

Sellafield Particles in the Environment (1-Jan to 14-July 2023)

1 Progress and areas monitored

During the period 1st January to 14th July 2023 a total area of 76 ha of the beaches along the Cumbrian coast were monitored against a programme target of 65 ha. A total of 59 particles and 2 larger objects¹ were detected, recovered and analysed, details are given in Table 1. The overall target for the 2023 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 find rates at all beaches are comparable with the average find rates from previous years.

Find rates to date in 2023 to date did not require any form of intervention through the EA Notification and Intervention Protocol⁴.

3 Find activities

Figure 2 shows the activities of Alpha-rich particles, Beta-rich particles and Beta-rich larger objects were comparable to the activities measured since May 2014 (when the current version of the monitoring equipment was introduced).

None of the finds recovered to date in 2023 required characterisation through the EA Notification and Intervention Protocol⁴.

4 Summary of programme

Table 3 presents a summary of the beach monitoring programme since it started in 2006. Overall, a total of 2784 ha of beaches have been monitored and 3549 particles and larger objects have been recovered and analysed.

5 Conclusion

The PHE risk assessment for radioactive particles and larger objects on West Cumbrian beaches 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-notification-and-intervention-plan/sellafield-radioactive-objects-notification-and-intervention-plan>

Table 1: Beach finds in 2023 (to 14th July 2023)

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	3	0	0	0	0	0	0	0	3
Northern beaches	21	18	0	0	0	0	0	0	0	18
Sellafield	37	35	2	0	0	0	2	0	0	39
Southern beaches	14	1	0	0	0	0	0	0	0	1
All	76	59	2	0	0	0	0	0	0	61

Note 1: Proportion of particles as % of total finds = 100%.

Table 2: Find per hectare and area monitored for main beach areas (to 14th July 2023)

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	2021	5	0	0	0	0
	2022	5	0	0	0	0
	2023	5	IA	0	0	0
Northern beaches	2021	36	2	0	0	0
	2022	35	<1	0	0	0
	2023	21	<1	0	0	0
Sellafield	2021	57	<1	<0.1	<0.1	0
	2022	55	<1	<0.1	<1	<0.1
	2023	37	<1	<0.1	<0.1	0
Southern beaches	2021	24	<0.1	0	0	0
	2022	22	<1	0	0	0
	2023	14	<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.**(to 14th July 2023)**

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	128	21	1	19	0	2	1	0	0
Northern beaches	924	896	0	839	0	51	0	6	0
Sellafield	1036	1738	729	1397	6	332	721	9	2
Southern beaches	617	138	6	113	0	25	4	0	2
Other beaches	78	19	1	17	0	2	1	0	0
All	2784	2812	737	2385	6	412	727	15	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. A single additional particle (2.8 kBq Am-241; 02/04/2012) was recovered by seabed grab sampling and is not included in the above table.

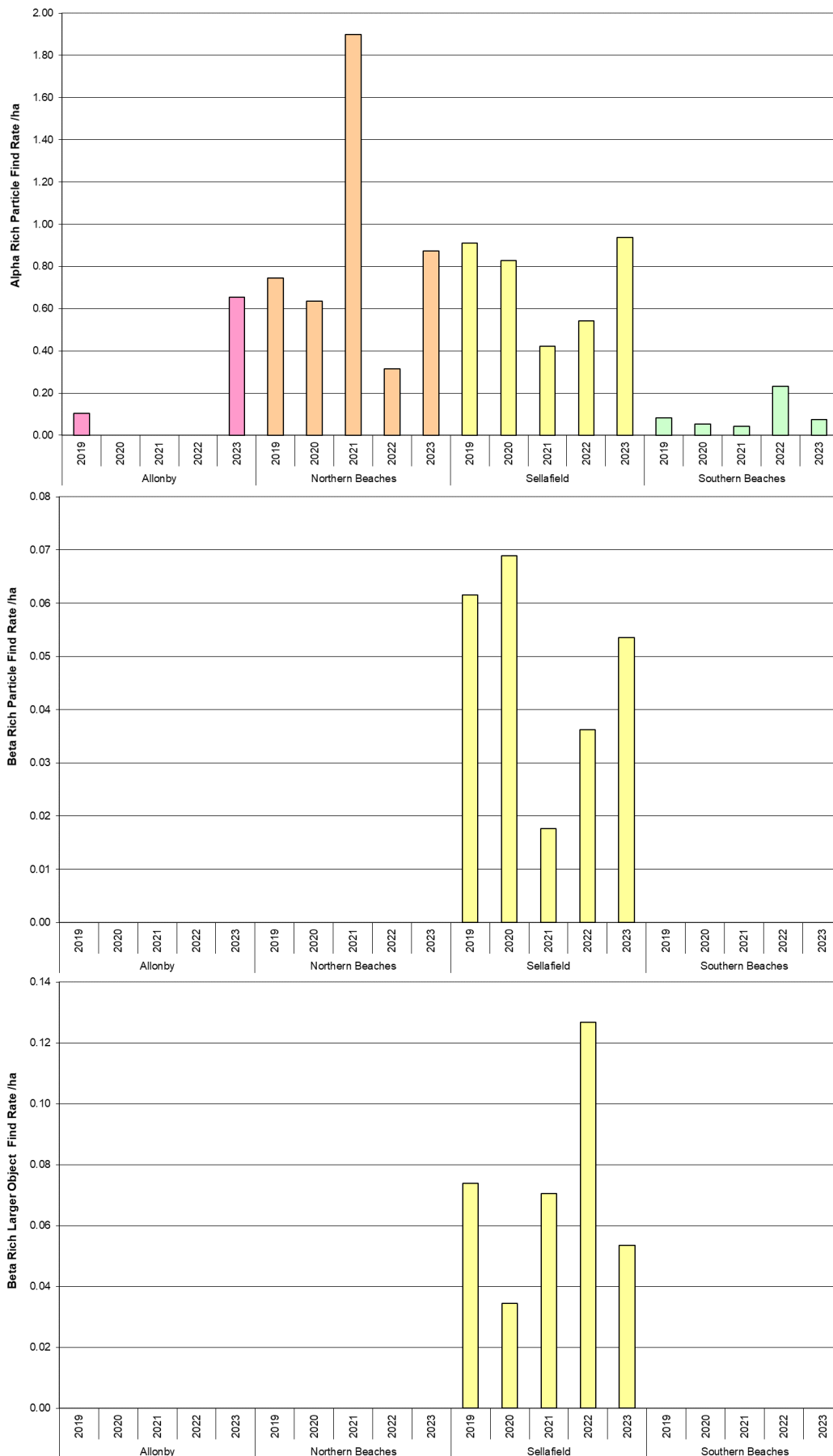
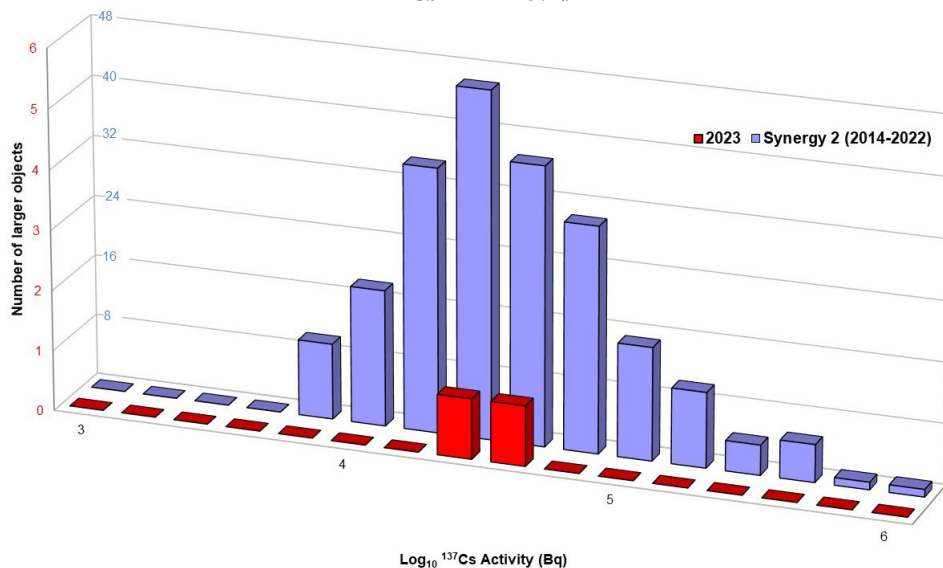
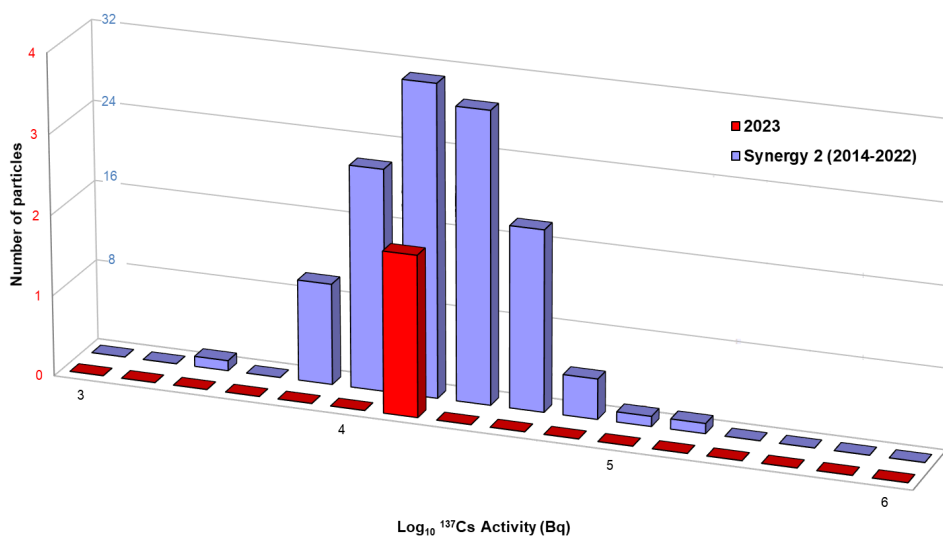
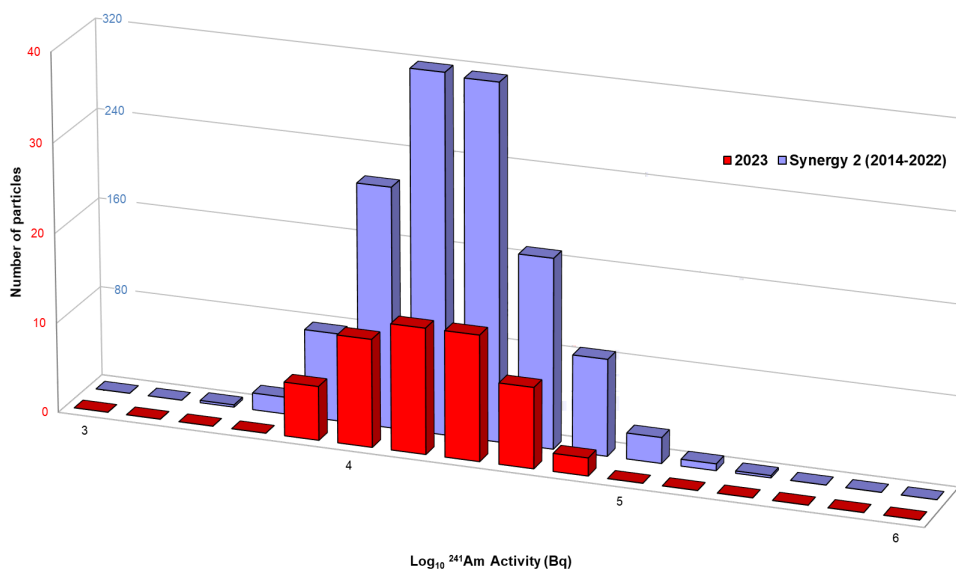


Figure 1: Find rates of Alpha-rich particles (upper), Beta-rich particles (middle) and Beta-rich larger objects (lower) between 2018 - 2023. Note that find rates in 2023 are for finds to date and not the annual rate.



Note 3: Different scales used for 2023 and Synergy2 datasets.

Figure 2: Radioactivity of finds classified as Alpha-rich particles (top), beta-rich particles (middle) and beta-rich larger objects (bottom) between May 2014 - December 2022 (termed "Synergy2" and shown in blue) compared to data from 2023 (termed "2023" and shown in red).