

Turning the tide on litter

An analysis of beach litter on the Northumberland coast in 2017/18

Laura Shearer



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Project Summary

This year-long litter monitoring project was planned to assess the amount and type of litter on the beaches of the Northumberland Coast Area of Outstanding Natural Beauty (AONB) and surrounding area.

Using a long-established methodology developed by the Marine Conservation Society (MCS), this survey was designed to replicate a similar study undertaken on the Northumberland Coast in 2007 which should make the results broadly comparable.

This project was funded by the Community Foundation through the Local Environmental Action Fund and was specifically supported by Muckle LLP, a leading law firm based in Newcastle. The funding was obtained through the Northumberland Coast Area of Outstanding Natural Beauty Partnership and the project was delivered by the Coast Care Initiative.

Two training workshops were held for interested volunteers in Seahouses and Boulmer in November 2017.

Project Area

The project area aimed to cover most of the beaches in the Northumberland Coast AONB as well as beaches on either side of the AONB in Berwick-upon-Tweed and Amble.

Volunteers were recruited to 'adopt' their local beach and carry out four surveys (one in each season) in order to provide an in-depth record of beach litter. At the end of the study, results were presented to the volunteers, other interested members of the public and governing bodies on the Northumberland coast. Attendees to this event were asked to help the AONB Partnership and Coast Care develop an action plan to target beach litter at the source.

It is hoped that this study will help raise awareness of beach litter on the Northumberland coast through the action plan, forthcoming promotions and at a local level through word of mouth from Coast Care volunteers.

Turning the tide on litter: An analysis of beach litter in Northumberland (2017/18)

1. Introduction

Litter is an increasing concern among scientists, conservationists and members of the public due to an increase in awareness of the devastating effect it can have on our environment following televised documentaries on the impact of pollution on marine life. Programmes such as the BBC's Blue Planet II and Drowning in Plastic have brought home the destruction caused by careless discard of rubbish and this has caused a shift in public opinion.

Litter on beaches is unsightly and offensive to beach users. Once in the sea, litter can cause direct death to marine creatures through ingestion or entanglement. A recent concern for environmentalists is the impact of chemical imbalances in the marine ecosystem caused by the breakdown of litter and the hazardous chemicals which they may contain.

Beach litter comes from a range of sources: directly from people using the coast, fishing from boats and the shore, washed down the rivers and from sewage outfalls. A variety of measures are required to reduce litter at the source including (but not exclusively) improving facilities at coastal sites, enforcement of anti-pollution laws, education across an array of sectors and incentives for changes in manufacturing.

The number of people coming to the Northumberland coast for recreational visits has dramatically increased as a result of housing development and tourism. Many people are attracted to the long sweeping beaches and the magnificent views which they boast.

The Northumberland coast supports nationally and internationally important numbers of breeding seabirds as well as one of the largest grey seal (*Halichoerus grypus*) colonies in England. Offshore reefs and ecosystems have been identified as significantly important and form a Marine Protected Zone (MPZ). The Lindisfarne Special Protected Area (SPA) covers an extensive range of the study region and most of the study sites fall under a European Marine Site (EMS).

2. Funding and Project Initiation

The Local Environmental Action Fund (LEAF) is a ground-breaking partnership between the Community Foundation, Shears Foundation, Greggs Foundation and individual and corporate donors. LEAF awards small grants for work that has a positive impact on the environment while improving the quality of life in communities. The project was funded by a LEAF grant, which was made possible through a donation to the LEAF fund by Muckle LLP, a leading independent commercial law firm based in Newcastle, as an alternative the firm's carbon offsetting

The funding enabled the project team to fully equip and train the volunteer surveyors to complete this study -

1. Train, equip and support volunteers to complete beach litter surveys
2. Perform a minimum of 10 beach litter talks throughout the region
3. Establish litter equipment hubs across the study area
4. Staffing to support and recruit volunteers to participate in litter surveys and create an ongoing legacy of beach cleaning activities

Nineteen volunteers were recruited. They carried out 84 litter surveys on beaches between Berwick-upon-Tweed to Amble. The volunteers were trained by Coast Care and AONB Partnership staff at two workshops in November 2017.

These workshops covered:

- Marine litter - impacts and costs
- How to undertake a beach clean including essential health and safety
- Identifying beach litter
- MCS beach litter protocol and methodology
- Reporting the results

A network of volunteers, covering the whole study area, was established and these groups organised regular beach cleans in addition to the official surveys. Beach cleans-ups were supported by Coast Care Initiative who organise a clean on each beach in the survey area a minimum of once every six months in conjunction with other local organisations.

Coast Care staff gave a number of talks to a range of audiences including schools and community groups about marine pollution:

1. Holy Trinity Primary School, Berwick-upon-Tweed
2. Amble Links First School

3. Seahouses Rotary Club
4. St Paul's School, Alnwick
5. Belford First School
6. Warkworth C of E Primary School
7. Seahouses Probus Club
8. Spittal Women's Institute
9. Branton Primary School
10. Berwick Town Council
11. Benton Dean
12. Berwick U3A
13. Berwick Education Association

In order to make it easier to access litter picking equipment, five hubs were established throughout the region -

1. Berwick Youth Hostel, Dewar's Lane, Berwick-upon-Tweed
2. Natural England Reserve Base at Beal.
3. Coast Care Volunteer Centre in Seahouses
4. Northumberland Coast & Country Cottages office in Alnmouth
5. Northumberland Wildlife Trust Hauxley Nature Reserve at Low Hauxley

The Berwick Youth Hostel have built a unique link with local volunteers, providing warm drinks and snacks for those participating in beach cleans as a reward for volunteering. Berwick Town Council have also been incredibly encouraging, erecting permanent notice boards at beaches to be used for advertising beach cleans and litter campaigns.

3. Methodology

Nineteen volunteers were recruited from Berwick-upon-Tweed to Amble. Each volunteer adopted a beach and performed one MCS survey each season:

Winter: November 2017-February 2018
 Spring: March-May
 Summer: June-July
 Autumn: August and September (culminating during the MCS Great British Beach Clean weekend 14-17th Sept)

During the winter season, nineteen beach litter surveys were carried out. Twenty one surveys were completed in spring and 22 in the summer and autumn.

Coast Care project assistants were on hand to support volunteers participating in the study. A reminder email was sent prior to each new season and all data was returned to Coast Care for analysis. This was then uploaded to the MCS through their website to support local, national and international environmental campaigns.

Each survey was performed using the following protocol:

1. Enter the beach from the most used entrance.
2. Measure the distance between the high tide line (usually marked by a line of seaweed) and the edge of the beach (do not include sand dunes/cliffs).
3. Walk 50m to the left, walk back to original location recording all items of litter between the high tide line and the edge of the beach and collect as you go along. Walk 50m to the right, walk back to original location recording all items of litter between the high tide line and the edge of the beach (figure 1).
4. Complete the MCS Beach Litter Summary form and return to Coast Care for analysis.

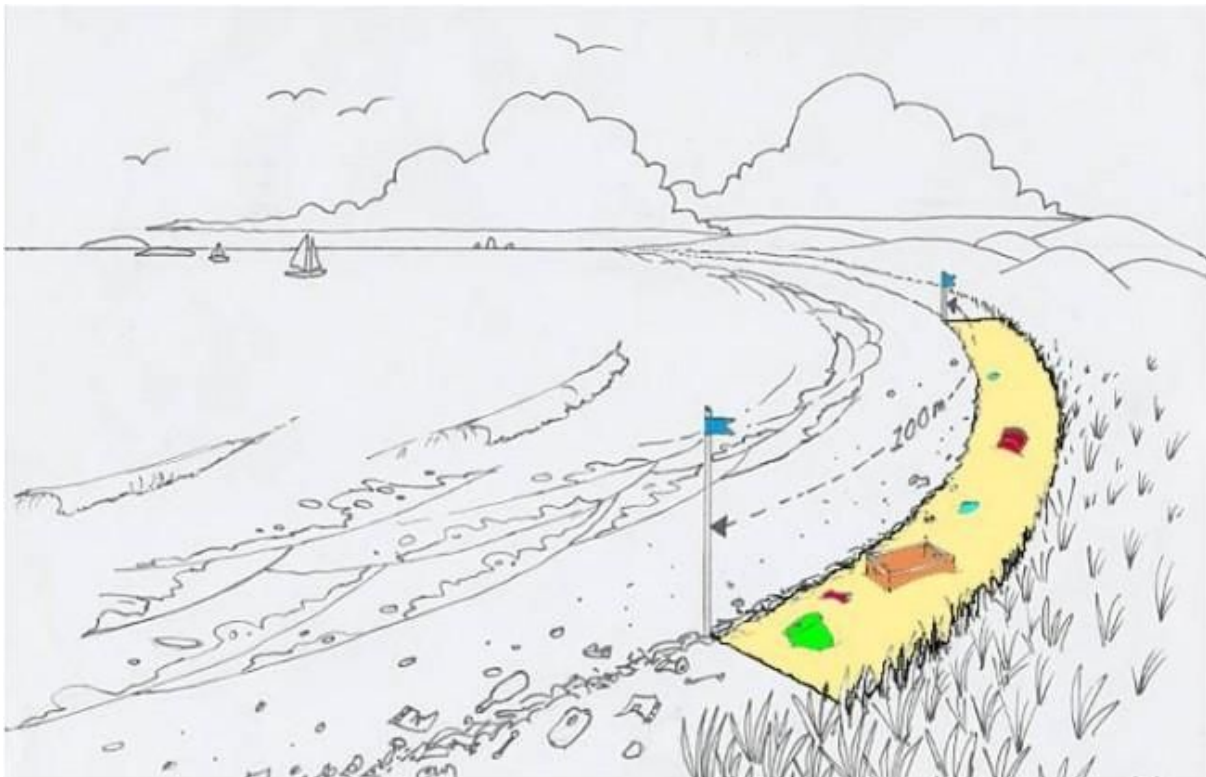


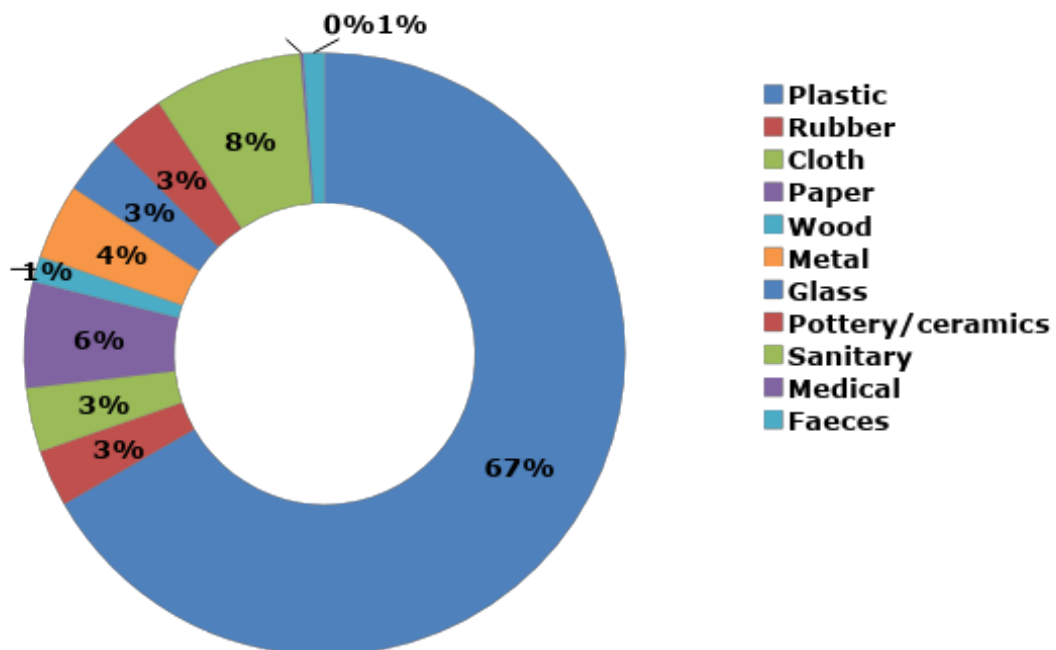
Figure 1 Example survey area (image courtesy of the Marine Conservation Society)

4. Results

A summary of the project results are given below:

Number of beaches surveyed	22
Number of surveys	84
Metres surveyed	840m
Number of volunteer beach cleaners	826
Number of beach clean hours	5029.9
Total number of items recorded	4974

2017/2018 beach litter breakdown



The results equate to six items of litter per metre on the Northumberland coast. Unsurprisingly, plastic is the main contributor to beach litter being 67% of all the items that were recorded. Following plastic, the next most common litter category was sanitary items at 8% (cotton bud sticks, tampons & applicators, towels, panty-liners and wet wipes being the main offenders). Paper items contribute a further 6% (cups, juice cartons and cigarette stubs included). At 4% of all litter recorded was metal and cloth while rubber, glass and pottery made up 3% each. Surprisingly only 1% of beach litter was made up of dog faeces.

Due to the volume and detail of the surveys, a number of analysis techniques have been employed.

4.1 Top 10

The top 10 most common litter items recorded from all of the surveys are listed below. Eight of the top 10 items are made of plastic with the exception of broken glass and wet wipes. This highlights the prevalence of plastic in our marine ecosystem.

	Item	Number recorded
1	Plastic 0-2.5cm	904
2	Plastic 2.5-50cm	625
3	String/cord/rope: thickness 0-1cm	383
4	Packets: crisp/sweet/lolly (inc sticks), sandwich	219
5	Plastic cotton buds	188
6	Cigarette stubs	171
7	Broken glass	146
8	Plastic caps/lids	142
9	Wet wipes	138
10	Plastic cups	102

4.2 Seasonal Litter

It was of interest to determine if there were seasonal changes in the types of litter recorded. The top five from each survey season are listed below:

	Winter	Spring	Summer	Autumn
1	Plastic 0-2.5cm	Plastic 0-2.5cm	Plastic 0-2.5cm	Plastic 2.5-50cm
2	Plastic 2.5-50cm	String/cord/rope: thickness 0-1cm	Plastic 2.5-50cm	Plastic 0-2.5cm
3	Broken Glass	Plastic 2.5-50cm	String/cord/rope: thickness 0-1cm	Cigarette stubs
4	Pottery fragments	Packets: crisp/sweet/lolly (inc sticks)/ sandwich	Wet wipes	String/cord/rope: thickness 0-1cm
5	Cans (drinks)	Cotton bud sticks	Cigarette stubs	Fishing line (angling)

N.B. Winter surveys were missing for Cocklawburn, St Aidans and Annstead. A spring survey was missing for Cocklawburn.

It is apparent that small pieces of plastic are the main issue on Northumberland beaches year round however there is definitely a change in the litter types related to seasons. During spring and summer, items left behind by beach users are more frequently recorded (crisp/sweet

packets and wet wipes) because of an increase use of this habitat. Angling line is more frequently recorded in the autumn months.

4.3 Analysis per beach

It became apparent that some beaches in Northumberland are prone to litter more than others. Tidal currents can play a role in the distribution of litter whilst some beaches are more popular with recreational users. As a result, each beach was analysed individually with the top five litter items noted.

4.3.1 Fisherman's Haven

A total of 89 items were recorded over four surveys on Fisherman's Haven, Berwick-upon-Tweed (winter: 28, spring: 28, summer: 21, autumn: 12). This small cove is situated nearby a caravan park and is often used by beach goers.

Plastic/polystyrene pieces: 0- 2.5cm	22
Plastic/polystyrene pieces: 2.5-50cm	13
Cigarette stubs	6
Tissue	6
Broken glass	5

4.3.2 Berwick Pier Road

A total of 908 items were recorded over four surveys on Berwick Pier Road (winter: 127, spring: 53, summer: 612, autumn: 116).

Plastic/polystyrene pieces: 0- 2.5cm	307
Plastic/polystyrene pieces: 2.5-50cm	228
Wet wipes	64
Plastic cups	49
Uncategorised plastic	31

This beach (also known as Berwick little beach) is situated just North of Berwick harbour mouth. Litter is known to wash down the river Tweed and currents bring the litter onshore. A local community group was established by Coast Care volunteers known as Friends of Little Pier Beach. These volunteers carry-out beach cleans weekly as a result of the volume of litter which washes on shore. These volunteers were supported by this project, providing essential equipment such as gloves, litter pickers, high-visibility vests and first aid equipment.

4.3.3 Spittal

On the southern side of the Tweed mouth lies Spittal beach. As with Pier Road beach, it is largely affected by litter carried down the river and then washing ashore. A total of 310 items were recorded over four surveys on Spittal beach (winter: 169, spring: 73, summer: 35, autumn: 33).

Fishing weights/hooks/lures	36
Balloons	19
Cotton bud sticks	18
Packets: crisp/sweet/lolly (inc sticks)/sandwich	17
Pens/pen lids	14

A number of interested local volunteers litter pick this beach regularly (sometimes daily following winter storms). These volunteers have a significant impact reducing the volume of litter found on this beach. Results from this study suggest that much of the litter comes from beach-users (fishing weights/lures and confectionery wrappers). A plastic inflatable lilo was the most obscure item found on this beach as was an empty tool box.

4.3.4 Cocklawburn

A total of 41 items were recorded over two surveys on Cocklawburn beach (summer: 36, autumn: 5). The main litter items here are pieces of foam/sponge from dog toys as this is a popular dog walking location.

Foam/sponge/insulation	11
Plastic/polystyrene pieces: 2.5-50cm	9
Plastic/polystyrene pieces: 0- 2.5cm	3
String/cord/rope: thickness 0-1cm	3
Wet wipes	2

There has been an increase in beach cleaning activities on this beach by Coast Care volunteers based around Berwick. This has no doubt had a positive effect on the volume of litter found on this beach and this may be reflected in the beach litter results.

4.3.5 Holy Island - North Shore

This beach is within the Lindisfarne National Nature Reserve and Natural England organise regular litter picks here. A total of 22 items were recorded over four surveys on the North Shore of Lindisfarne/Holy Island (winter: 6, spring: 3, summer: 6, autumn: 7). It is likely that litter does

not accumulate on this beach due to its flat profile while surrounding beaches with bays and gyres trap local litter.

Plastic/polystyrene pieces: 2.5-50cm	5
String/cord/rope: thickness 0-1cm	4
Cutlery/trays/straws	2
Plastic/polystyrene pieces: 0- 2.5cm	2
Cans (drinks)	2

4.3.6 Budle Point

A total of 138 items were recorded over four surveys on Budle Point (winter: 25, spring: 39, summer: 27, autumn: 47). This location is subject to a range of tidal factors and as a result, the main pollution items come from the fishing industry- string/cord/rope. The lay-by at Budle Bay is a popular place with visitors to admire the views therefore a lot of litter can accumulate around this area (e.g. food wrappers).

String/cord/rope: thickness 0-1cm	27
Plastic/polystyrene pieces: 2.5-50cm	25
Plastic/polystyrene pieces: 0- 2.5cm	18
String/cord/rope: thickness 1cm+	14
Packets: crisp/sweet/lolly (inc sticks)/sandwich	10

4.3.7 Bamburgh

Bamburgh is the most iconic beach in Northumberland and draws thousands of visitors due to its backdrop of Bamburgh castle and views across to the Farne Islands.

A total of 185 items were recorded over four surveys on Bamburgh beach (winter: 31, spring: 58, summer: 70, autumn: 26) with most litter dropped by beach users. This beach attracts families due to its easy access and consequently wet wipes featured heavily during the surveys of this beach. This is the only beach where nappies were found during this study.

Packets: crisp/sweet/lolly (inc sticks)/sandwich	34
Wet wipes	25
Cotton bud sticks	24
String/cord/rope: thickness 0-1cm	19
Cigarette stubs	16

4.3.8 St Aidans

A total of 150 items were recorded over four surveys on St Aidans beach, Seahouses (spring: 40, summer: 86, autumn: 24). A sewage outlet near Monk's House is the likely source of cotton bud sticks. This beach is also prone to plastic nurdles with hundreds noted by litter surveyors. This beach is popular for dog walkers and recreational visitors (note confectionary wrappers are one of the top five items on this beach). Foam dog toys are also commonly found here.

Cotton bud sticks	27
Foam/sponge/insulation	18
Packets: crisp/sweet/lolly (inc sticks)/sandwich	17
Plastic/polystyrene pieces: 0- 2.5cm	13
Broken glass	10

4.3.9 Annstead

A total of 299 items were recorded over three surveys on Annstead (spring: 211, summer: 62, autumn: 26). Surveys for this beach were undertaken at the southern end closest to Beadnell. It is a popular beach close to B&B's and caravan sites resulting in cigarette stubs and confectionary wrappers making up the top five items.

Plastic/polystyrene pieces: 0- 2.5cm	59
Cigarette stubs	38
Plastic/polystyrene pieces: 2.5-50cm	24
Cotton bud sticks	22
Packets: crisp/sweet/lolly (inc sticks)/sandwich	19

4.3.10 Beadnell

A total of 154 items were recorded over four surveys on Beadnell (winter: 16, spring: 48, summer: 50, autumn: 40). This beach is popular with people due to its facilities (car park and toilets). Consequently the two most popular litter items could have been dropped by beach users.

Packets: crisp/sweet/lolly (inc sticks)/sandwich	28
Cigarette stubs	19
Plastic/polystyrene pieces: 0- 2.5cm	16
Uncategorised wood	10
Fishing line (angling)	9

4.3.11 Low Newton

A total of 258 items were recorded over four surveys on the beach at Low Newton (winter: 44, spring: 106, summer: 80, autumn: 28). Pollution from the fishing industry is the most prevalent issue on this beach, particularly small pieces of rope and cord as well as broken pieces of fishing nets.

String/cord/rope: thickness 0-1cm	72
Fishing net & net pieces: 0-50cm	27
Plastic/polystyrene pieces: 0- 2.5cm	27
Plastic/polystyrene pieces: 2.5-50cm	24
Cotton bud sticks	14

4.3.12 Embleton - Golf Club

The beach at Embleton is popular with dog walkers and thus rubber tennis balls feature in the top five items of litter found here. Many walk this stretch of beach towards Dunstanburgh Castle and therefore dropped-litter such as crisp/sweet wrappers and drink cans are also commonly found. A total of 107 items were recorded over four surveys on the beach at Embleton Golf Club (winter: 73, spring: 9, summer: 20, autumn: 5).

Plastic/polystyrene pieces: 2.5-50cm	26
Tennis balls	10
Plastic/polystyrene pieces: 0- 2.5cm	8
Packets: crisp/sweet/lolly (inc sticks)/sandwich	7
Cans (drinks)	7

4.3.13 Embleton - Dunstan Steads

As with the beach at Embleton Golf Club, the main issues at Dunstan Steads comes from beach goers- tennis balls left behind by dogs and wrappers/cups left behind by the beach walkers. A total of 163 items were recorded over four surveys on Embleton beach at Dunstan Steads (winter: 94, spring: 16, summer: 30, autumn: 23).

Tennis balls	28
Plastic/polystyrene pieces: 2.5-50cm	26
Plastic/polystyrene pieces: 0- 2.5cm	16
Plastic cups	9
Packets: crisp/sweet/lolly (inc sticks)/sandwich	9

4.3.14 Howdiemont

Howdiemont is popular with beach anglers and as a result fishing line is the main type of pollution found here. Small pieces of fishing net and other fishing related litter feature in the top five items commonly found at Howdiemont.

A total of 242 items were recorded over four surveys on Howdiemont beach (winter: 97, spring: 62, summer: 18, autumn: 65).

Fishing line (angling)	32
Plastic/polystyrene pieces: 0- 2.5cm	22
Bottles/containers: drinks	18
Fishing net & net pieces: 50cm+	15
Plastic cups	13

4.3.15 Sugar Sands

Just south of Howdiemont beach is Sugar Sands which has similar litter issues from anglers and other fishing equipment. A total of 96 items were recorded over four surveys on Sugar Sands (winter: 31, spring: 17, summer: 26, autumn: 22).

Fishing line (angling)	12
Bottles/containers: drinks	10
Cotton bud sticks	8
Plastic/polystyrene pieces: 2.5-50cm	7
String/cord/rope: thickness 0-1cm	7

4.3.16 Boulmer

Boulmer beach has a significantly higher percentage of broken glass (including sea glass) and pottery fragments than any other surveyed beach. This beach is regularly cleaned by local volunteers.

A total of 383 items were recorded over four surveys on Boulmer (winter: 219, spring: 99, summer: 28, autumn: 37).

Broken glass	97
Pottery fragments	83
Construction material (e.g. tiles)	54
Plastic/polystyrene pieces: 0- 2.5cm	21
String/cord/rope: thickness 0-1cm	16

4.3.17 Seaton Point

Seaton point is subject to tidal litter with small items of plastic, polystyrene and fishing pollution regularly recorded on this beach. Sewage litter (cotton bud sticks) are also a common feature here. A total of 817 items were documented over four surveys at Seaton Point (winter: 166, spring: 299, summer: 257, autumn: 95).

Plastic/polystyrene pieces: 0- 2.5cm	289
String/cord/rope: thickness 0-1cm	145
Plastic/polystyrene pieces: 2.5-50cm	106
Cotton bud sticks	42
Caps/lids	30

4.3.18 Alnmouth

Alnmouth is popular with visitors due to the proximity of local amenities. The Burgage Holders employ a regular beach cleaner who ensures the area is suitably maintained. A total of 113 items were recorded over four surveys at Alnmouth (winter: 66, spring: 17, summer: 23, autumn: 7). Most litter items recorded here were dropped by beach goers despite adequate access to bins regularly dispersed around the beach car park.

Packets: crisp/sweet/lolly (inc sticks)/sandwich	19
Caps/lids	9
Paper	8
String/cord/rope: thickness 0-1cm	7
Cigarette stubs	6

4.3.19 Buston Links

South of the river Aln mouth is Buston Links. Although only 47 items were recorded over four surveys at Buston Links (winter: 21, spring: 10, summer: 16, autumn: 0). The surveyor noted a lot of litter in areas surrounding the survey site at this location.

Plastic bags (e.g. shopping)	7
String/cord/rope: thickness 0-1cm	6
Plastic/polystyrene pieces: 0- 2.5cm	5
Broken glass	5
Packets: crisp/sweet/lolly (inc sticks)/sandwich	3

4.3.20 Warkworth

The profile of the beach at Warkworth makes it subject to sea driven litter. During storms, this beach can be covered in debris which can wash away during the next high tide. A total of 40 items were recorded over three surveys on Warkworth beach (winter: 15, summer: 19, autumn: 6).

String/cord/rope: thickness 0-1cm	6
Plastic/polystyrene pieces: 0-2.5cm	4
Uncategorised plastic	3
Caps/lids	2
Foam/sponge/insulation	2

4.3.21 Amble Little Shore

The Little Shore at Amble is affected by the tide and River Coquet. It is popular for families due to its shallow profile which makes it suitable for paddling. Three of the top five litter items found on this beach are dropped by beach goers (cigarette stubs, caps/lids and plastic drink bottles). A total of 113 items were recorded over four surveys on Amble Little Shore (winter: 27, spring: 17, summer: 14, autumn: 55). This beach is regularly litter picked by local people.

Plastic/polystyrene pieces: 2.5-50cm	23
Cigarette stubs	22
Caps/lids	12
Plastic/polystyrene pieces: 0- 2.5cm	8
Bottles/containers: drinks	7

4.3.22 Amble Links

The beach at Amble Links gathers rubbish deposited by the sea. Pieces of plastic are commonly found among the seaweed as are small pieces of rope/cord. A total of 300 items were recorded over four surveys on Amble Links (winter: 91, spring: 98, summer: 59, autumn: 52).

Plastic/polystyrene pieces: 2.5-50cm	67
Plastic/polystyrene pieces: 0- 2.5cm	47
Bags (e.g. shopping)	17
String/cord/rope: thickness 0-1cm	14
Cigarette stubs	12

4.4 Comparison between 2007-2017/18

This study was developed to repeat a similar project which was conducted in 2007. The results from each are compared below. Many of the most commonly-found litter items have not changed with small pieces of plastic, polystyrene and fishing equipment still prevalent. Wrappers remain the fourth most popular litter item and cigarette stubs and broken glass still feature. Wet wipes are not a new phenomenon. However, it appears there is an increase in their usage and disposal on our beaches.

	2007	2017/18
1	Plastic 1-50cm	Plastic 0-2.5cm
2	Fishing line (anglers)	Plastic 2.5-50cm
3	Plastic rope	String/cord/rope: thickness 0-1cm
4	Packets: crisp/sweet/lolly (inc sticks), sandwich	Packets: crisp/sweet/lolly (inc sticks), sandwich
5	Cigarette stubs	Plastic cotton buds
6	Plastic <1cm	Cigarette stubs
7	Polystyrene <50cm	Broken glass
8	Broken Glass	Plastic caps/lids
9	Cloth pieces, string	Wet wipes
10	Plastic drinks bottles	Plastic cups

The volume of litter has significantly decreased since the 2007 survey

2007: 8.17 items/m

2017-18: 5.92 items/m

4.5 Comparison between Northumberland and the rest of UK

The final surveys were completed during the Great British Beach Clean weekend (14-17th September 2018) in line with other surveys organised by the Marine Conservation Society. At the time of print, no results had been released by the MCS for comparison.

5. Discussion

The volume of litter on the Northumberland coast has significantly reduced since the 2007 study. This is likely a result of an increase in awareness of litter, easier recycling options and a recent surge in beach cleaning activities organised through the Coast Care Initiative. Regular beach cleans and sometimes daily litter picks by Coast Care site wardens ensure there is little build-up of litter on some of the beaches. There was no presence of oil/tar or other pollutants throughout 2017-18 surveys due to tighter control and care of these substances. It was not possible to

compare the results from 2007-2017/18 for individual beaches due to the patchy distribution of the previous data.

It is interesting that the top 10 litter items remain similar after 10 years. Small pieces of broken up plastic remain a real threat to our marine ecosystem and it is difficult to develop an effective solution to remove this hazard as these items originate from a range of sources.

Cigarette stubs still feature in the top 10 items likely to be found on our beaches despite a decrease in the number of people smoking. The ban on smoking inside public buildings may have exacerbated the problem as cigarette butts dropped many kilometres in land from the coast can end up in surface drains, into the river systems to the sea and eventually onto the beach as litter.

There are seasonal changes in the volume and types of litter found on Northumberland beaches which suggests that seasonal campaigns may be more likely to have effect. During winter months, storms can damage fishing equipment and small pieces of net and sections of lobster pots wash ashore. Once this equipment is damaged, it can become a hazard to marine life as they may become entangled. This is unfortunately difficult to manage and this type of litter may increase as winter storms become more prevalent. During the spring and summer, dropped litter is the main issue as the number of beach goers increase. Any anti-litter campaigns aimed at recreational visitors should be carried out in the summer months.

Although volunteers were trained to undertake litter surveys, it is likely that recording varies between individuals. Therefore some beaches can appear to have less litter than others but this maybe a result of bias. It is likely that the data may be skewed by weather conditions and tidal extremities. For example some surveys were carried-out after the 'Beast from the East' storm whilst others were done during more settled weather periods.

The results from this study were presented to an audience of volunteers and other interested people with the hope of developing an action plan to stop litter at the source and prevent it reaching the beach in the first place. The main points of discussion can be found in Appendix 1.

6. Appendix 1: Comments from beach litter surveyors

Litter dropped by beach visitors:

- Information in hotels, guest houses, holiday lets etc. to make people aware of the problem of beach litter and the work of Coast Care volunteers.
- Use letting-agents to make holiday-let owners aware of using plastic bags. Maybe it isn't necessary to use bags in all bins.
- Takeaway restaurants should charge more for take-away.
- Involve the tourist industry to educate visitors who are staying in the area to think about what happens to their waste and discourage them from littering.
- Encourage visitors to take part in Coast Care events e.g. litter pick as a family activity whilst they are here on holiday.
- Provide information and litter-picking equipment in holiday accommodation so people are able to assist in their own time.
- Ban single use plastic such as toiletry sachets in the holiday accommodation and encourage shops to supply paper bags and plastic free coffee cups.
- The tourist industry uses the beautiful Northumberland coastline as their selling point/attraction so they need to work alongside Coast Care/AONB Partnership to help keep it clean and accessible for the visitors.
- Make shopkeepers aware and suggest removing all tags and plastic labels from buckets, spades etc.
- Recycling bins at beach car park.
- Large gull proof dustbins!
- Tourist Board to get involved and also second-homes and holiday cottages – leaflets could be given about litter and also supply litter picking equipment.
- Caravan parks to take more responsibility for rubbish.
- Notice boards in beach car parks to give information about litter and also what can happen from fishing waste.
- Two minute litter pick events with visitors to show how much litter there is.
- Poster campaigns and social media posts about the issue.
- Visual posters such as a dog poo bag tree to attract attention.
- Ask visitors why they come to the beach, do they like seeing all the litter...make them think about it and take responsibility.

Stopping sewage pollution:

- The general public need educated on what you can/can't be put down the toilet. This could be done by manufacturers on their packaging but also awareness is needed through schools, universities, hospitals and other care facilities. For example new mums may not know how to dispose of wipes or nappies or know of environmentally friendly alternatives and may appreciate this

information in their starter packs. Campaign "Only flush the 3 P's: Paper, Pee and Poo" successful in Edinburgh, perhaps organise a similar campaign.

- Higher tax on wet wipes and cotton buds.
- Campaign supermarkets and government to get rid of plastic cotton buds and speed up the consultation process.
- Challenge manufacturers on use of natural products.
- More messages and education in public toilets and holiday accommodation to make people aware of the issues.
- Increase awareness of composition of wet wipes – is it wood pulp/paper "air layered paper" or non-woven polymer – to reduce litter.
- Dispose baby used nappies in dog poo refuse bins.
- Target information to local schools.
- More provision needed for sanitary bins.
- Query Northumberland Water re: frequency of sewage releases -why, how often, how can you prevent? Mesh sacks on the ends of sewage outlets to collect waste?

Reducing fishing litter:

- Fishing waste to be reported. If serial numbers are found attached to equipment, report to relevant authorities, eg. Northumberland Inshore Fisheries and Conservation Authority (NIFCA).
- Waste disposal facilities at harbours to prevent it being dumped at sea.
- Public awareness to recreational anglers of impact of fishing waste upon the ecosystem.
- Licencing sea fishing and funds to go back into environmental projects.
- People need to take personal responsibility – purchase power (stop buying fish).

6.1 2019/20 Action Plan

The suggestions listed above were very valuable in assisting the project organisers to come up with an action plan to reduce litter at source. Some of the suggestions are beyond the remit of the AONB Partnership or would require a change in government policy. Rather than do everything on the list, the Partnership will run a series of targeted campaigns and longer-term initiatives.

Reducing litter from recreational visitors

Run an awareness campaign that will include:

- A social-media campaign in the summer of 2019
- Information about how to reduce use of single-use plastics in the AONB Visitor Guide
- Provide information about beach litter for bedroom browsers/welcome packs in hotels, B&Bs, caravan parks and self-catering premises.
- Encourage the operators of self-catering accommodation premises to provide reusable mugs, for use whilst people are staying, to reduce the use of single-use cups.
- Work with 'Beadnell Blue' to continue to the work already started to the availability of single-use plastic items in that village. Use social media to raise awareness of participating businesses.
- Work with one of the bigger tourism businesses to develop alternatives to single-use plastics.
- Work with Northumbrian Water to keep people hydrated on the go while reducing the use of single use plastics, by promoting Refill North East and encouraging businesses to register as Refill stations on the Refill app.

Sewage-related debris

- Work with Northumbrian Water, on a coast-themed campaign, to encourage the '3P's' message.

Fishing-related litter

- Work with NIFCA to scope out a 'fishing for litter' type project to include awareness raising with fishers and an audit of port/harbour waste reception facilities.
- Encourage volunteer beach-cleaners to report pot-tags to NIFCA

Encouraging volunteering

- Provide funding and support for community litter groups
- Maintain beach-litter hubs at five locations in the AONB.
- Promote opportunities to volunteer with Coast Care to local people and visitors.

7 Appendix 2: Acknowledgements

We would like to thank our funders who made this possible.

The project was funded by The Local Environmental Action Fund (LEAF), a ground-breaking partnership between the Community Foundation, Shears Foundation, Greggs Foundation and individual and corporate donors. LEAF awards small grants for work that has a positive impact on the environment while improving the quality of life in communities. The project was specifically funded by Muckle LLP, a leading independent commercial law firm based in Newcastle.

We would also like to thank the team at Coast Care for overseeing the project.

Coast Care is a new initiative created to train, support and resource volunteers to contribute to the management and conservation of the Northumberland coastline from Berwick to Amble. It is a dynamic partnership delivered by the Northumberland Coast Area of Outstanding Natural Beauty Partnership, Northumberland Wildlife Trust and the Seahouses Development Trust. The project is supported by the Heritage Lottery Fund.

Laura Shearer and Anna Chouler from Coast Care recruited volunteers and provided training and support throughout the year. Laura Shearer analysed the results and produced this report.

Iain Robson, Northumberland Coast AONB Partnership