

Particles in the Environment Update for Quarter 2 2018 (1-Apr to 20-July)

1 Progress and Areas Monitored

To date, a total of 101.1 ha of Cumbrian beaches have been monitored against a target of 98 ha, demonstrating that beach monitoring is on-track to meet the overall target for 2018 of 152 ha. In total, 82 particles and 14 larger objects (all of which are stones) have been recovered in 2018, see Table 1.

In May 2018 a find, initially identified as a beta rich particle, was detected on Sellafield beach with an associated ^{137}Cs activity of $1.03\text{E}+05$ Bq. This find is within the range of previous measurements and therefore does not challenge the Public Health England (PHE) health risk assessment¹. However, as it contained more than $1\text{E}+05$ Bq of ^{137}Cs , it exceeded the Environment Agency's (EA) characterisation trigger levels². This particle was sent for more detailed laboratory analysis in July 2018. When separated from the rest of the sample by PHE, size analysis has shown that the dimensions are $4.0 \times 3.0 \times 1.5$ mm. The EA has confirmed that further characterisation of this find is not necessary as the dimensions are greater than 2 mm and as a result it is re-categorised as a larger object rather than a particle. The associated activity of this item is within the range of previous measurements and does not challenge PHE health risk assessment for finds in this category.

2 Find rates

Average find rates are compared with find rates over the last two calendar years in Table 2. For clarity of presentation, the find rates in Table 2 are rounded to the nearest significant figure.

Find rates across all beaches remain low and are comparable with the find rates observed during 2016 and 2017, see Figure 1.

A single beta-rich particle has been detected on Braystones beach in 2018. All remaining beta-rich finds detected during 2018 have been located on Sellafield beach (3 particles, 14 larger objects).

A two week survey of Allonby beach took place in April and May 2018, focussing on areas of beach that hadn't been monitored previously. A single alpha-rich particle was detected during the survey with 9.7 ha of beach monitored.

Find rates continue to be low, providing confidence that the chances of encounter used in the PHE health risk assessment remains appropriate.

The PHE health risk assessment states *"The conclusion, based on the currently available information, is that the overall health risks to beach users are very low and significantly lower than other risks that people accept when using the beaches"*.

3 Find activities

The activities of alpha-rich and beta-rich particle finds in 2018 are compared to the activities measured since the start of 2016. Data covers 1st January 2016 until 31st December 2017 and from 1st January – 20th July 2018. The maximum particle activity recorded during this time period for ^{241}Am was $1.37\text{E}+05$ Bq detected on 25/10/2016 and for ^{137}Cs was $1.86\text{E}+05$ Bq detected on 03/10/2017.

Similar activities over time provides confidence that the risks following encounter used in the PHE health risk assessment remain fit for purpose.

¹ <https://www.gov.uk/government/publications/radioactive-objects-on-beaches-near-sellafield-health-risks>

² <https://www.gov.uk/government/publications/sellafield-radioactive-objects-intervention-plan>

4 Communications

The 2017 Particles in the Environment report was issued in June 2018 and will be available on the website shortly³.

The PHE health risk assessment is currently being reviewed and the review is scheduled to be completed in 2019. Progress on the health risk assessment review will be presented by PHE at the West Cumbria Sites Stakeholder Group meeting (Environmental Health Working Group) on Thursday 29th November at Cleator Moor Civic Hall⁴.

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³ <https://www.gov.uk/government/collections/sellafield-ltd-environmental-and-safety-reports>

⁴ <https://wcssg.co.uk/meetings-event/environmental-health-working-group-9/>

Table 1: Beach finds in 2018

Beach location	Area covered (ha)	No. of particles found			No. of larger objects found			Total finds
		Alpha rich	Beta rich	Other	Alpha rich	Beta rich	Other	
Allonby	9.7	1	0	0	0	0	0	1
St. Bees	12.6	8	0	0	0	0	0	8
Braystones	14.7	10	1	0	0	0	0	11
Sellafield	49.2	53	3	0	0	14	0	70
Seascale	12.7	6	0	0	0	0	0	6
Drigg	2.2	0	0	0	0	0	0	0
ALL AREAS TOTAL	101.1	78	4	0	0	14	0	96

Note 1: Proportion of particles as % of total finds 85%.

Table 2: Find per hectare and area monitored for main beach areas

Beach Location	Year	Area covered (ha)	Find category & Type (finds per hectare)			
			Alpha-rich Particle	Beta-rich Particle	Beta-rich Larger Object	Other Finds
Allonby	2016	10.7	No Finds	No Finds	No Finds	No Finds
	2017	5.1	IA	No Finds	IA	No Finds
	2018	9.7	<1	No Finds	No Finds	No Finds
St. Bees	2016	22.1	1	No Finds	No Finds	<0.1 [*]
	2017	22.2	<1	No Finds	No Finds	No Finds
	2018	12.6	<1	No Finds	No Finds	No Finds
Braystones	2016	25.3	1	No Finds	No Finds	No Finds
	2017	21.6	1	No Finds	No Finds	No Finds
	2018	14.7	<1	<0.1	No Finds	No Finds
Sellafield	2016	82.3	1	<1	<1	No Finds
	2017	80.4	1	<1	<1	No Finds
	2018	49.2	1	<0.1	<1	No Finds
Seascale	2016	27.7	<0.1	No Finds	No Finds	No Finds
	2017	21.6	<1	No Finds	No Finds	No Finds
	2018	12.7	<1	No Finds	No Finds	No Finds
Drigg	2016	1.1	IA	No Finds	No Finds	No Finds
	2017	1.1	IA	No Finds	No Finds	No Finds
	2018	2.2	No Finds	No Finds	No Finds	No Finds

Note 2: IA - Insufficient area coverage to estimate finds rates (<10 ha).

NM - No monitoring to date in calendar year.

"<1" denotes values between 0.1 and 0.99.

"<0.1" denotes values between zero and 0.099.

* This was a single particle find containing 1.1E+04 Bq Co-60.

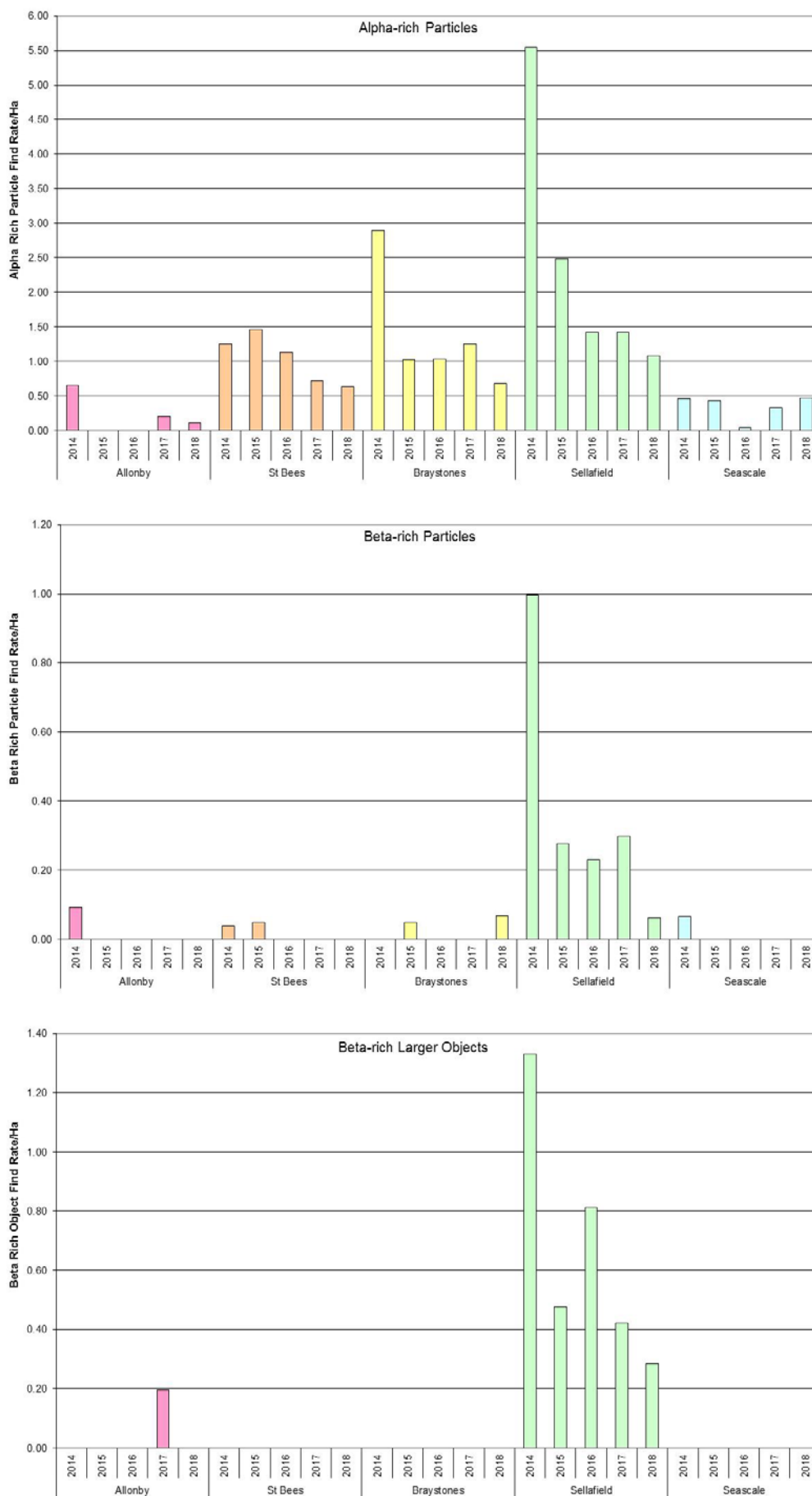
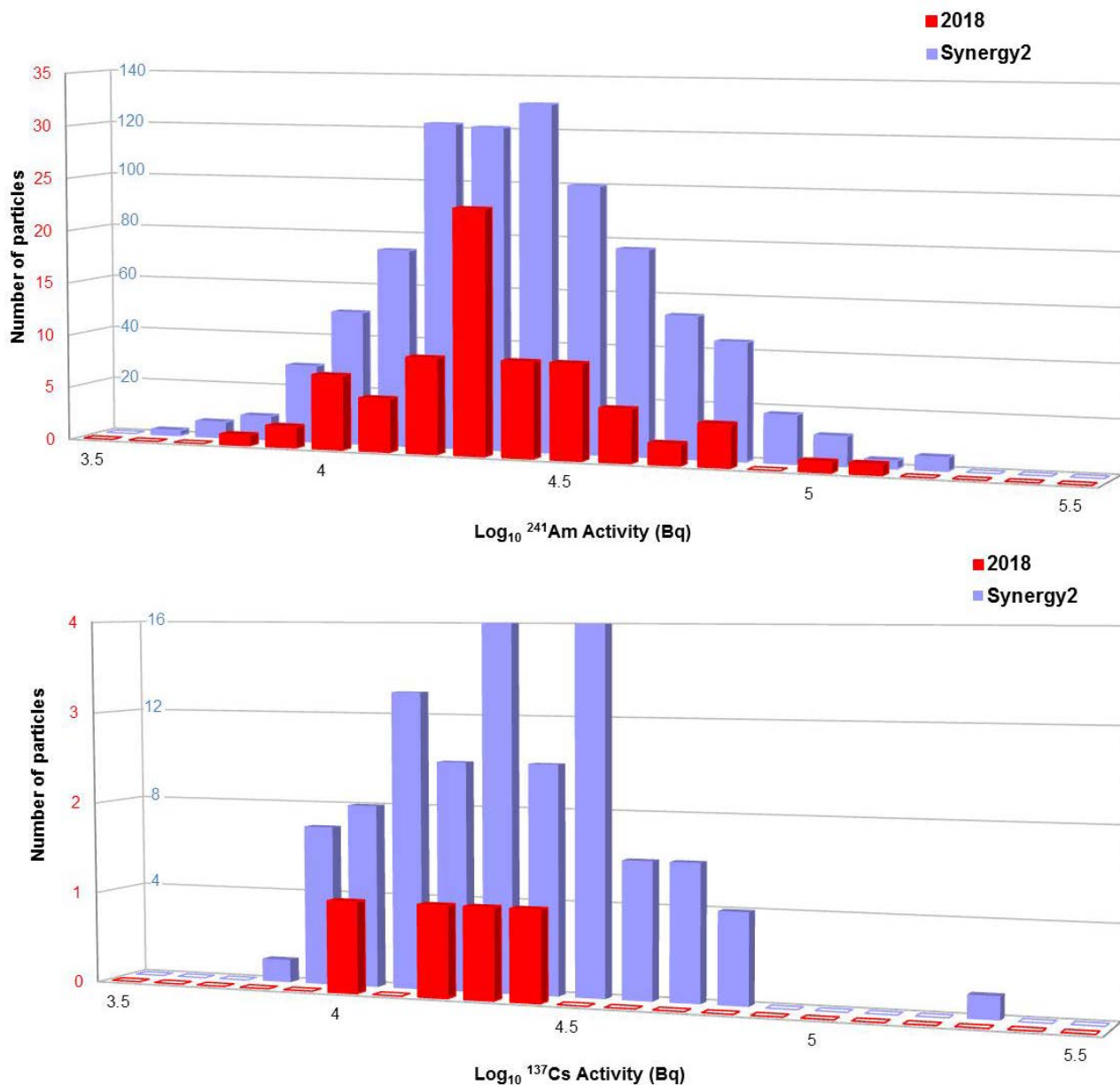


Figure 1: Alpha-rich particle (upper), beta-rich particle (middle) and beta-rich larger object (lower) find rates since the introduction of Synergy 2 in May 2014.



Note 3: Different scales used for 2018 and Synergy2 datasets are shown.

Figure 2: Radioactivity of finds classified as alpha-rich particles (upper) and beta rich particles (lower) between May 2014 - December 2017 (termed "Synergy2" and shown in blue) compared to data from 2018 to date (termed "2018" and shown in red).