**Developing the Evidence Base for Microplastics – A discussion paper Paper 2**

**Background**

NEG has been tasked with the following action:

* NEG to continue to develop the [Cleans Solent Shores and Seas (CSSS)](http://www.solentforum.org/services/Member_Services/css/) resource hub, with a focus for 2022/23 on collating, supporting and sharing information on the impacts of microplastics and GRP fibres on designated sites. SEMS MG members to use the hub to find information to support or coordinate any appropriate research, policy making, communications, events etc.

In preparation for this the CSSS website has been updated to include further information on glass microfibres. See Appendix A below. The Microplastics page was first developed in 2020 and NEG took on the role of researching the evidence base at the time. It was understood by NEG at the time that the growing evidence base of the effects of micro plastic on the marine environment was a national issue, although the problem of nurdles in Southampton Water amplified how this affected the Solent.

Since 2020 there has been growing evidence of the effects of Glass Reinforced Plastics on the marine environment. This is a national issue, however the huge numbers of GRP boats in the Solent means that the effects and forefront of research is likely to take place in the Solent.

**Discussion**

To discuss the website content and identify evidence gaps (in particular the effects of microfibres on the features of designated sites) that NEG can realistically fill.

**Appendix A – Solent Forum Clean Shores and Seas Hub page on microplastics**

**MICROPLASTICS**

Nurdles Chessel Bay. © Southampton City Council

Introduction

Microplastics are small plastic particles that are generally between 1 and 5 mm although some are invisible to the human eye. Sources include industrial products such as plastic pellets, paints, abrasive cleaning agents, tyres, and personal care products such as toothpaste and skin cleaners (microbeads now banned). They also come from fragmentation and degradation of larger plastics pieces and fibres from synthetic clothing when washed.

How do Microplastics affect Water Quality?

After entering the sea microplastics tend to concentrate close to population centres, waterside businessess that use raw plastics materials and sewage treatment works. They have been found on beaches, in surface waters, seabed sediments and in a wide variety of marine life. They can affect water quality in the following ways:

* Reducing the amenity value of beaches and riversides by creating plastic 'litter'.
* Absorbing and concentrating contaminants from the surrounding seawater. This can create a secondary problem with toxicity for feeding coastal and marine wildlife.
* Lodging in filter feeders such as shellfish.
* Changing habitat functioning due to the presence of plastic in sediments, or on the shore or seabed.

Nurdles and Pellets

Plastic pellets are pieces of plastic that form the building blocks of almost all plastic items manufactured; nurdles are small lentil-sized pellets that are the preproduction building blocks for nearly all plastic goods. Nurdles enter the marine environment in a number of ways but chiefly from production processes spilling into drains or directly into watercourses. They can also arise from shipping or port spills. Currents and wind can disperse them widely.

National action is required to understand the source of pellet pollution and its impacts. A study by Fauna sand Flora International entitled [Stemming the tide: Putting an end to plastic pellet pollution](https://www.fauna-flora.org/app/uploads/2022/09/FF_Plastic_Pellets_Report-2.pdf) makes a number of recommendations including all companies that handle plastic pellets be legally required to provide independent, third-party verification that pellet loss prevention measures are implemented, maintained and monitored.

Glass Microfibres

Glass Reinforced Plastic (GRP) boats have been produced in large volumes since the 1960’s many of which are reaching end-of-life, there is a lack of legislation around disposal and recycling of these boats; the Solent has large numbers of GRP boats. There is emerging evidence that glass fibres from degrading GRP is affecting aquatic ecosystems especially estuarine habitat where fine sediment and organic material bind contaminants.  The University of Brighton’s Centre for Aquatic Environments is [researching this issue](https://blogs.brighton.ac.uk/aquatic/2021/09/14/scuppered-dreams-abandoned-boats/) in collaboration with Chichester Harbour Conservancy and other partners.  Their work is looking at bioaccumulation of glass fibres in oyster tissues and the impact on zooplankton through the food web. They are also developing a new bio composite material that may absorb GRP shards/powder and are identifying the best areas to deploy and test this material. The Solent Forum are funding some of this work and a [presentation](http://www.solentems.org.uk/natural_environment_group/NEG_Meetings/Environmental_Effects_GRP.pdf) was made to its Natural Environment Group in November 2021.

Solent Context and Issues

Solent Research

In 2016, Southampton Solent University published a paper on the prevalence of  [microplastics in the Solent](https://www.sciencedirect.com/science/article/abs/pii/S0025326X15001903). A Solent Forum placement student produced a further useful summary paper on [whether microplastics in the Solent need to be addressed](http://www.solentems.org.uk/sems/SEMS_Activities/Littering/Student_Paper_on_Microplastics_Solent.pdf). The Solent University report concluded that the most common plastics were fiberous microplastics, closely followed by the microplastics found in cosmetics (now banned). Irregularly shaped microplastics were also found suggesting that there are new pieces of plastic breaking down within the complex. The River Itchen recorded large amount of microplastics compared with other sites; there is a plastic industry based complex on the river. The study showed that the highest levels corresponded with the presence of wastewater treatment plants.

In 2020, a student from the University of Portsmouth won a Prof Mike Clarke bursary award for his dissertation - [A Critical Investigation into Microplastic Accumulation, Transportation and Physical Processes in the Marine Environment in and around Langstone and Chichester Harbours, Central Southern England](http://www.solentforum.org/services/Member_Services/Professor_Mike_Clark_Award/Simon_Slattery_MSc_dissertation.pdf).

Portsmouth University is putting its research into practice to transform Portsmouth into a global showcase for how to achieve a sustainable plastics future. The city is home to an increasing number of organisations and groups advocating urban sustainability, ocean conservation and plastic waste reduction.

Work includes:

* [Revolution Plastics](https://www.port.ac.uk/research/themes/sustainability-and-the-environment/revolution-plastics)
* [Jetsam - a plastic-tracking app](https://www.port.ac.uk/research/research-projects/mapp)
* [The Big Microplastics Survey](https://microplasticsurvey.org/)
* [See Bin Sea Change](https://www.facebook.com/seebinseachangeportsmouth/)
* [Portsmouth Climate Action Board](https://www.portsmouth.gov.uk/services/environmental-health/climate-action/portsmouth-climate-action-board/)
* Watch the Revolution Plastics video: <https://vimeo.com/484394686>.

Removing Nurdles from the Solent

Nurdles are a problem on the River Itchen owing to industry production processes that release them into the water environment. The Environment Agency and Southampton City Council have been working together for some years to try and prevent the source of the nurdle discharge and clean-up nurdle spillages. They are particular problem in Chessel Bay in Bitterne Manor. Local community group, The Friends of Chessel Bay, carries out regular planned litter picks at the site, but because nurdles are so small, it's very difficult to remove them especially when they are mixed in with reeds. In 2021, successful trials took place to suction and sieve out the nurdles; the [University of Southampton](https://www.southampton.ac.uk/news/2021/08/itchen-microplastics.page) continues to roll-out these trials in the Itchen using the River Hamble as a control site.

Microplastics Initiatives

Local

* [National Oceanography Centre Plastics Research](https://noc.ac.uk/science/microplastics)
* [Solent Information Database resources on litter (including microplastics)](http://www.solentforum.org/publications/sid/admin/?region=0&topic=Litter&link=detail.php)
* [Southampton University's Marine Plastics Research](https://www.southampton.ac.uk/smmi/academics/marine-plastics.page)
* [Portsmouth University's Revolution Plastics Hub](https://www.port.ac.uk/research/themes/sustainability-and-the-environment/revolution-plastics)
* [Solent Plastics Pollution hub](http://www.solentforum.org/services/Current_Projects/Solent_Plastics_Hub/)

National

* [Great Nurdle Hunt](https://www.nurdlehunt.org.uk/)
* [Nurdle locations](https://nurdlehunt.org.uk/nurdle-finds.html) (including a map where you can zoom into locations in the Solent)
* [MCS Guidance on clothes washing and plastic fibre shedding](https://www.mcsuk.org/campaigns/microfibrecampaign-more)
* [Operation clean sweep](https://bpf.co.uk/sustainability/Operation_Clean_Sweep.aspx)
* Find out how scientists analyse for [coastal microplastic samples](https://microplasticsurvey.org/analysing-data-samples).
* [An introduction to Nurdles and Bio-beads](https://www.cleanjurassiccoast.uk/nurdles)
* [Microplastics Cleaning Machine](https://nurdle.org.uk/machine/)
* [NERC video on uncovering the impact of microplastics in the ocean](https://www.youtube.com/watch?time_continue=3&v=kQbazaWsVP8).
* Environmental Audit Committee [inquiry into the environmental impact of microplastics](https://www.parliament.uk/business/committees/committees-a-z/commons-select/environmental-audit-committee/news-parliament-2015/environmental-impact-of-microplastics-launch-15-16/)
* [The Big Microplastic Survey Results](https://microplasticsurvey.org/results)
* Environment Agency study on the [impacts of microplastics on fish](https://www.gov.uk/government/publications/assessing-the-impact-of-exposure-to-microplastics-in-fish)
* [UK Parliament’s All-Party Parliamentary Group on Microplastics](https://www.thewi.org.uk/campaigns/key-and-current-campaigns/end-plastic-soup/all-party-parliamentary-group-on-microplastics)
* [Plastic Pellet Pollution: A report by Flora and Fauna International](https://www.fauna-flora.org/app/uploads/2022/09/FF_Plastic_Pellets_Report-2.pdf)