

HUNTING THE NURDLES CASP 2023: MACHTELD RIJKEBOER <u>www.CASPMR.eu</u>

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INTRODUCTION

In 2020 I started CASP as my own citizen science project. CASP stands for Cycling for the Awareness of a Sustainable Planet. CASP2020 aimed at cycling along the whole coast of the North Sea, whereby the focus was on the origin of small plastic litter on the beaches (<u>www.caspmr.eu</u>). Identification of diatoms attached to litter would provide an answer about the origin of the litter. But unfortunately due to COVID 19 the CASP2020 project was cancelled.

In preparation of a new cycling tour in 2023, I looked for a new project suitable to perform during my cycling tour throughout the UK and which would meet the objectives of CASP. The Great Nurdle Hunt of the Scottish organisation FIDRA (<u>www.fidra.org.uk</u>) became the challenge.

FIDRA is an environmental charity working to reduce plastic waste and chemical pollution in the environment. The Great nurdle hunt initiative started in 2013. This citizen science project aims to register nurdle finds and uses this information, together with scientific evidence and research best practices, to start the dialogue with the industry and government in order to end the 'nurdle' pollution into our environment.

This inspired me to look for nurdles along the beaches of Scotland, England, Belgium and the Netherlands, which I would pass during my cycling tour. This small report shows my findings between the period 6 June – 13 August 2023. It is only to be used as a descriptive report. All findings are also recorded in the database of FIDRA.

What are nurdles and where do they come from

Nurdles are the plastic pellets which form the raw production material in the plastic industry. They can be lost at different stages during the use. They are very small and lightweighted and therefore often due to spillage during storage and transport (figure 1). Those nurdles float easily and are often found near the coast or along rivers in the high tide zone (HTZ).

The nurdles form big problems in the environment, since they are tiny, persistent and potentially toxic. Animals may consider them as food and may starve to dead. In the end even these microplastics degrade and become smaller and smaller and will continue to find their way in the food chain.



Figure 1: the pathways of the nurdles into the environment (after: <u>www.fidra.org.uk</u>)

Figure 1 shows the pathways of the nurdles to find their way into the environment. There are several spills possible. In factories these pellets are made of crude oil products or based on recycled plastics. Around the factory, spills may happen, but also all kind of spills during transport occur. These spills may reach the rivers and find their way to sea. Another pathway is due to shipping these pellets from continent to continent and spills occur at sea. Based on the drift of those in sea they will reach

the beaches all over the world. Here part will be covered by sand or debris or will be eaten by animals. Since they are very persistent they will not disappear easily from the environment.

Why registration

Registration is important to find out what the extent of the nurdle problem in the environment is. Only with specific data concerning the amount of environmental pollution, organisations can start the discussion with the industry and the government. These data provides evidence of the ongoing nurdle pollution and may put pressure on the responsible parties and authorities. Besides, knowing the extent of the problem may create awareness by the general public. This may be an even bigger tool to put pressure on the government to take their responsibility to combat these environment issues and compel the industry to improve their way of producing the pre-product of plastic or transporting these nurdles.

Recently a big report by Oracle Environmental experts ltd. (2023) was launched, regarding findings and incidents with nurdles.

Hopefully this will lead to better solutions in the making and handling these plastics or even resulting in producing alternative for plastics.

MATERIAL & METHODS

Nurdle identification

On beaches several microplastics can be found. For successful filling a database it is essential that the citizen scientists all use the same protocols and the correct identification of the items. FIDRA designed an identification chart for the small microplastics which look very similar (figure 2). In the field most of the time it is easy to recognize the nurdles and discriminate them from other microplastics. However, sometimes it was difficult to see the difference between the nurdles and the micro beads. I took all my samples home and in case of doubt I put the samples under a stereo microscope to be sure to count only the nurdles.



Figure 2: the identification chart of FIDRA.

Selection strategy of beaches

My strategy was to combine 2 cycling routes in the UK and visit beaches along the way when possible and look for nurdles. Two criteria were important for selection of beaches: 1) the beach should be accessible in an easy way with my bike, meaning the distance between the cycle path and the beach must be short. 2) the beach should at least has a potential to find nurdles. In reality I visited more beaches then shown in this report, but those not suitable were not searched. For instance because the beach consisted of only big peddles forming the high tide zone, whereby the nurdles will vanish easily between the peddles. The first criterium was based on my map, the second was based on the actual situation.

A third aspect which influenced visiting beaches was the impact of continuous rain, which seriously decreased the motivation to visit some beaches on the way.

In principle after arriving at a beach, I had a quick look at the potential area where nurdles would be expected. The high tide zone was always the guiding principle, except later on the Belgium and Dutch beaches. On those sandy beaches nurdles were often directly visible on the sand. After deciding on the spot, for 10-20 minutes a search was done and all nurdles were collected and counted in that timespan and put in a small bag. In principle the nurdles should be immediately visible or accessible in or on the sediment. So no digging of holes in the sediment was performed, only removing substrate like washed up algae or debris was done. Pictures were taken for description of the environment as well as the coordinates were recorded. Most of the monitoring was done within half an hour.

High tide zone at different beach types

During my research I encountered different types of beaches with a different high tide zone (HTZ) types*.

I: Sandy beach

- II: Sandy beach with small peddles
- III: Beach with small/mediate peddles
- IV: Beach formed by big peddles
- V: Beach formed of gravel

Besides the HTZ can consist of small piles of algae and debris (A) or it can be a typical dead corner area (B), with a high pile of debris. Beaches could be clean of plastic litter or not. The amount of litter was not taken in account, but remarkable things were noted. Pictures were taken of all sampled beaches.

*The classification is following guidelines of FIDRA. Especially HTZ of beaches dominated by thick layers of peddles (IV) were difficult to sample (figure 3), sometimes even impossible, those were then

immediately skipped. The beaches I-III were more promising, although a typical dead corner area on top could be very dirty to handle.



Figure 3: example of beaches type IV which are difficult to sample and may give unreliable results.

Registration of the findings

Due to problems with electricity for my mobile phone, internet connections and other small practical issues underway, I took all the samples home. After my trip, I checked all the requested information and filled in the online registration per beach for FIDRA (figure 4).



Figure 4: the online form for registration of the nurdle findings.

RESULTS

All findings were reported in the FIDRA database. Table I shows location names, area (EN=England; SC=Scotland; SH=Shetland Isles; OR=Orkney Isles; FR=France; BE=Belgium; NL=Netherlands) geographic positions. The local time and the search time are registered as well as the beach type and the total amount of nurdles found in the search time (minutes).

	Location		date	local	lat/lon	Туре	nurdle	Search
				time				(min)
1	Budle beach	EN	20230610	19:00	N 55° 36' 46.728 E -1° 45' 17.9748	1B	8	20
2	Cheswick	EN	20230611	10:36	N 55° 43' 29.1288 E -1° 56' 42.9612	3A	2	20
3	Eyemouth	SC	20230611	19:49	N 55°52′24 E -2°05′28	1A	0	10
4	Cement Work (Dunbar)	SC	20230612	11:22	N 55° 59' 14.9028 E -2° 27' 49.0212	4A	121	5
5	Milsay bay North Berwick	SC	20230612	19:34	N 56° 3' 32.1192 E -2° 41' 43.1988	2A	10	10
6	North Berwick	SC	20230614	13:30	N 56° 3' 38.5992 E -2° 43' 3.2592	1A	39	10
7	WardBay beach	SC	20230615	13:00	N 55° 58' 49.5372 E-3 13'4.674	2A	12	10
8	Tayport	SC	20230616	20:50	N 56° 26' 37.734 E-2 52' 0.84	4B	0	10
9	Dundee	SC	20230617	09:35	N 56° 28' 1.9740 E-2 55'3	2B	17	10
10	Broughty Ferry*	SC	20230617	10:28	N 56° 27' 51.7068 E-2 52'20.1288	1B*	25	10
11	Easthaven	SC	20230617	13:15	N 56° 30' 58.032 E -2° 39' 52.9956	1A	0	10
12	LunanBay	SC	20230617	19:12	N 56° 39' 16.902 E -2° 30' 14.256	1A	2	10
13	Stonehaven I	SC	20230619	08:43	N 56° 58' 12.2664 E -2° 12' 9.8172	2A	0	20
14	Stonehaven II	SC	20230619	09:44	N 56° 58' 15.7908 E -2° 12' 1.1268	2B	0	15
15	Stonehaven III	SC	20230619	12:40	N 56° 57' 44.0208 E -2° 12' 20.8548	2A	0	15
16	Stonehaven IV	SC	20230620	10:05	N 56° 57' 11.826 E -2° 11' 59.0172	4A	0	15
17	AberdeenI	SC	20230621	10:50	N 57° 8' 22.902 E -2° 4' 16.0752	4B	0	15
18	AberdeenII	SC	20230621	14:40	N 57° 9' 14.0472 E -2° 4' 40.476	2A	0	15
19	Catfirth	SH	20230622	10:40	N 60° 16' 3.4644 E -1° 12' 17.3772	4B	0	10
20	Burravoe	SH	20230622	18:33	N 60° 29' 50.46 E -1° 2' 40.254	4A	0	10
21	Sellafirth	SH	20230623	07:55	N 60° 40' 8.346 E -1° 4' 2.6436	5B	3	10
22	Wick of Belmont	SH	20230623	10:45	N 60° 41' 4.9308 E -0° 57' 58.9608	4A	2	10
23	Easting beach	SH	20230623	13:55	N 60° 41' 48.9768 E -0° 51' 55.2492	ЗA	0	20
24	Wick of Skaw	SH	20230624	09:31	N 60° 49' 30.8316 E -0° 47' 17.9232	1A	0	10
25	Harold's wick	SH	20230624	13:41	N 60° 47' 22.65 E -0° 49' 31.0224	4B	0	10
26	Harold's wick II	SH	20230624	14:43	N 60° 47' 8.3832 E -0° 50' 8.2536	1A	0	10
27	Uyea Sound	SH	20230624	17:38	N 60° 41' 16.6236 E -0° 55' 10.3692	2B	0	15
28	Garths Voe	SH	20230625	11:49	N 60° 26' 54.4272 E -1° 15' 38.2032	2A	0	15
29	MavisGrind	SH	20230625	14:50	N 60° 23' 51.6552 E -1° 23' 8.034	3A	47	15
30	HoutonBay	OR	20230627	12:00	N 58° 55' 6.9096 E -3° 11' 12.5088	5B	5	10
31	The Bush (Stennes)	OR	20230627	13:05	N 58° 58' 57.3132 E -3° 15' 3.2472	4A	7	10
32	Skara Brae	OR	20230628	14:41	N 59° 3' 12.708 E -3° 20' 4.2792	4A	1	10
33	Stromness	OR	20230628	18:55	N 58° 57' 14.616 E -3° 17' 58.2504	5A	0	15

Table: I Overview of the visited beaches.

34	Hoy I	OR	20230629	08:00	N 58° 54' 59.166 E -3° 18' 46.26	4B	0	10
35	Hoy 2	OR	20230629	08:39	N 58° 54' 24.0264 E -3° 18' 42.0876	5A	0	10
36	Hoy 3 (Rackwick)	OR	20230629	10:52	N 58° 52' 2.9244 E -3° 22' 45.7284	1A	1	20
37	Finstown	OR	20230630	09:24	N 59° 0' 23.346 E -3° 6' 52.2432	5B	0	10
38	Hatston	OR	20230630	10:25	N 59° 0' 1.6848 E -2° 59' 18.9708	5B	0	10
39	Italian Chapel	OR	20230630	15:03	N 58° 53' 24.72 E -2° 53' 41.1684	1A	0	10
40	Castletown	SC	20230701	14:41	N 58° 35' 38.9292 E -3° 22' 27.3828	1A	0	10
41	Melvich	SC	20230702	15:00	N 58° 33' 31.5612 E -3° 55' 5.8692	2A	0	10
42	Bettyhill	SC	20230703	11:48	N 58° 31' 48.54 E -4° 12' 49.3452	1A	0	10
43	Tain	SC	20230705	15:15	N 57° 49' 0.1344 E -4° 2' 28.7412	2A	0	10
44	Cromarty	SC	20230706	11:01	N 57° 41' 1.4424 E -4° 2' 8.4228	3A	0	10
45	Troon	SC	20230711	12:05	N 55° 33' 39.2688 E -4° 39' 28.44	1A	0	10
46	Preswick	SC	20230711	14:00	N 55° 30' 4.1652 E -4° 37' 13.458	1B	5	15
47	Seaham2	SC	20230718	09:56	N 54° 50' 53.97 E -1° 20' 25.0404	2A	0	10
48	Whitby beach	SC	20230721	07:00	N 54° 29.371080 E -0° 36.690600	1B	23	10
49	Filey beach	SC	20230721	14:33	N 54° 12' 47.3112 E -0° 16' 54.786	3A	1	10
50	Flamborough beach	SC	20230722	16:10	N 54° 6' 15.3972 E -0° 7' 6.6432	3B	0	10
51	Humber N-site bridge	SC	20230724	10:42	N 53° 42' 51.7248 E -0° 27' 4.284	5B	19	10
52	King's Lynn Snettisham beach	EN	20230727	11:30	N 52° 52' 24.042 E 0° 26' 43.9692	2A	0	10
53	Heachham south	EN	20230727	12:30	N 52° 54' 11.4228 E 0° 28' 6.7692	1A	0	10
54	Hunstanton	EN	20230727	13:42	N 52° 55' 53.9724 E 0° 28' 46.3296	2A	0	10
55	Mundesley beach	EN	20230728	11:50	N 52° 52' 30.7056 E 1° 26' 33.9756	2A	0	10
56	Southwold	EN	20230729	16:32	N 52° 19' 31.242 E 1° 40' 56.0172	2A	0	10
57	Gillingham	EN	20230805	10:59	N 51° 23' 43.4148 E 0° 33' 53.2332	2A	0	10
58	Gravelines	FR	20230807	18:59	N 51° 0' 34.578 E 2° 7' 0.9372	1A	68	10
59	Leffrinckoucke	FR	20230808	11:50	N 51° 3' 28.6992 E 2° 25' 55.1496	1A	130	10
60	Bray Dunes	FR	20230808	13:25	N 51° 4' 45.552 E 2° 30' 46.9728	1A	15	10
61	De Panne	BE	20230808	14:42	N 51° 6' 24.8544 E 2° 35' 51.6732	1A	27	10
62	Westende	BE	20230809	09:00	N 51° 10' 4.1052 E 2° 45' 53.7804	1A	22	10
63	Middelkerke	BE	20230809	09:50	N 51° 11' 42.936 E 2° 49' 49.332	1A	41	10
64	Raversijde-Bad	BE	20230809	10:58	N 51° 12' 14.9688 E 2° 51' 3.798	1A	58	10
65	Oostende	BE	20230809	13:11	N 51° 14' 21.9012 E 2° 55' 54.7608	1A	21	10
66	Blankeberge	BE	20230809	15:03	N 51° 19' 24.5388 E 3° 9' 8.1972	1A	25	10
67	Zwin	NL	20230810	07:13	N 51° 22' 10.2576 E 3° 22' 14.6748	1A	0	10
68	Zwin Duinlaan Badstrand	NL	20230810	08:57	N 51° 22' 41.088 E 3° 22' 46.8552	1A	10	10
69	Breskens	NL	20230810	10:07	N 51° 24' 20.5812 E 3° 30' 10.6848	1A	161	10
70	Vlissingen	NL	20230811	10:32	N 51° 26' 49.056 E 3° 33' 42.4332	1A	169	10
71	Scheldevliet (Westkapelle)	NL	20230811	11:58	N 51° 31' 6.0852 E 3° 26' 50.37	1A	31	10
72	Voordelta	NL	20230811	14:36	N 51° 35' 58.1028 E 3° 40' 48.2772	2A	0	10
73	Westerschouwen	NL	20230811	16:10	N 51° 40' 8.274 E 3° 42' 17.622	1A	1	10
74	Renesse	NL	20230812	09:37	N 51° 44' 11.9904 E 3° 44' 11.2812	1A	0	10
75	Brouwersdam Beware beach	NL	20230812	10:58	N 51° 45' 32.9112 E 3° 50' 29.976	1A	5	10
76	Oostvoorne	NL	20230812	14:25	N 51° 54' 36.3564 E 4° 2' 58.7904	1A	0	10
77	Gravezande	NL	20230813	08:07	N 52° 0' 10.5876 E 4° 7' 36.9588	1A	0	10

78	Zuiderstrand	NL	20230813	08:53	N 52° 3' 31.5828 E 4° 12' 6.0768	1A	0	10
79	Wassenaar	NL	20230813	10:32	N 52° 8' 30.102 E 4° 19' 15.9708	1A	100	10
80	Katwijk-zuid	NL	20230813	11:57	N 52° 12' 40.1868 E 4° 23' 43.512	1A	0	10
81	Bloemendaal	NL	20230813	14:55	N 52° 25' 13.35 E 4° 33' 13.374	1A	60	10
82	IJmuiden	NL	20230813	16:31	N 52° 27' 22.8672 E 4° 33' 23.3028	1A	0	10

In total 82 locations were explored for nurdles. Locations who at first sight were unsuitable were immediately left. In the end I realized more locations -the type IV- may give unreliable results, especially when looking at concentrations.

*The Broughty Ferry location showed a HTZ composed of staircases full of debris.



Figure 5: the normalized amount of nurdles found during the tour (N/min). The colours indicate the different concentration categories, whereby green =0; yellow=0.1-1; orange=1-10; red=10-100.

In order to obtain a quick overview of the differences between the locations, all nurdles findings were normalized by dividing the amount of nurdles by the time span of the search (N/min).

Figure 5 show that the highest nurdle concentrations were found along the French/Belgium coast. But also locations in the Netherlands: Vlissingen (mouth of the Scheldt estuary) and Wassenaar were red coloured. Nurdles may be lost in the rivers due to the transport activities from the plastic industries and in the end find their way to the sea and the beaches. Also losses during sea transport may be the cause.

I am not a specialist to comment on the why, but for the North Sea coasts it may be due to the prevailing direction of the wind and sea currents in the North Sea in combination with losses of nurdles from industries related to the Scheldt estuary or other rivers feeding the estuary.

Also in the area of outflow of the estuary of the Tay a relative higher concentration of nurdles was found. Maybe also due to plastic industry along the river Tay.

DISCUSSION & COMMENTS

One must realize this research was done during a cycling tour which was aimed as a holiday but also as a tour for awareness of plastic pollution on beaches to be chaired with my friend and colleagues. Generating reliable scientific data means a fixed protocol. However for me this was a new field of science and during my tour I more and more learned what was the best approach. For instance in the beginning the time of the search has not always be the same. But this was overcome by normalizing the findings with search time. Also picking the area was not always standard and my way of searching was influenced by the type of beach. Beaches with many peddles may hide the nurdles since they are so small and easily disappear between them. On sandy beaches with a clear high tide zone it is more easy to define where to search. Although here the dilemma is searching directly at the surface and between the algae remnants and debris washed ashore or monitoring a fixed area and sieving all until a certain depth. I focused only on direct surface sampling on the beach and between the algae and debris. So my findings only indicate the existence of nurdles and to some degree the concentration of them. After each flooding new sand and other material will bury them under the sediment.

As these findings represent mainly the surface laying nurdles they probably are an indication of recent spills or the result of a long voyage on sea.

For more information about concentrations of nurdles the locations should be searched more often in time and probably be searched in fixed segment from high tide zone towards the low tide zone. However for using these finding for awareness for the general public and as a tool for FIDRA to influence the Government and Industry these finding are of important value. Especially since FIDRA uses a worldwide database which is filled by those many volunteers.

I was proud to be able to contribute to this important initiative of FIDRA.

REFERENCES

Oracle Environmental experts ltd. (2023) Plastic pellet supply chain risks polluting more countries worldwide- new report. <u>Oracle Environmental Experts - Mapping the global plastic pellet supply chain</u> <u>- Report and resource packs - Nurdle Hunt Hub</u>

https://www.fidra.org.uk

https://www.nurdlehunt.org.uk

https://CASPMR.eu

APPENDIX

Location 1: BUDLE BEACH (ENGLAND) N 55° 36' 46.728 E -1° 45' 17.9748

10 June 2023 19:00-19:20*, the searched area was 5 times 30*30 cm

The beach is part of an huge estuary, the area searched consisted of old and dried plant materials on a sandy beach. Nurdle numbers: 7 white and 1 blue. The nurdles were found under the plant materials. So probably these are nurdles, deposited longer ago. On the sandy daily floodable strip no nurdles were found during a quick (10 min) search.



Location 2: CHESWICK (ENGLAND) N 55° 43' 29.1288 E -1° 56' 42.9612

11 June 2023 10:34-10:54

Small sandy beach with at high tide zone of big peddles with dead brown algae (Laminaria and Ascophyllum). Search at high tide zone. No micro- or macro plastics, some polystyrene beads. 2 yellow nurdles.





Location 3: EYEMOUTH BEACH (ENGLAND) N 55°52'24 E -2°05'28

11 June 2023 19:49-19:59

Sandy beach, with seaweeds like Ulva, here no nurdles found. There was also a spot, probably due to clean-up the beach with high piles of dead seaweeds. Here no search was done.



Location 4: WHITESANDS, DUNBAR (ENGLAND) N 55° 59' 14.9028 E -2° 27' 49.0212

12 June 2023 11:22-11:27

Hightide line consisted of big and small peddles on a sandy stretch, covered with organic debris. Nurdles were immediately visible. Also a lot of small plastics, lids, cotton buds and small ropes. 107 transparent, 5 white, 5 yellow, 3 blue, 3 dark grey



Location 5: MILSEY BAY (NORTH BERWICK, ENGLAND) N 56° 3' 32.1192 E -2° 41' 43.1988

12 June 2023 19:34-19:44

Sandy beach, with thin layer of debris and seaweed and small peddles, near the end of the bay. Area of 1*1 m. 8 white, 1 blue and 1 yellow nurdle. Quick research at several spots at the sandy beach showed nothing.



Location 6: NORTH BERWICK (ENGLAND) N 56° 3' 38.5992 E -2° 43' 3.2592

14 June2023 13:30-13:40

Beach next to North Berwick Sea birds centre. Near the sea shore was nothing. The large high tide line consistent of dead brown algae (Ascophyllum) on sand. Some micro plastics and nurdles were found. At the open sandy parts many polystyrene beads were found. Nurdles 35 transparent, 2 blue, 1 yellow, 1 white.



Location 7: WARDIE BAY BEACH N 55° 58' 49.5372 E -3° 13' 4.674

15 June 2023 13:00-13:10

Sandy beach, which mediate peddles and dead seaweed. Containing some larger macro and microplastics and nurdles, 11 transparent, 1 darkgrey.



Location 8: TAY PORT N 56° 26' 37.734 E -2° 52' 0.84

16 June 2023 20:50-21:00

Muddy estuarium with search on the edge of the dryer part showing seaweeds and debris and big peddles. No litter and no nurdles.







Location 9: DUNDEE N 56° 28' 1.974 E -2° 55' 3

17 June 2023 9:35-9:45

Dead end corner, with small peddles and a lot of debris and dead seaweeds on a sandy underground. Nurdles transparent 16, white 1.



Location 10: BROUGHTY FERRY N 56° 27' 51.7068 E -2° 52' 20.1288

17 June 2023 10:28-10:38

Area with staircases, with old organic debris on it. Search in debris on 1 staircase (length =0.7 m). Nurdles 14 transparent, 5 white, 1 light blue, 1 green, 2 grey and 1 blue biobead.





Location 11: EAST HAVEN N 56° 30' 58.032 E -2° 39' 52.9956

17 June 2023 13:15-13:25



Sandy beach with organic debris. Nurdles 4 transparent, 2 black

Location 12: LUNAN BAY N 56° 39' 16.902 E -2° 30' 14.256

17 June 2023 19:12-19:22

The beach showed 3 different high tide lines. At the highest zone 2 nurdles were found, 1 transparent, 1 yellow. The lower zones showed some fish gear, a lot of rope and microplastics. Also a lot of dead birds were spotted here. Massive amount of polystyrene beads on the sand.





Location 13: STONEHAVEN1 N 56° 58' 12.2664 E -2° 12' 9.8172

19 June 2023 8:43-9:03

Sandy layer covered with small peddles and gravel and seaweed spots. The layer contained no litter and no nurdles.



Location 14: STONEHAVEN 2 N 56° 58' 15.7908 E -2° 12' 1.1268

19 June 2023 9:44-9:59

High tide line consists of layer brown algae on gravel and small peddles. Typical dead corner, with many microplastics. No nurdles.



Location 15: STONEHAVEN3 N 56° 57' 44.0208 E -2° 12' 20.8548

19 June 2023 12:40-12:55



High tide line consists of brown algae on gravel. Many small micro plastics but no nurdles.



Location 16: STONEHAVEN VI N 56° 57' 11.826 E -2° 11' 59.0172

20 June 2023 10:05-10:20

Bay with thick high tide layer consistenting of all kind of organic debris on relative big peddles with a lot of litter. Plastic bottles, micro plastics, polystyrene bead. No nurdles found.





Location 17: ABERDEEN 1 N 57° 8' 22.902 E -2° 4' 16.0752

21 June 2023 10:50-11:05

South site of the Dee, wet and thick layer of debris on relatively big peddles. Containing many microplastics, polystyrene beads and other plastic litter. Not a real good spot for easily spotting nurdles.



Location 18: ABERDEEN 2 N 57° 9' 14.0472 E -2° 4' 40.476

21 June 2023 14:40-14:55

The high tide line consists of mediate peddles with a thin layer of brown algae on a sandy beach. Inside the brown algae layer a lot of small fish rope. No nurdles.



Location 19: GATFIRTH (SHETLANDS) N 60° 16' 3.4644 E -1° 12' 17.3772

22 June 2023 10:40-10:50



22 June 2023 18:33-18:43

High tide layer consists of brown algae on a layer of gravel and small and mediate peddles. Hardly any litter or microplastics visible, some fishing rope. No nurdles.





Location 21: SELLAFIRTH N 60° 40' 8.346 E -1° 4' 2.6436

23 June 2023 7:55-8:05

Thick seaweed layer on gravel underground. Diverse plastic items, fishing ropes, 3 transparent nurdles. 1 white bb gun pellet.







Location 22: WICK OF BELMONT (SHETLAND) N 60° 41' 4.9308 E -0° 57' 58.9608

23 June 2023 10:45-10:55

Sea weed on small peddles and seashell underground, consisting microplastics, ropes, small foam pieces, 2 transparent nurdles.


Location 23: EASTING BEACH (SHETLAND) N 60° 41' 48.9768 E -0° 51' 55.2492

23 June 2023, 13:55-14:00 (upper layer: stones) 14:08-14:23(sandy layer)*

Sandy beach with peddles on highest shore, directly facing the North Sea. 5 minute search on stoney underground, 15 minute on sand. No nurdles but on both sites many polystyrene beads.



Location 24: WICK OF SKAW (SHETLAND) N 60° 49' 30.8316 E -0° 47' 17.9232

24 June 2023 9:31-9:41

Most northern beach of the Shetlands, sandy beach with seaweed. Some polystyrene beads. No nurdles



Location 25: HAROLD'S WICK (SHETLAND) N 60° 47' 22.65 E -0° 49' 31.0224 24 June 2023 13:41-13:51

Thick seaweed layer on mediate size peddles, immediately facing the North Sea. The underground consist of a kind of peat layer. 1 blue biobead.



Location 26: HAROLD'S WICK II (SHETLAND) N 60° 47' 8.3832 E -0° 50' 8.2536

24 June 2023 14:43-14.53

Layer of seaweed on a sandy beach, immediately facing the North Sea, showing a lot of microplastics, no nurdles.



Location 27: UYEA SOUND (SHETLAND) N 60° 41' 16.6236 E -0° 55' 10.3692

24 June 2023 17:38-17:53

Seaweed layer on medium sized peddles and a layer on sand. No nurdles found.



Location 28: GARTHS VOE (SHETLAND) N 60° 26' 54.4272 E -1° 15' 38.2032

25 June2023 11:49-12:04

Seaweed on gravel and small peddles. Almost no litter and no nurdles found.



Location 29: MAVIS GRIND (SHETLAND). N 60° 23' 51.6552 E -1° 23' 8.034

25 June 2023 14:50-15:05

Small strip of land between North Sea and Atlantic Ocean. The beach was facing the Atlantic Ocean. Area with older underground, typical dead end full of microplastics, fishing rope and nurdles between brown algae debris and small peddles. 43 transparent, 3 dark grey, 1 blue.



27 June 2023 12:00-12:10



Thick layer of debris on mediate peddles and gravel, with a lot of microplastics. 5 transparent nurdles.

Location 31: THE BUSH: STENNES BAY OF IRELAND (ORKNEYS) N 58° 58' 57.3132 E -3° 15' 3.2472

27 June 2023 13:05-13:15

Layer of seaweed and debris on big peddles. 7 transparent nurdles.



28 June 2023 14:41-14:51

Thin seaweed layer on the bigger peddles. Some microplastics, 1 transparent nurdle





28 June 2023 18:55-19:10



High tide line consist of thick seaweed on gravel. No litter, no nurdles.

Location 34: HOY I, BAY OF CREEKLAND (ORKNEYS) N 58° 54' 59.166 E -3° 18' 46.26

29 June 2023 8:00-8:10

Seaweed on big peddles, some polystyrene beads, no nurdles.



Location 35: HOY 2(BAY OF QUOYS: ORKNEYS)) N 58° 54' 24.0264 E -3° 18' 42.0876

29 June 2023 8:39-8:49



Thin seaweed layer on gravel and small peddles. No litter, no nurdles.

Location 36: RACKWICK BURN (ORKNEYS) N 58° 52' 2.9244 E -3° 22' 45.7284

29 June 2023: in area with big peddles no nurdles and no litter, (10:52-11:02), on sandy beach 11:19-11:29.

High tide layer with thin seaweed layer. Thel lower sandy beach contained polystyrene beads and 1 transparent nurdle.



Location 37: FINSTOWN (ORKNEYS) N 59° 0' 23.346 E -3° 6' 52.2432

30 June 2023 9:24-9:34



Diverse substrate, thick seaweed layer, some microplastics, no nurdles.

Location 38: HATSTON (ORKNEYS) N 59° 0' 1.6848 E -2° 59' 18.9708

30 June 2023 10:25-10:35



Layer of seaweed on mediate peddles, hardly litter, no microplastics. No nurdles.

Location 39: ITALIAN CHAPEL (ORKNEYS) N 58° 53' 24.72 E -2° 53' 41.1684

30 June 2023 15:03-15:13

Seaweed on sandy beach. Some ropes, no litter. No nurdles.



Location 40: CASTLETOWN (SCOTLAND) N 58° 35' 38.9292 E -3° 22' 27.3828

1 July 2023 14:41-14:51

Some seaweed spots on sandy beach. No litter, no nurdles.



2 July 2023: 15:00 - 15:10

Sandy beach with some big peddles and some seaweed. Some fishing rope, no litter. No nurdles.



Location 42: BETTYHILL (SCOTLAND) N 58° 31' 48.54 E -4° 12' 49.3452

3 July 2023 11:48-11:58

Sandy beach, hardly microplastics, but a lot of polystyrene beads, separate or in small groups. No nurdles.



Location 43: TAIN (SCOTLAND) N 57° 49' 0.1344 E -4° 2' 28.7412

5 July 2023 15:15-15:25

Small bay in Dornoch Firth. Seaweed mainly on vegetation (which was due to overflooding). Some marine plastic litter, no microplastics, 1 polystyrene bead. No nurdles.



Location 44: CROMARTY (SCOTLAND) N 57° 41' 1.4424 E -4° 2' 8.4228

6 July 2023 11:01-11:11

Brown algae (Ascophyllum, Himanthalia) on sand. Some plastic litter, no nurdles.



11 July 2023 12:05-12:15

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Brown algae (Laminaria) on sandy beach, with seashells. No litter, no nurdles.

Location 46: PRESWICK (ATLANTIC OCEAN: SCOTLAND) N 55° 30' 4.1652 E -4° 37' 13.458

11 July 2023 14:00-14:15

High tide line is formed by a pile of brown algae containing litter and plastics against the quayside on sandy beach. 5 transparent nurdles.



Location 47: SEAHAM2 (GLASS BEACH: SCOTLAND) N 54° 50' 53.97 E -1° 20' 25.0404

18 July 2023 9:56-10:06

Small high tide line with seaweeds on mediate peddles. A lot of micro glass. Some microplastics and polystyrene beads. No nurdle.





Location 48: WHITBY BEACH (SCOTLAND) N 54° 29.371080 E -0° 36.690600

21 July 2023 7:00-7:10

Sandy beach with a lot of debris and brown algae. Typical dead end place. A lot of polystyrene beads and 23 transparent nurdles.



Location 49: FILEY BEACH (SCOTLAND) N 54° 12' 47.3112 E -0° 16' 54.786

21 July 2023 14:33-14:43

Sandy beach with at high tide line, big peddles and hardly any seaweed. No litter and no polysterren beads, 1 transparent nurdle.



Location 50: FLAMBOROUGH SOUTH LANDING BEACH (SCOTLAND) N 54° 6' 15.3972 E -0° 7' 6.6432

22 July 2023 16:10-16:20

Layer of mediate and small peddles on the sand. Decaying brown algae in between (Laminaria and Ascophyllum) no plastics , no litter, no polystyrene beads, no nurdles.



Location 51: HUMBER N-SIDE (SCOTLAND) N 53° 42' 51.7248 E -0° 27' 4.284

24 July 2023 10:42-10:52

Typical dead corner area, where al kind of debris is collected. Also a lot of microplastics, lids, polystyrene beads, cotton swabs. Riverine litter. Nurdles immediately visible. 17 transparent, 2 blue nurdles.



Location 52: SNETTISHAM BEACH (ENLAND) N 52° 52' 24.042 E 0° 26' 43.9692

27 July 2023 11:30-11:40

Sandy beach with some organic debris. No litter, 2 polystyrene beads 1 microplastic. No nurdles.





Location 53: HEACHHAM SOUTH (ENGLAND) N 52° 54' 11.4228 E 0° 28' 6.7692

27 July 2023 12:30-12:40

Sandy beach with a little organic debris. Some microplastics, no polystyrene beads and no nurdles.



27 July 2023 13:42-13:52

Beach of small peddles with patches of organic debris. no litter, a bit of fishing ropes no nurdles.



28 July 2023 11:50-12:00

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High tide line was formed by small red and green algae. No litter, no nurdles.

Location 56: SOUTHWOLD (ENGLAND) N 52° 19' 31.242 E 1° 40' 56.0172

29 July 2023 16:32-16:42

High tide line consist of small green algae on sandy beach with small peddles. No litter, 1 polystyrene bead, no nurdles.



Location 57: GILLINGHAM MARSHES (ENGLAND) N 51° 23' 43.4148 E 0° 33' 53.2332

5 August 2023 10:59-11:09

High tide line formed by brown (Ascophyllum)and green (Ulva) algae on sandy beach with small peddles near wall. Hardly litter, 2 polysterne beads, no nurdles.





Location 58 GRAVELINES (FRANCE) N 51° 0' 34.578 E 2° 7' 0.9372

7 August 2023 18:59-19:09

High tide line is formed by organic debris and brown algae on a sandy beach. There is also a zone of seashells. In these zones there is a lot of microplastics, bullet hulls, fishing rope, polystyrene beads and nurdles. Obvious a marine origin. 66 transparent nurdles, 1 white, 1 yellow.


Location 59: LEFFRINCKOUCKE (FRANCE) N 51° 3' 28.6992 E 2° 25' 55.1496

8 August 2023 11:50-12:00

High tide line was found on sandy beach and artificial stone path, consisted of brown algae (Ascophyllum and Himanthalia) and some debris. Some microplastics and cotton swabs, nurdles immediately on sand and stones. 120 transparent, 5 white, 3 black and 2 grey nurdles.





Location 60: BRAY DUNES (FRANCE) N 51° 4' 45.552 E 2° 30' 46.9728

8 August 2023 13:25-13:35

High tide line is small and consist of some debris on the sandy beach. High wind may have buried more litter. A lot of stearin (wax) in small pieces and nurdles. Nurdles only from the surface taken. 14 transparent, 1 white nurdle.



Location 61: DE PANNE (BELGIUM) N 51° 6' 24.8544 E 2° 35' 51.6732

8 August 2023 14:42-14:52

High tide line with brown algae and some debris on sandy beach. A lot of stearin pieces and nurdles on top of sand. 25 transparent, 2 white nurdles.



Location 62: WESTENDE (BELGIUM)N 51° 10' 4.1052 E 2° 45' 53.7804

9 August 2023 9:00-9:10

High tide line consist of Brown algae (Himanthalia). Some microplastic, stearin and nurdles on sandy beach. 21 transparent, 1 white nurdle.



Location 63: MIDDELKERKE (BELGIUM) N 51° 11' 42.936 E 2° 49' 49.332

9 August 2023 9:50-10:00

High tide line, like Westende, consisted of brown algae (Ascophyllum and Himanthallia) on sandy beach. Microplastics plus some fishing rope, 34 transparent,5 white, 1 blue, 1 grey nurdles.



Location 64: RAVERSIJDE-BAD (BELGIUM) N 51° 12' 14.9688 E 2° 51' 3.798

9 August 2023 10:58-11:08

High tide line with small microplastics, stearin pieces and many nurdles on sandy beach. 52 transparent, 5 white, 1 black





Location 65: OOSTENDE (BELGIUM) N 51° 14' 21.9012 E 2° 55' 54.7608

9 August 2023 13:11-13:21

High tide line on sandy beach with microplastics and some nurdles. 10 transparent, 6 white, 4 blue and 1 grey nurdles





Location 66: BLANKENBERGE (BELGIUM) N 51° 19' 24.5388 E 3° 9' 8.1972

9 August 2023 15:03-15:13

High tide line with many stearin pieces, microplastic and nurdles. 21 transparent, 2 white, 1 grey, 1 black nurdle.



10 August 2023 7:13-7:23



Hardly a high tide line visible, no litter, no nurdles. Only peat layer and sand.

Location 68: ZWIN DUINLAAN CADZAND-BAD (NETHERLANDS) N 51° 22' 41.088 E 3° 22' 46.8552

10 August 2023 8:57-9:07

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Location 69: BRESKENS (NETHERLANDS) N 51° 24' 20.5812 E 3° 30' 10.6848

10 August 2023 10:07-10:17

High tide line consist of brown algae and debris. Microplastics, foam, many nurdles. 158 transparent, 1 brown, 1 blue, 1 white nurdle.



Location 70: VLISSINGEN (NETHERLANDS) N 51° 26' 49.056 E 3° 33' 42.4332

11 August 2023 10:32-10:42

High tide line with brown algae (Ascophyllum) on sand. Little microplastic, little polystyrene beads, many nurdles fresh from sea. 156 transparent, 10 grey, 2 white, 1 blue.



Location 71: SCHELDEVLIET WESTKAPELLE (NETHERLANDS) N 51° 31' 6.0852 E 3° 26' 50.37 11 August 2023 11:58-12:08

High tide line with brown algae (Ascophyllum and Himanthallia) on sandy beach. Little bit of microplastics, polystyrene beads, nurdles on fresh tide line. Beach is subject to cleaning by overthrowing sand after flood. 27 transparent and 4 white nurdles.







Location 72 VOORDELTA (NETHERLANS) N 51° 35' 58.1028 E 3° 40' 48.2772

11 August 2023 14:36-14:46

Sandy beach with small peddles and some brown algae, no litter, no nurdles.



Location 72: WESTENSCHOUWEN (NETHERLANS) N 51° 40' 8.274 E 3° 42' 17.622

11 August 2023 16:10-16:20

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Sandy beach with seashells and some organic debris, 1 transparent nurdle

Location 74 RENESSE (NETHERLANDS) N 51° 44' 11.9904 E 3° 44' 11.2812

12 august 2023 9:37-9:47

Sandy beach, no litter, no nurdles



Location 75 BROUWERSDAM (NETHERLANDS) N 51° 45' 32.9112 E 3° 50' 29.976

12 August 2023 10:58-11:08

Sandy beach, with organic debris, some polystyrene beads (bigger pieces), 3 transparent and 2 white nurdles.



12 August 2023 14:25-14:35

Sandy beach, bit of fishing rope and brown algae, no nurdles.



Location 77: GRAVEZANDE (NETHERLANS) N 52° 0' 10.5876 E 4° 7' 36.9588

13 August 2023 8:07-8:17

Sandy beach, no high tide line visible, the sand is cleaned by ploughing the sand for tourism. No litter, no nurdles.



Location 78: Zuiderstrand (NETHERLANS) N 52° 3' 31.5828 E 4° 12' 6.0768

13 August 2023 8:53-9:03

Sandy beach, no litter, no nurdles



Location 79: WASSENAAR (NETHERLANS) N 52° 8' 30.102 E 4° 19' 15.9708

13 August 2023 10:32-10:42

Sandy beach with many micro plastics and nurdles, directly on the sand. 98 transparent, 1 white, 1 brown nurdle.



Location 80: Katwijk Z (NETHERLANS) N 52° 12' 40.1868 E 4° 23' 43.512

13 August 2023 11:57-12:07

Sandy beach with many small sea urchins, no real high tide line. No nurdles.





Location 81: Bloemendaal (NETHERLANDS) N 52° 25' 13.35 E 4° 33' 13.374

13 August 2023 14:55-15:05



Sandy beach, 55 transparent, 4 white and 1 blue nurdle. Nurdles directly visible on the sand.

Location 82: IJmuiden (NETHERLANDS) N 52° 27' 22.8672 E 4° 33' 23.3028

13 August 2023 16:31-16:41

Sandy beach, no nurdles



