

Sellafield Particles in the Environment Update (1-Jan to 31-Dec 2021)

1 Progress and areas monitored

During the period 1st January to 31st December 2021 (Q1 – Q4 2021) a total area of 121 ha of the beaches along the Cumbrian coast were monitored against a programme target of 105 ha. A total of 94 particles and four larger objects¹ were detected, recovered and analysed, see Table 1. The overall target for the 2021 programme is to monitor an area of 105 ha. Further details of the programme can be found in the annual report series².

2 Find rates

Average find rates were compared with find rates over the last two calendar years in Table 2 and the last four years in Figure 1. For clarity of presentation, the find rates in Table 2 were rounded to the nearest significant figure.

Table 2 and Figure 1 shows that Alpha-rich particle³, Beta-rich particle and Beta-rich larger object find rates at Sellafield beach and Southern beaches were comparable with the average find rates from the previous years. Alpha-rich particle find rates at Northern beaches were higher than those previously measured at this area in recent years. This increase was due to a temporary period of high find rates during Q1 2021.

Find rates in Q1-Q4 2021 did not require any form of intervention through the EA Intervention Protocol⁴.

3 Find activities

Figure 2 shows the activities of Alpha-rich particle and Beta-rich larger object finds were within the range of the activities measured since May 2014 (when the current version of the monitoring equipment was introduced).

None of the finds recovered in Q1-Q4 2021 required characterisation through the EA Characterisation Protocol⁴.

4 Summary of programme

Table 3 presents a summary of the beach monitoring programme since it started in 2006. Overall, a total of 2591 ha of beaches have been monitored and 3432 particles and larger objects have been recovered and analysed.

5 Conclusion

The risk assessment for radioactive particles and larger objects on West Cumbrian beaches⁵ reported that:

- “overall health risks for beach users are very low, and significantly lower than other risks that people accept when using the beaches.”; and that
- “measures to control these risks are not warranted on public health grounds.”

¹ "Particles" are finds < 2 mm in diameter and "larger objects" are finds \geq 2mm in diameter (includes: granules, gravel, pebbles, stones etc.)

² <https://www.gov.uk/government/collections/sellafield-ltd-environmental-and-safety-reports>

³ "Alpha-rich" are finds with ²⁴¹Am activity greater than ¹³⁷Cs activity, "Beta-rich" are finds with ¹³⁷Cs activity greater than ²⁴¹Am activity and "Co-60 rich" are finds with positive ⁶⁰Co activity greater than the ¹³⁷Cs activity.

⁴ <https://www.gov.uk/government/publications/sellafield-radioactive-objects-intervention-plan/sellafield-radioactive-objects-intervention-plan>

⁵ https://www.ukhsa-protectionservices.org.uk/cms/assets/gfx/content/resource_4526cs1dfcb07c68.pdf

Table 1: Beach finds in 2021

Beach location	Area covered (ha)	No. of particles found				No. of larger objects found				Total finds
		Alpha-rich	Beta-rich	Other	Not analysed	Alpha-rich	Beta-rich	Other	Not analysed	
Allonby	5	0	0	0	0	0	0	0	0	0
Northern beaches	36	68	0	0	0	0	0	0	0	68
Sellafield	57	24	1	0	0	0	4	0	0	29
Southern beaches	24	1	0	0	0	0	0	0	0	1
All	121	93	1	0	0	0	4	0	0	98

Note 1: Proportion of particles as % of total finds 96%.

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	2019	10	<1	0	0	0
	2020	6	0	0	0	0
	2021	5	0	0	0	0
Northern beaches	2019	42	<1	0	0	0
	2020	30	<1	0	0	0
	2021	36	2	0	0	0
Sellafield	2019	81	<1	<0.1	<0.1	0
	2020	58	<1	<0.1	<0.1	0
	2021	57	<1	<0.1	<0.1	0
Southern beaches	2019	25	<0.1	0	0	0
	2020	19	<0.1	0	0	0
	2021	24	<0.1	0	0	0

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

NA - No monitoring to date.

"<1" denotes values between 0.1 and 0.99.

"<0.1" denotes values between zero and 0.099.

Table 3: Summary of beach monitoring data since programme began in 2006.

Beach location	Area (ha)	Total		Alpha-rich		Beta-rich		Co-60 rich	
		Particle	Larger object	Particle	Larger object	Particle	Larger object	Particle	Larger object
Allonby	118	18	1	16	0	2	1	0	0
Northern beaches	869	867	0	810	0	51	0	6	0
Sellafield	943	1668	720	1332	6	328	712	8	2
Southern beaches	582	132	6	107	0	25	4	0	2
Other beaches	78	19	1	17	0	2	1	0	0
All	2591	2704	728	2282	6	408	718	14	4

Note: Northern beaches are St Bees and Braystones, Southern beaches are Seascale and Drigg. Allonby and Sellafield are included specifically. All other beaches (e.g. Whitehaven, Workington, Silecroft etc.) are incorporated into the "Other beaches" definition.

Note that some Beta-rich particles have been reclassified as larger objects following analysis.

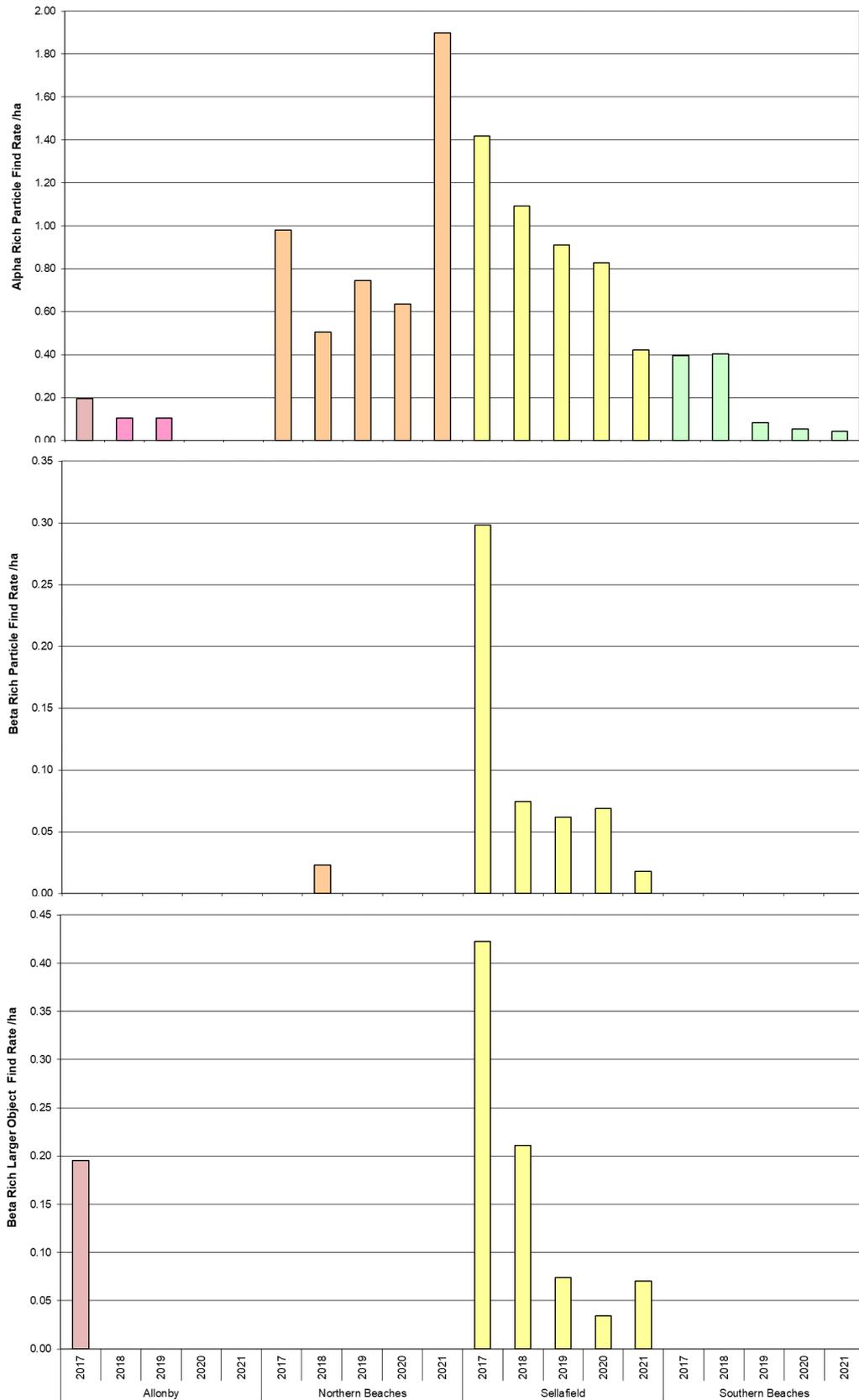
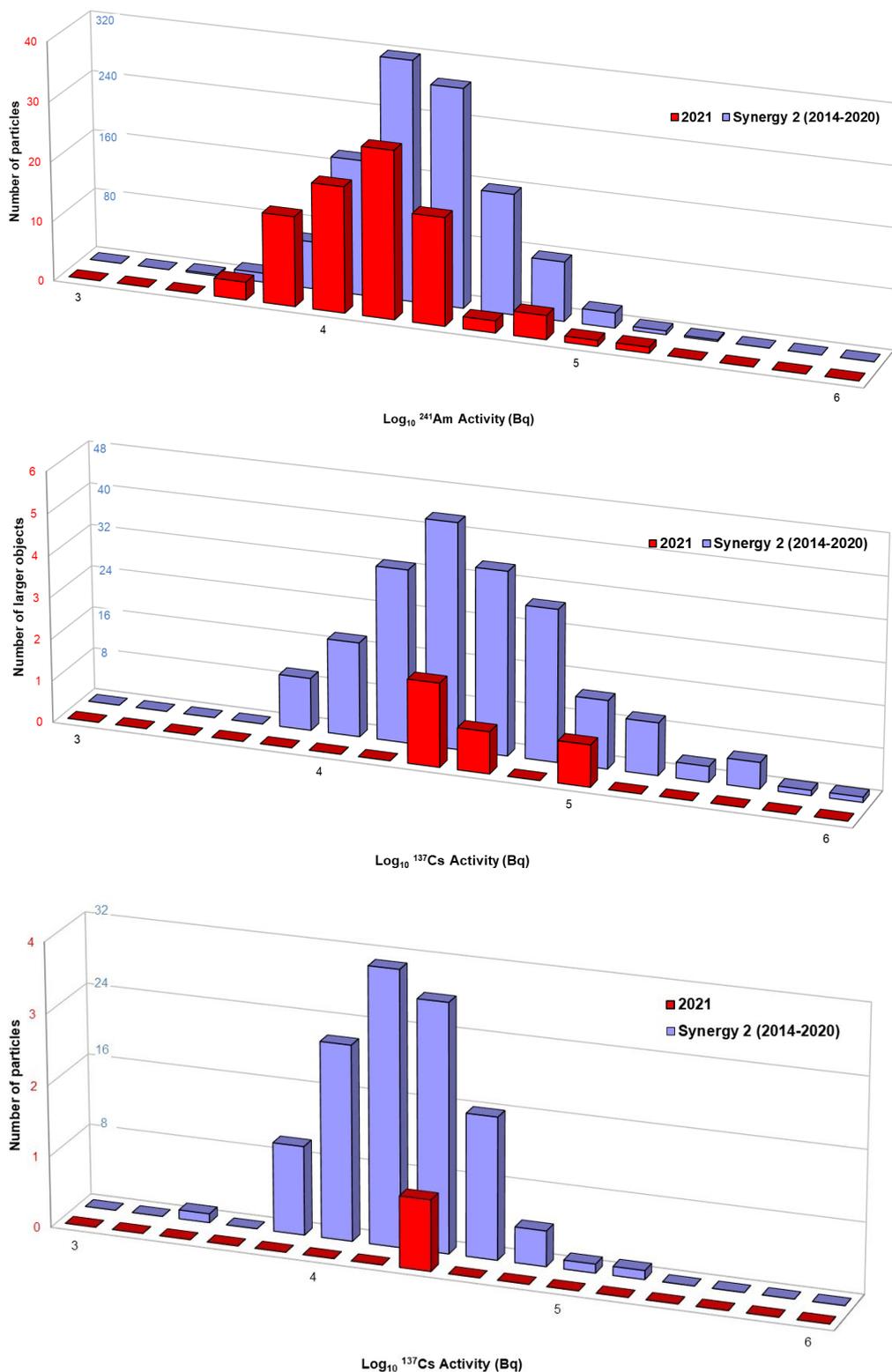


Figure 1: Find rates of Alpha-rich particles (upper), Beta-rich particles (middle) and Beta-rich larger objects (lower) between 2017 - 2021.



Note 3: Different scales used for 2021 and Synergy2 datasets.

Figure 2: Radioactivity of finds classified as Alpha-rich particles (upper) and Beta-rich larger objects (mid) and Beta-rich particles (lower) between May 2014 - December 2020 (termed "Synergy2" and shown in blue) compared to data from 2021 (termed "2021" and shown in red).