

## Particles in the Environment Update for Quarter 4 2018 (1-Oct to 31-Dec)

### 1 Progress and Areas Monitored

The 2018 beach monitoring programme was successfully completed, with a total of 158.8 ha of Cumbrian beaches being monitored against a target of 152 ha. In total, 129 particles and 16 larger objects (all of which are stones) were recovered in 2018, see Table 1.

The area covered, as detailed in Table 1, included the vehicle based biannual strandline surveys. These surveys were conducted along the coast from St. Bees to Drigg<sup>1</sup>, where a single beach find was detected on Drigg strandline during September 2018.

### 2 Find rates

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

Find rates across all beaches were comparable with the find rates observed during 2016 and 2017, see Figure 1 and remained low. This provided confidence that the chances of encounter used in the Public Health England (PHE) health risk assessment remained 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”*.

A single beta-rich particle was detected on Braystones beach in 2018. All remaining beta-rich finds detected during 2018 were located on Sellafield beach (7 particles, 16 larger objects).

### 3 Find activities

The activities of alpha-rich and beta-rich particle finds in 2018 were compared to the activities measured since May 2014 (when the current version of the monitoring equipment was introduced) (Figure 2). This analysis showed that the activity distribution measured during 2018 was within the bounds of the long-term measurements, providing confidence that the risks following encounter used in the PHE health risk assessment remained fit for purpose.

A beta rich particle find was recovered on the 26<sup>th</sup> October 2018 which had a <sup>137</sup>Cs activity of 1.23E+05 Bq. As the Environment Agency characterisation criteria is set at 1.00E+05 Bq of <sup>137</sup>Cs, this particle was sent for further detailed laboratory analysis. The results are expected to be available during 2019. It should be noted that this find is within the range of activities previously considered by PHE.

### 4 Communications

The Environment Agency have asked PHE to review their beach particles health risk assessment to include the additional information available since the beach risk assessment was last updated in 2012. This review is scheduled to be completed in 2019.

**Corporate Lead - Environment, Sellafield  
07/01/2019**

**Distribution:** EA, ONR, NDA, Sellafield Ltd  
**Copied to:** COMARE, Nuvia, PHE, FSA

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<sup>1</sup> Strandline monitoring excludes Nethertown due to the rocky nature of the beach

**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	10	1	0	0	0	0	0	1
St. Bees	21	12	0	0	0	0	0	12
Braystones	23	10	1	0	0	0	0	11
Sellafield	81	88	7	0	0	16	0	111
Seascale	22	9	0	0	0	0	0	9
Drigg	3	1	0	0	0	0	0	1
<b>ALL AREAS TOTAL</b>	<b>159</b>	<b>121</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>16</b>	<b>0</b>	<b>145</b>

Note 1: Proportion of particles as % of total finds 89%.

**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	20.7	<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	22.9	<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	80.6	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	21.6	<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	3.3	IA	No Finds	No Finds	No Finds

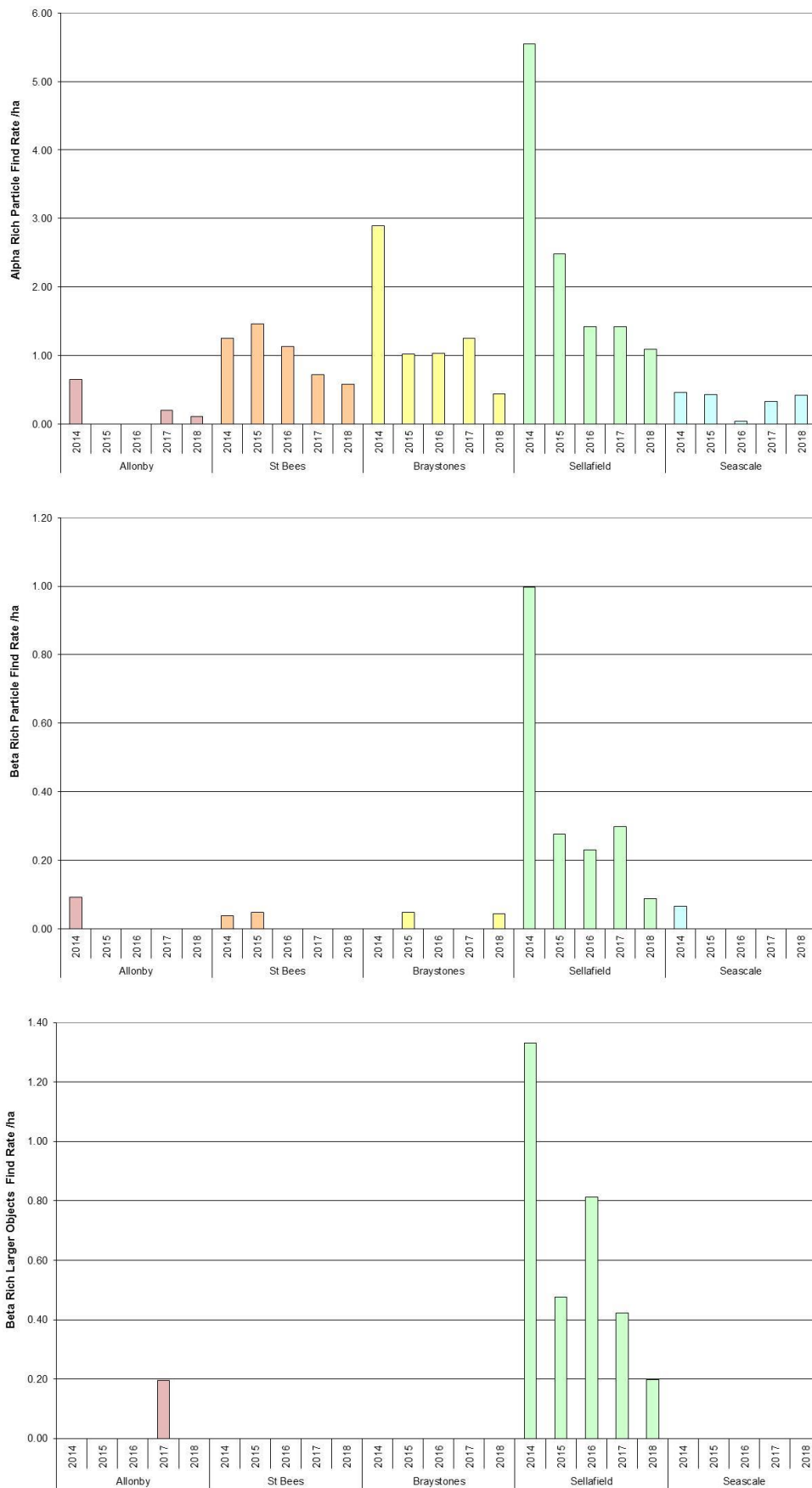
Note 2: IA - Insufficient area coverage to estimate finds rates (<10 ha).

NM - No monitoring to date in calendar year.

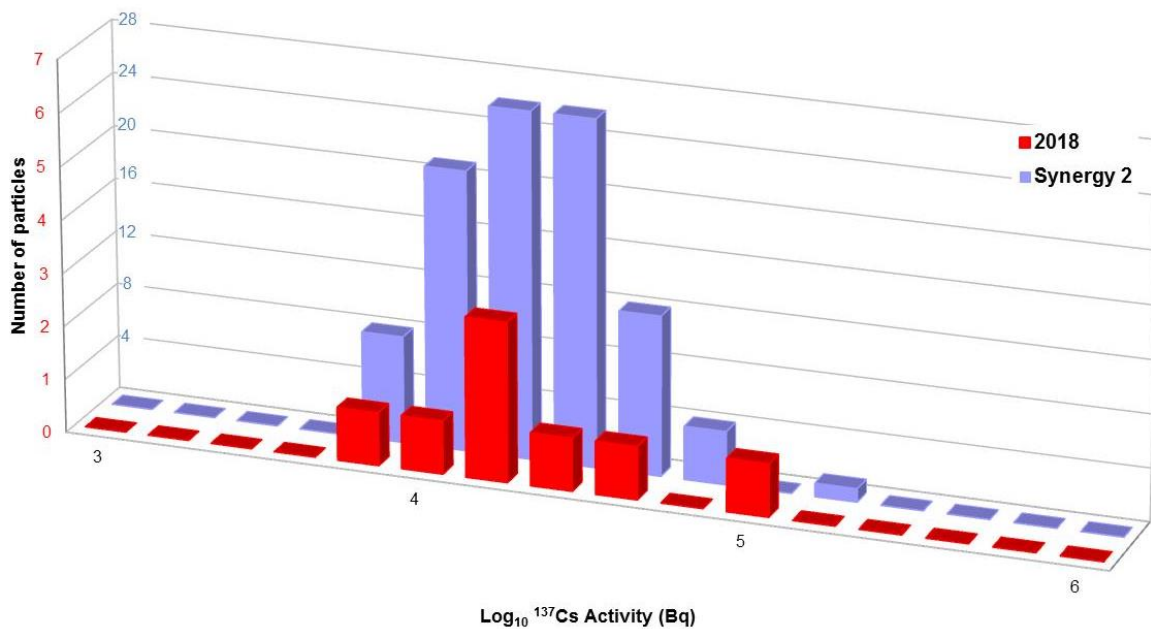
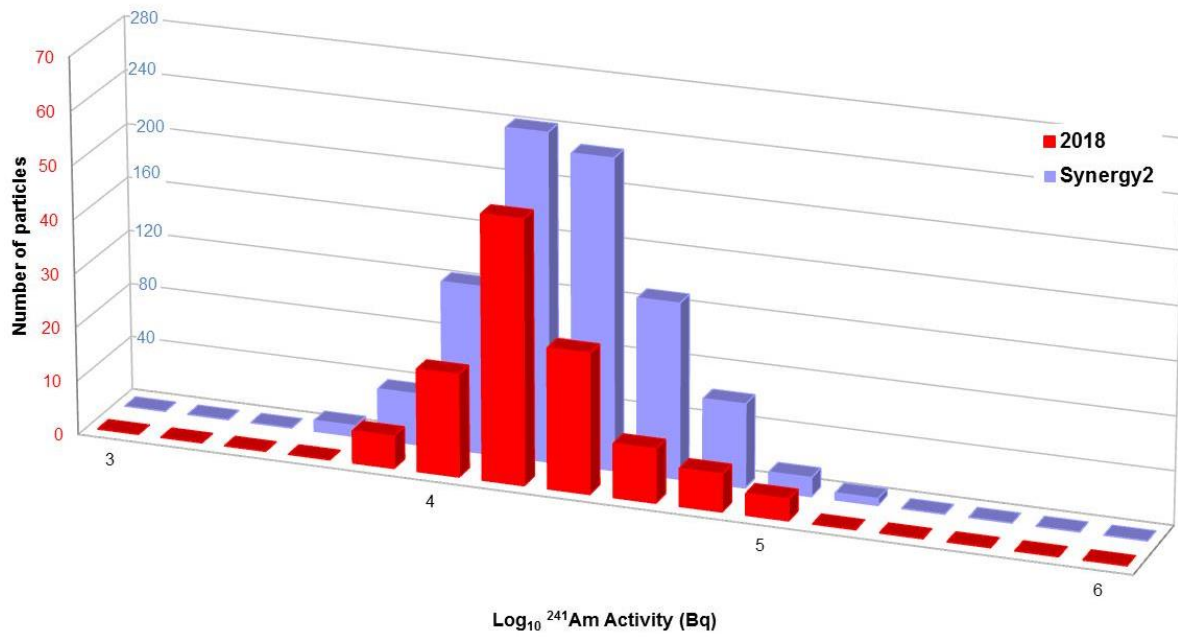
"<1" denotes values between 0.1 and 0.99.

"<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.

**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).**