	238	1782	
1565/2/5																																			2020	238	1782	
1565/2/6																																			2020	238	1782	
1565/2/7																																				2020	238	1782
1565/2/8																																				2020	238	1782
1565/2/9																																				2020	238	1782
1566/1/1																					17																17	
1566/1/2																					17																17	
1566/1/3																					17																17	
1566/1/4																					17																17	
1566/1/5																					17																17	
1566/1/6																					17																17	
1566/1/7																					17																17	
1566/1/8																					17																17	
1566/1/9																					17																17	
1566/1/10																					17																17	
1567/1/1																0.9																						
1567/2/1																0.9																						
1569/1/1													11.1	5.4			13.8	2																				
1569/2/1												2.6					13.8																					
1570/1/1	19.2	0.1																																		521		
1572/1/1																																					2376	
1572/1/2																																					2376	
1577/1/1																																					728	
1577/1/2																																					728	
1577/1/3																																					728	
1577/1/4																																					728	
1577/1/5																																					728	
1577/1/6																																					728	
1577/1/7																																					728	
1577/1/8																																					728	
1579/1/1																														360							439	
1581/1/1																																					366	
1581/2/1																																					366	
1582/1/1																0.2																						
1582/2/1																5.2																						
1585/1/1	41.5	0.8	1.2	7.3																																1680	3	240
1590/1/1																																					7366	358
1590/2/1																																					6676	537
1590/3/1																																					5857	179
1592/1/1																																					1310	445
1592/2/1																																					1310	445
1592/2/2																																					1310	445
1592/2/3																																					1310	445

Annex 1. Adults' consumption rates (kg y⁻¹) and occupancy rates (h y⁻¹) in the Devonport area

Person ID number	Fish	Crustaceans	Molluscs	Wildfowl	Marine plants/algae	Green vegetables	Other vegetables	Root vegetables	Potato	Domestic fruit	Cattle meat	Sheep meat	Poultry	Wild/free foods	Rabbits/hares	Honey	Wild fungi	Venison	Intertidal occupancy over mud	Intertidal occupancy over mud and sand	Intertidal occupancy over mud and stones	Intertidal occupancy over mud, sand and stones	Intertidal occupancy over rock	Intertidal occupancy over salt marsh	Intertidal occupancy over sand	Intertidal occupancy over sand and stones	Intertidal occupancy over stones	Intertidal occupancy over boat on mud	Handling fishing gear	Handling sediment	Occupancy in close proximity (<10 m) to liquid sewage sludge	Occupancy in close proximity (<10 m) to dried sewage sludge	Occupancy in water	Occupancy on water	Indoor occupancy within 1 km of the licensed site boundary	Outdoor occupancy within 1 km of the licensed site boundary	
1649/2/3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152	
1649/2/4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/2/28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1653/1/1	5.2	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	72	-	-	-	216	-	-		
1653/2/1	5.2	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	72	-	-	-	216	-	-		
1654/1/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	684	456	-	-	881	806	
1654/2/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	684	456	-	-	881	806	
1655/1/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	209	-	-	-	-	-	39	-	-	
1657/1/1	18.7	1.8	1.4	-	0.5	36.6	42.4	6.7	100.0	4.5	-	-	-	1.1	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	
1657/2/1	18.7	1.8	1.4	-	0.5	36.6	42.4	6.7	100.0	4.5	-	-	-	1.1	-	-	-	-	-	-	-	-	1	-	-	4	-	10	104	0	-	5	108	-	-	12	-
1657/3/1	18.7	1.8	-	-	-	36.6	42.4	6.7	100.0	4.5	-	-	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1657/4/1	8.9	0.7	-	-	-	36.6	42.4	6.7	100.0	4.5	-	-	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1657/5/1	8.9	0.7	-	-	-	36.6	42.4	6.7	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Notes

Emboldened observations are the high-rate individuals

Annex 2. Children's and infants' consumption rates (kg y⁻¹) and occupancy rates (h y⁻¹) in the Devonport area

Person ID number	Fish	Green vegetables	Other vegetables	Root vegetables	Potato	Domestic fruit	Honey	Intertidal occupancy over mud and stones	Intertidal occupancy over mud, sand and stones	Intertidal occupancy over rock	Intertidal occupancy over sand and stones	Intertidal occupancy over stones	Handling sediment	Occupancy in water	Occupancy on water	Indoor occupancy within 1 km of the licensed site boundary	Outdoor occupancy within 1 km of the licensed site boundary
Child age group (6 - 15 years old)																	
1385/4/1	-	0.5	2.7	-	-	1.8	-	-	-	-	-	-	-	-	-	-	-
1385/5/1	-	0.5	2.7	-	-	1.8	-	-	-	-	-	-	-	-	-	-	-
1399/3/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4814	168
1399/4/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7217	669
1425/3/1	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1425/4/1	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1430/2/1	-	-	-	-	-	-	-	-	-	-	52	-	-	-	52	-	-
1441/2/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48	-	-
1448/1/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48	-	-
1454/3/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7095	448
1485/2/1	-	-	-	-	-	-	-	-	-	-	-	13	-	-	65	-	-
1485/3/1	-	-	-	-	-	-	-	-	-	-	-	13	-	-	65	-	-
1495/3/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-
1502/4/1	-	-	-	-	-	-	-	-	-	-	-	26	-	-	26	-	-
1520/2/1	-	-	-	-	-	-	-	78	-	-	-	-	78	-	-	-	-
1558/1/1	-	-	-	-	-	-	-	-	-	-	-	-	-	120	-	-	-
1558/2/1	-	-	-	-	-	-	-	-	-	-	-	-	-	120	-	-	-
1558/3/1	-	-	-	-	-	-	-	-	-	-	-	-	-	120	-	-	-
1558/4/1	-	-	-	-	-	-	-	-	-	-	-	-	-	120	-	-	-
1558/5/1	-	-	-	-	-	-	-	-	-	-	-	-	-	120	-	-	-

Annex 2. Children's and infants' consumption rates (kg y⁻¹) and occupancy rates (h y⁻¹) in the Devonport area

Person ID number	Fish	Green vegetables	Other vegetables	Root vegetables	Potato	Domestic fruit	Honey	Intertidal occupancy over mud and stones	Intertidal occupancy over mud, sand and stones	Intertidal occupancy over rock	Intertidal occupancy over sand and stones	Intertidal occupancy over stones	Handling sediment	Occupancy in water	Occupancy on water	Indoor occupancy within 1 km of the licensed site boundary	Outdoor occupancy within 1 km of the licensed site boundary
1567/3/1	-	-	-	-	-	-	0.9	-	-	-	-	-	-	-	-	-	-
1567/4/1	-	-	-	-	-	-	0.7	-	-	-	-	-	-	-	-	-	-
1598/2/1	5.2	-	-	-	-	-	-	-	-	-	2	-	-	-	10	-	-
1599/3/1	1.4	8.1	6.9	14.6	19.1	2.0	-	-	-	-	-	-	-	-	-	-	-
1599/4/1	1.1	6.1	5.1	10.9	14.3	1.5	-	-	-	-	-	-	-	-	-	-	-
1619/3/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5174	1412
1619/4/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5174	1412
1619/5/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5174	1412
1620/3/1	17.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7873	783
1620/4/1	13.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7873	783
1620/5/1	13.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6373	783
1634/3/1	-	-	-	-	-	-	-	-	-	102	102	-	-	102	-	-	-
1634/4/1	-	-	-	-	-	-	-	-	-	102	102	-	-	102	-	-	-
1635/2/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8146	614
1635/3/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8146	614
1642/6/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6172	122
Infant age group (0 - 5 years old)																	
1385/6/1	-	0.5	2.7	-	-	1.8	-	-	-	-	-	-	-	-	-	-	-
1385/7/1	-	0.5	2.7	-	-	1.8	-	-	-	-	-	-	-	-	-	-	-
1426/2/1	-	-	-	-	-	-	-	-	-	-	9	-	-	-	-	-	-
1430/3/1	-	-	-	-	-	-	-	-	-	-	52	-	-	-	52	-	-

Annex 2. Children's and infants' consumption rates (kg y⁻¹) and occupancy rates (h y⁻¹) in the Devonport area

Person ID number	Fish	Green vegetables	Other vegetables	Root vegetables	Potato	Domestic fruit	Honey	Intertidal occupancy over mud and stones	Intertidal occupancy over mud, sand and stones	Intertidal occupancy over rock	Intertidal occupancy over sand and stones	Intertidal occupancy over stones	Handling sediment	Occupancy in water	Occupancy on water	Indoor occupancy within 1 km of the licensed site boundary	Outdoor occupancy within 1 km of the licensed site boundary
1440/3/1	-	-	-	-	-	-	-	-	-	-	6	-	-	6	-	-	-
1440/4/1	-	-	-	-	-	-	-	-	-	-	6	-	-	6	-	-	-
1455/3/1	-	-	-	-	-	-	-	-	-	-	24	-	-	-	-	-	-
1502/3/1	-	-	-	-	-	-	-	-	-	-	-	26	-	-	26	-	-
1506/3/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7766	316
1506/4/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7766	316
1592/3/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1265	445
1592/3/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1265	445
1592/4/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1265	445
1592/4/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1265	445
1592/5/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	632	223
1592/5/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	632	223
1592/6/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	632	223
1592/6/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	632	223
1592/7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1265	445
1592/7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1265	445
1592/8/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	632	223
1592/8/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	632	223
1592/9/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1265	445
1592/9/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1265	445
1592/10/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	632	223

Annex 2. Children's and infants' consumption rates (kg y^{-1}) and occupancy rates (h y^{-1}) in the Devonport area

Person ID number	Fish	Green vegetables	Other vegetables	Root vegetables	Potato	Domestic fruit	Honey	Intertidal occupancy over mud and stones	Intertidal occupancy over mud, sand and stones	Intertidal occupancy over rock	Intertidal occupancy over sand and stones	Intertidal occupancy over stones	Handling sediment	Occupancy in water	Occupancy on water	Indoor occupancy within 1 km of the licensed site boundary	Outdoor occupancy within 1 km of the licensed site boundary
1592/10/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	632	223
1614/3/1	-	-	-	-	-	-	-	-	20	-	20	-	-	-	-	7568	688
1619/6/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5174	1412

Notes

Emboldened observations are the high-rate individuals

Annex 3. Qualitative and estimated data for use in dose assessments

Details of activity	Exposure pathways involved	Estimated rate
Information was obtained during the survey that people were permanently living on board boats in the aquatic survey area. The boats were resting on mud at low tide and were afloat at high tide.	Occupancy on board a boat that is resting on mud at low tide and associated occupancy on board a boat while it is afloat.	4098 h y ⁻¹ on board a boat that is resting on mud, which is the mean occupancy rate for the high-rate group for the 13 adults for this pathway from the 2004 Devonport habits survey report. 2348 h y ⁻¹ for occupancy on board a boat that is afloat, which is the mean of the 'water on' occupancy rates for the previous 13 adults from the 2004 Devonport habits survey report.

Annex 4. Ratios for determining consumption and occupancy rates for children and infants

Group	Ratio ^a	
	Child ^e /adult	Infant ^e /adult
Fish ^b	0.200	0.050
Crustaceans ^b	0.250	0.050
Molluscs ^b	0.250	0.050
Green vegetables	0.444	0.222
Other vegetables	0.500	0.200
Root vegetables	0.500	0.375
Potatoes	0.708	0.292
Domestic fruit	0.667	0.467
Milk	1.000	1.333
Cattle meat	0.667	0.222
Pig meat	0.625	0.138
Sheep meat	0.400	0.120
Poultry	0.500	0.183
Eggs	0.800	0.600
Wild/free foods ^c	0.490	0.110
Game ^d	0.500	0.140
Honey	0.789	0.789
Wild fungi	0.450	0.150
Freshwater fish ^b	0.250	0.050
External exposure over intertidal substrates ^b	0.500	0.030

Notes

^aExcepting notes b and c, consumption ratios were derived from Byrom et al., (1995) which presented data for infants aged 6 to 12 months and children aged 10 to 11 years.

^bRatios were derived from Smith and Jones, (2003) which presented data for infants and children of unspecified ages.

^cRatios were derived from FSA data for wild fruit and nuts for infants and 10-year-old children.

^dGame includes rabbits/hares and venison.

^eNote that the age ranges within the age groups in this table do not correspond exactly with the age ranges within the age groups used throughout the rest of this report.

Annex 5. Consumption rates (kg y⁻¹) and occupancy rates (h y⁻¹) for women of childbearing age^a in the Devonport area for use in foetal dose assessments

Person ID number	Fish	Crustaceans	Molluscs	Green vegetables	Other vegetables	Root vegetables	Potato	Domestic fruit	Cattle meat	Sheep meat	Poultry	Wild/free foods	Honey	Venison	Intertidal occupancy over mud sand and stones	Intertidal occupancy over rock	Intertidal occupancy over sand	Intertidal occupancy over sand and stones	Intertidal occupancy over stones	Handling fishing gear	Occupancy in water	Occupancy on water	Indoor occupancy within 1 km of the licensed site boundary	Outdoor occupancy within 1 km of the licensed site boundary
1385/3/1	-	-	-	0.5	2.7	-	-	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1387/1/1	-	-	-	3.6	9.3	5.4	2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1391/5/1	-	-	-	-	-	-	-	-	17.0	2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1400/2/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4757	157
1422/2/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	157	-	-
1422/2/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	157	-	-
1422/2/3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	157	-	-
1422/2/4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	157	-	-
1422/2/5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	157	-	-
1422/2/6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	157	-	-
1422/2/7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	157	-	-
1422/2/8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	157	-	-
1422/2/9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	157	-	-
1422/2/10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	157	-	-
1428/1/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104	-	-
1428/1/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104	-	-
1428/1/3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104	-	-
1428/1/4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104	-	-
1428/1/5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104	-	-
1428/1/6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104	-	-
1428/1/7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104	-	-
1428/1/8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104	-	-
1428/1/9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104	-	-
1428/1/10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104	-	-
1428/1/11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104	-	-
1428/1/12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104	-	-
1428/1/13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104	-	-
1428/1/14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104	-	-
1428/1/15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104	-	-
1428/1/16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104	-	-
1428/1/17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104	-	-
1428/1/18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104	-	-
1430/1/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52	-	-	-	-	52	-	-
1434/4/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	-	-	-
1440/1/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	6	-	-	-
1442/2/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90	-	-
1442/2/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90	-	-

Annex 5. Consumption rates (kg y^{-1}) and occupancy rates (h y^{-1}) for women of childbearing age^a in the Devonport area for use in foetal dose assessments

Person ID number	Fish	Crustaceans	Molluscs	Green vegetables	Other vegetables	Root vegetables	Potato	Domestic fruit	Cattle meat	Sheep meat	Poultry	Wild/free foods	Honey	Venison	Intertidal occupancy over mud sand and stones	Intertidal occupancy over rock	Intertidal occupancy over sand	Intertidal occupancy over sand and stones	Intertidal occupancy over stones	Handling fishing gear	Occupancy in water	Occupancy on water	Indoor occupancy within 1 km of the licensed site boundary	Outdoor occupancy within 1 km of the licensed site boundary
1633/1/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48	-	-	-	-	-	-	-
1634/1/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	102	-	102	-	-	102	-	-	-	-
1637/2/1	19.2	5.2	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1642/5/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6422	122
1643/2/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2328	7
1643/4/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6112	94
1649/1/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/1/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/1/3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/1/4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/1/5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1649/1/6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1933	152
1653/2/1	5.2	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	72	-	216	-	-
1657/4/1	8.9	0.7	-	36.6	42.4	6.7	100.0	4.5	-	-	-	1.1	-	-	-	-	-	-	-	-	-	-	-	-

Notes

^a Based on National Statistics guidelines, women were deemed to be of childbearing age if they were between 15 and 44 years old. Women of unknown age were included as they were potentially women of childbearing age

Annex 6. Summary of profiles for adults in the Devonport area for use in the assessment of total dose

Profile Name	Number of individuals	Pathway Name																													
		Notes:	Crustacea	Direct	Fish - Sea	Fruit - Domestic	Fruit and nuts - Wild	Gamma ext - Houseboat	Gamma ext - Salt marsh	Gamma ext - Sediments	Honey	Marine plants/algae	Meat - Cow	Meat - Game	Meat - Poultry	Meat - Sheep	Meat - Wildfowl	Mollusca	Mushrooms	Occupancy in proximity to sewage sludge	Occupancy in proximity to sewage cake biosolids	Occupancy IN water	Occupancy ON water	Plume (IN; 0 - 0.25 km)	Plume (MID; 0.25 - 0.5 km)	Plume (OUT; 0.5 - 1 km)	Vegetables - Green	Vegetables - Other Domestic	Vegetables - Potatoes	Vegetables - Root	
		Units:	kg	-	kg	kg	kg	h	h	h	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	h	h	h	h	h	h	h	kg	kg	kg	kg
Crustacean Consumers	12	3.4	-	15.3	1.1	0.28	-	-	150	-	0.08	-	-	-	-	-	-	0.42	-	-	-	270	-	-	-	-	-	-	-	-	-
Occupants for Direct Radiation	142	-	1.00	0.74	0.98	0.05	-	-	6	-	-	-	-	-	-	-	-	-	-	10	6	<1	160	1730	730	1210	0.54	0.48	1.4	1.3	
Sea Fish Consumers	12	0.67	0.08	38.0	-	<1	-	290	-	0.61	-	-	-	-	-	-	-	0.10	-	-	4	200	-	590	-	-	-	-	-	-	
Domestic Fruit Consumers	19	-	0.42	-	15.3	0.38	-	<1	0.24	0.07	-	-	-	-	-	-	-	-	-	-	1	-	-	210	34	13.2	11.3	11.9	11.7		
Wild Fruit and Nut Consumers	14	0.43	0.50	4.6	6.3	1.1	-	3	9	0.55	0.17	-	2.7	0.15	0.64	0.15	0.20	0.10	-	-	1	<1	1300	220	-	11.5	14.6	33.6	10.7		
Houseboat Occupants	2	-	-	-	-	-	4100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Occupants over Saltmarsh	4	-	-	-	-	0.17	-	35	-	0.40	-	-	4.7	0.27	1.1	0.27	-	0.17	-	-	-	-	-	-	-	-	-	-	-	-	
Occupants over Sediment	3	1.5	-	25.7	-	-	-	1330	-	2.4	-	-	-	-	-	-	-	0.42	-	-	-	81	-	-	-	-	-	-	-	-	
Honey Consumers	5	-	-	0.60	1.6	0.27	-	<1	7.1	0.27	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	5.8	14.7	-	1.3	
Consumers of Marine Plants and Algae	1	0.76	-	41.5	-	-	-	1680	-	7.3	-	-	-	-	-	-	-	1.2	-	-	-	240	-	-	-	-	-	-	-	-	
Cattle Meat Consumers	9	-	-	-	-	-	-	-	-	-	-	20.0	5.2	-	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Game Meat Consumers	8	-	-	-	-	0.17	-	4	<1	0.40	-	11.8	14.7	2.0	1.1	0.27	-	0.17	-	-	-	-	-	-	-	-	-	-	-	-	
Poultry Meat Consumers	1	-	-	-	-	-	-	2	-	-	-	19.1	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sheep Meat Consumers	7	-	-	-	-	0.19	-	5	-	0.45	-	12.1	5.4	0.31	2.9	0.31	-	0.19	-	-	-	-	-	-	-	-	-	-	-	-	
Wildfowl Consumers	2	-	-	-	-	0.68	-	18	-	1.6	-	18.8	1.1	4.5	1.1	-	0.68	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mollusc Consumers	5	2.9	-	23.5	1.8	0.45	-	360	-	1.7	-	-	-	-	-	-	-	-	-	-	-	260	-	-	-	-	14.6	16.9	40.0	2.7	
Mushroom Consumers	2	-	-	-	-	0.68	-	18	-	1.6	-	18.8	1.1	4.5	1.1	-	0.68	-	-	-	-	-	-	-	-	-	-	-	-	-	
Occupancy in Proximity to Sewage Sludge	2	-	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	680	460	-	-	1690	-	-	-	-	-	-	
Occupancy in Proximity to Sewage Cake Biosolids	2	-	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	680	460	-	-	1690	-	-	-	-	-	-	
Occupants In Water	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	440	640	-	-	-	-	-	-	-	
Occupants On Water	18	0.56	0.61	5.2	-	-	-	23	-	-	-	-	-	-	-	-	0.09	-	-	-	-	1820	-	260	1120	-	-	-	-	-	
Local Inhabitants (0 - 0.25km)	34	-	1.00	0.05	-	0.06	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6390	-	-	-	-	-	-	
Local Inhabitants (0.25 - 0.5km)	13	-	1.00	7.8	-	-	-	56	-	-	-	-	-	-	-	-	-	-	-	-	-	130	-	6940	-	-	-	-	-	-	
Local Inhabitants (0.5 - 1km)	10	-	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35	-	-	6750	-	-	-	-	-	
Green Vegetable Consumers	23	0.29	0.09	3.2	8.4	0.26	-	6	0.20	0.10	-	-	-	-	-	-	0.12	-	-	-	<1	<1	-	-	28	25.2	19.2	29.2	11.7		
Other Domestic Vegetable Consumers	18	0.38	-	4.3	8.2	0.25	-	7	0.76	0.06	-	-	-	-	-	-	0.15	-	-	-	<1	<1	-	-	-	18.6	28.2	38.3	6.9		
Potato Consumers	12	0.56	0.17	6.2	4.7	0.38	-	10	-	0.08	-	-	-	-	-	-	0.23	-	-	-	-	<1	-	44	-	20.5	23.7	73.9	7.5		
Root Vegetable Consumers	20	-	0.35	0.14	10.1	0.29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	180	21	12.9	12.8	13.6	20.9		

Notes

1. Direct radiation is expressed as proportion of group who are present within 1 km of site perimeter.
 2. Gamma ext - Houseboat represents occupancy of boat on mud. See Annex 3.
 3. Gamma ext - Salt marsh represents occupancy over salt marsh.
 4. Gamma ext - Sediments represents occupancy over mud; mud and sand; mud and stones; mud, sand and stones; sand; sand and stones; stones.
 5. Marine plants/algae is consumption of *Porphyra*, samphire, sea beat and sea lettuce.
 6. Meat - Game includes consumption of venison and rabbits.
 7. Workers at the local sewage treatment works.
 8. Plume times are the sum of individuals' indoor and outdoor times.
- The means of the high-rate groups are determined by the 'cut-off' method and are highlighted on the diagonal.

Annex 7. Summary of profiles for the child age group (6 - 15 years old) in the Devonport area for use in the assessment of total dose

Profile Name	Number of individuals	Pathway Name														
		Notes:	1	Fish - Sea	Fruit - Domestic	Gamma ext - Sediments	Honey	Occupancy IN water	Occupancy ON water	Plume (IN; 0 - 0.25 km)	Plume (MID; 0.25 - 0.5 km)	Plume (OUT; 0.5 - 1 km)	Vegetables - Green	Vegetables - Other Domestic	Vegetables - Potatoes	Vegetables - Root
		Units:	-	kg	kg	h	kg	h	h	h	h	h	kg	kg	kg	kg
Occupants for Direct Radiation	12	1.00	3.7	-	-	-	-	-	520	5150	1700	-	-	-	-	
Sea Fish Consumers	3	1.00	14.9	-	-	-	-	-	-	8160	-	-	-	-	-	
Domestic Fruit Consumers	4	-	0.62	1.8	-	-	-	-	-	-	-	3.8	4.3	8.4	6.4	
Occupants over Sediment	4	-	-	-	84	-	51	13	-	-	-	-	-	-	-	
Honey Consumers	2	-	-	-	-	0.82	-	-	-	-	-	-	-	-	-	
Occupants In Water	7	-	-	-	29	-	110	-	-	-	-	-	-	-	-	
Occupants On Water	6	-	-	-	17	-	-	51	-	-	-	-	-	-	-	
Local Inhabitants (0 - 0.25km)	1	1.00	-	-	-	-	-	-	6290	-	-	-	-	-	-	
Local Inhabitants (0.25 - 0.5km)	8	1.00	5.6	-	-	-	-	-	-	7720	-	-	-	-	-	
Local Inhabitants (0.5 - 1km)	3	1.00	-	-	-	-	-	-	-	-	6800	-	-	-	-	
Green Vegetable Consumers	2	-	1.2	1.8	-	-	-	-	-	-	-	7.1	6.0	16.7	12.7	
Other Domestic Vegetable Consumers	4	-	0.62	1.8	-	-	-	-	-	-	-	3.8	4.3	8.4	6.4	
Potato Consumers	2	-	1.2	1.8	-	-	-	-	-	-	-	7.1	6.0	16.7	12.7	
Root Vegetable Consumers	2	-	1.2	1.8	-	-	-	-	-	-	-	7.1	6.0	16.7	12.7	

Notes

1. Direct radiation is expressed as proportion of group who are present within 1 km of site perimeter.
 2. Gamma ext - Sediments represents occupancy over mud and stones; sand and stones; stones.
 3. Plume times are the sum of individuals' indoor and outdoor times.
- The means of the high-rate groups are determined by the 'cut-off' method and are highlighted on the diagonal.

Annex 8. Summary of profiles for the infant age group (0 - 5 years old) in the Devonport area for use in the assessment of total dose

Profile Name	Number of individuals	Pathway Name								
		Direct	Fruit - Domestic	Gamma ext - Sediments	Occupancy IN water	Occupancy ON water	Plume (IN; 0-0.25km)	Plume (MID; 0.25-0.5km)	Vegetables - Green	Vegetables - Other Domestic
Notes:		1		2			3	3	3	
Units:		-	kg	h	h	h	h	h	kg	kg
Occupants for Direct Radiation	20	1.00	-	2	-	-	1440	1140	-	-
Domestic Fruit Consumers	2	-	1.8	-	-	-	-	-	0.50	2.7
Occupants over Sediment	4	0.25	-	36	-	20	2060	-	-	-
Occupants In Water	2	-	-	6	6	-	-	-	-	-
Occupants On Water	2	-	-	39	-	39	-	-	-	-
Local Inhabitants (0 - 0.25km)	1	1.00	-	40	-	-	8260	-	-	-
Local Inhabitants (0.25 - 0.5km)	3	1.00	-	-	-	-	-	7580	-	-
Green Vegetable Consumers	2	-	1.8	-	-	-	-	-	0.50	2.7
Other Domestic Vegetable Consumers	2	-	1.8	-	-	-	-	-	0.50	2.7

Notes

1. Direct radiation is expressed as proportion of group who are present within 1 km of site perimeter.
2. Gamma ext - Sediments represents occupancy over mud, sand and stones; sand and stones; stones.
3. Plume times are the sums of individuals' indoor and outdoor occupancy rates in each of the direct radiation zones. The means of the high-rate groups are determined by the 'cut-off' method and are highlighted on the diagonal.

Annex 9. Summary of profiles for women of childbearing age in the Devonport area, for use in the assessment of total dose to the foetus

Profile Name	Number of individuals	Pathway Name																						
		Notes:	Crustacea	Direct	Fish - Sea	Fruit - Domestic	Fruit and nuts - Wild	Gamma ext - Houseboat	Gamma ext - Sediments	Honey	Meat - Cow	Meat - Game	Meat - Poultry	Meat - Sheep	Mollusca	Occupancy IN water	Occupancy ON water	Plume (IN; 0-0.25km)	Plume (MID; 0.25-0.5km)	Plume (OUT; 0.5-1km)	Vegetables - Green	Vegetables - Other Domestic	Vegetables - Potatoes	Vegetables - Root
		Units:	kg	-	kg	kg	kg	h	h	kg	kg	kg	kg	kg	kg	h	h	h	h	h	kg	kg	kg	kg
Crustacean Consumers	2	3.7	-	12.2	-	-	-	-	-	-	-	-	-	0.33	-	110	-	-	-	-	-	-	-	-
Occupants for Direct Radiation	45	-	1.00	0.43	-	0.03	-	<1	-	-	-	-	-	-	-	45	1820	610	780	-	-	-	-	-
Sea Fish Consumers	6	0.87	0.17	21.2	-	-	-	-	-	-	-	-	-	0.11	-	-	-	1430	-	-	-	-	-	-
Domestic Fruit Consumers	1	-	-	-	21.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.9	22.2	2.5	12.9
Wild Fruit and Nut Consumers	3	0.24	0.67	3.0	1.5	0.82	-	-	-	-	-	-	-	-	-	-	4110	-	-	12.2	14.1	33.3	2.2	
Houseboat Occupants	2	-	-	-	-	-	4100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Occupants over Sediment	6	-	0.17	0.27	-	-	-	62	-	-	-	-	-	-	17	9	980	-	-	-	-	-	-	-
Honey Consumers	1	-	-	-	-	-	-	-	0.23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cattle Meat Consumers	2	-	-	-	-	-	-	-	-	20.3	5.9	-	1.1	-	-	-	-	-	-	-	-	-	-	-
Game Meat Consumers	2	-	-	-	-	-	-	-	-	11.8	12.8	1.3	-	-	-	-	-	-	-	-	-	-	-	-
Poultry Meat Consumers	1	-	-	-	-	-	-	-	-	-	13.8	2.6	-	-	-	-	-	-	-	-	-	-	-	-
Sheep Meat Consumers	1	-	-	-	-	-	-	-	-	17.0	-	-	2.3	-	-	-	-	-	-	-	-	-	-	-
Mollusc Consumers	1	5.2	-	19.2	-	-	-	-	-	-	-	-	-	0.67	-	-	-	-	-	-	-	-	-	-
Occupants In Water	2	-	-	-	-	-	-	51	-	-	-	-	-	-	86	-	-	-	-	-	-	-	-	-
Occupants On Water	1	-	1.00	-	-	-	-	-	-	-	-	-	-	-	-	2020	-	-	-	-	-	-	-	2020
Local Inhabitants (0 - 0.25km)	11	-	1.00	0.15	-	0.12	-	4	-	-	-	-	-	-	-	-	5310	-	-	-	-	-	-	-
Local Inhabitants (0.25 - 0.5km)	3	-	1.00	6.0	-	-	-	-	-	-	-	-	-	-	-	-	-	8400	-	-	-	-	-	-
Local Inhabitants (0.5 - 1km)	2	-	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6180	-	-	-	-	-
Green Vegetable Consumers	2	0.36	-	4.4	13.0	0.57	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28.2	32.3	51.3	9.8
Other Domestic Vegetable Consumers	3	0.24	-	3.0	10.1	0.38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.3	30.4	38.3	11.3
Potato Consumers	1	0.72	-	8.9	4.5	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36.6	42.4	100.0	6.7
Root Vegetable Consumers	6	0.12	-	1.5	7.3	0.19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.7	18.4	21.6	9.8

Notes

1. Direct radiation is expressed as proportion of group who are present within 1 km of site perimeter.
2. Gamma ext - Houseboat represents occupancy of boat on mud. See Annex 3.
3. Gamma ext - Sediments represents occupancy over mud, sand and stones; sand; sand and stones.
4. Meat - Game includes consumption of venison.
5. Plume times are the sums of individuals' indoor and outdoor occupancy rates in each of the direct radiation zones. The means of the high-rate groups are determined by the 'cut-off' method and are highlighted on the diagonal.

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