The Friends of Chichester Harbour

SEMS
Solent European Marine Sites

University of Brighton

CHICHESTER HARBOUR CONSERVANCY

SOLENT FORUM
EST. 1992

# Natural Environment Group

CHASM
Crustaceans Habitat and Sediment Movement

# Agenda

Introduction and Thanks

History of collaboration

First papers and assessments

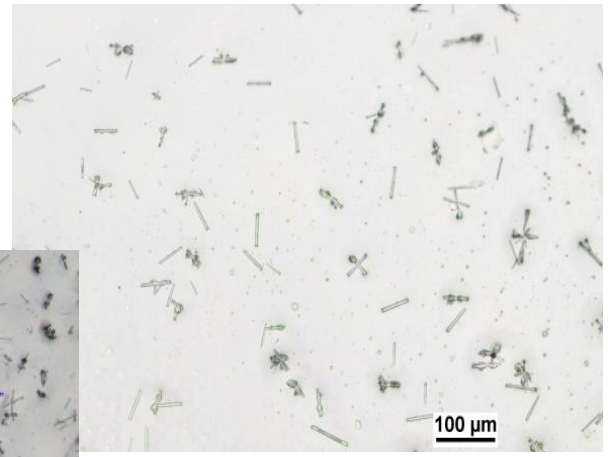
Remediation potential opportunity

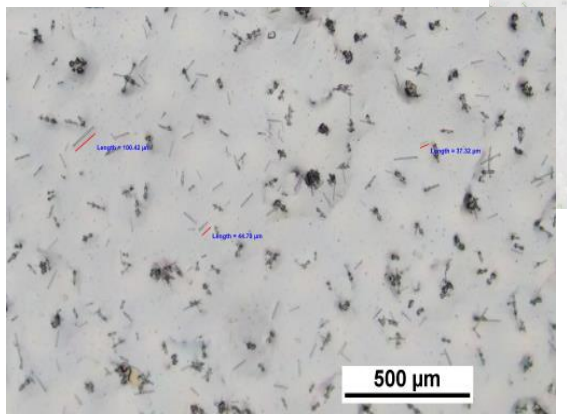
Next Steps

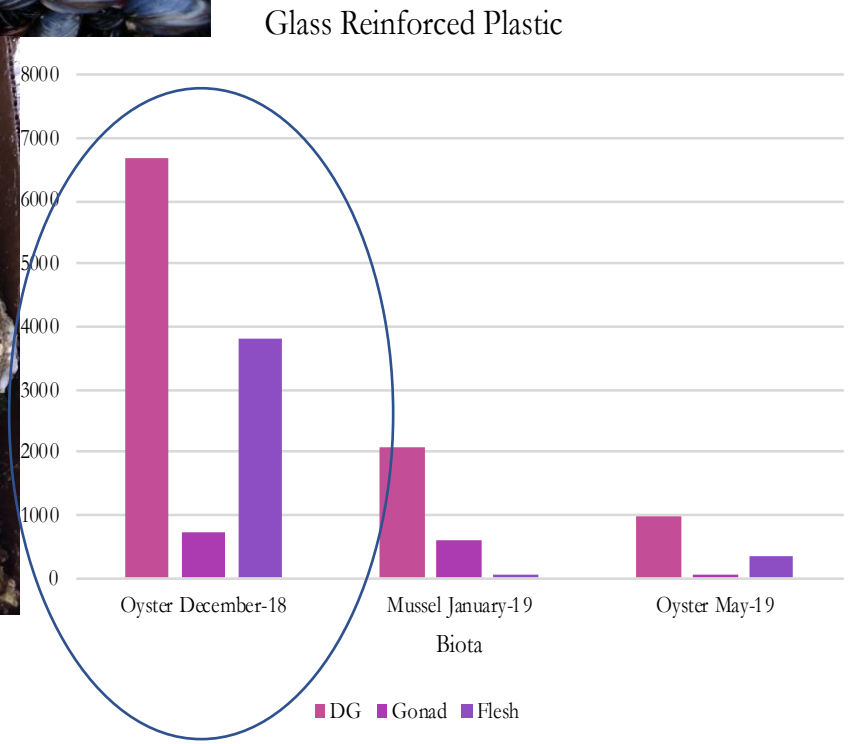
# Sampling the coastal habitat in Chichester Harbour and off Brighton coast, since 2018

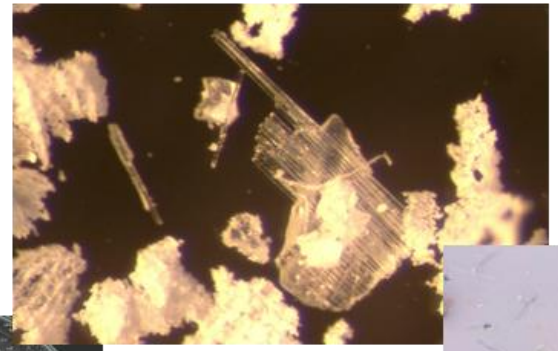
# Glass microfibres (GRP)

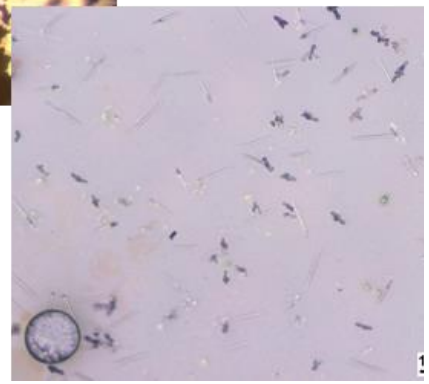
Up to 7000 Ingested particles per Kg flesh of oysters

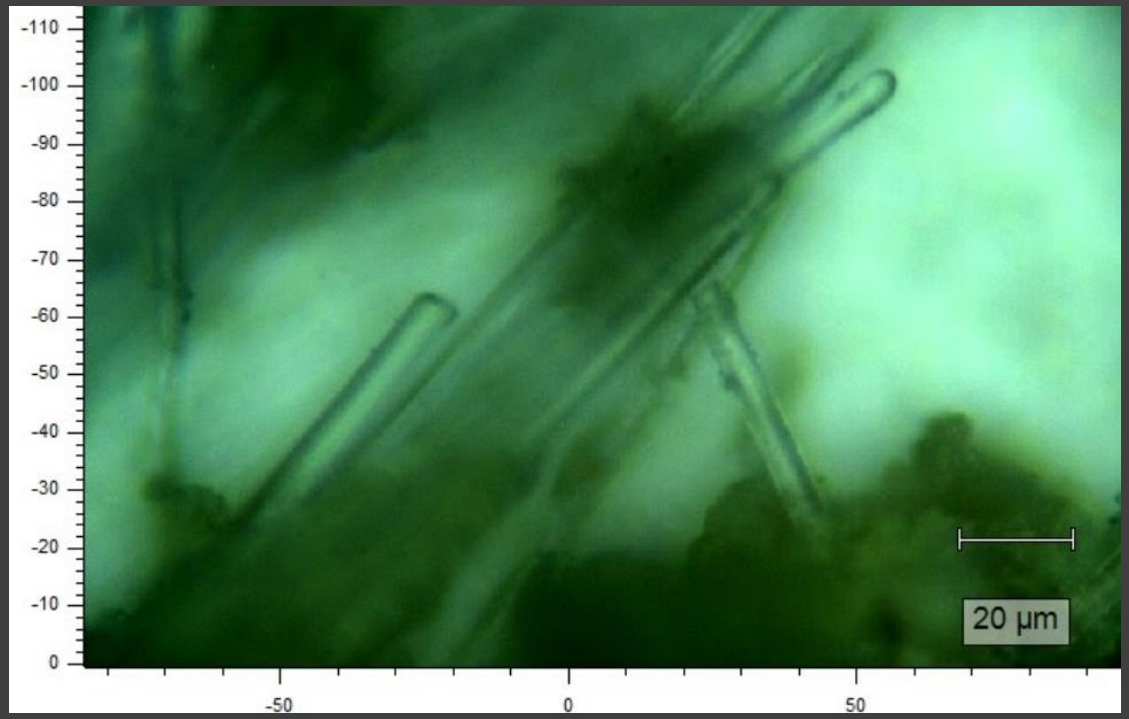


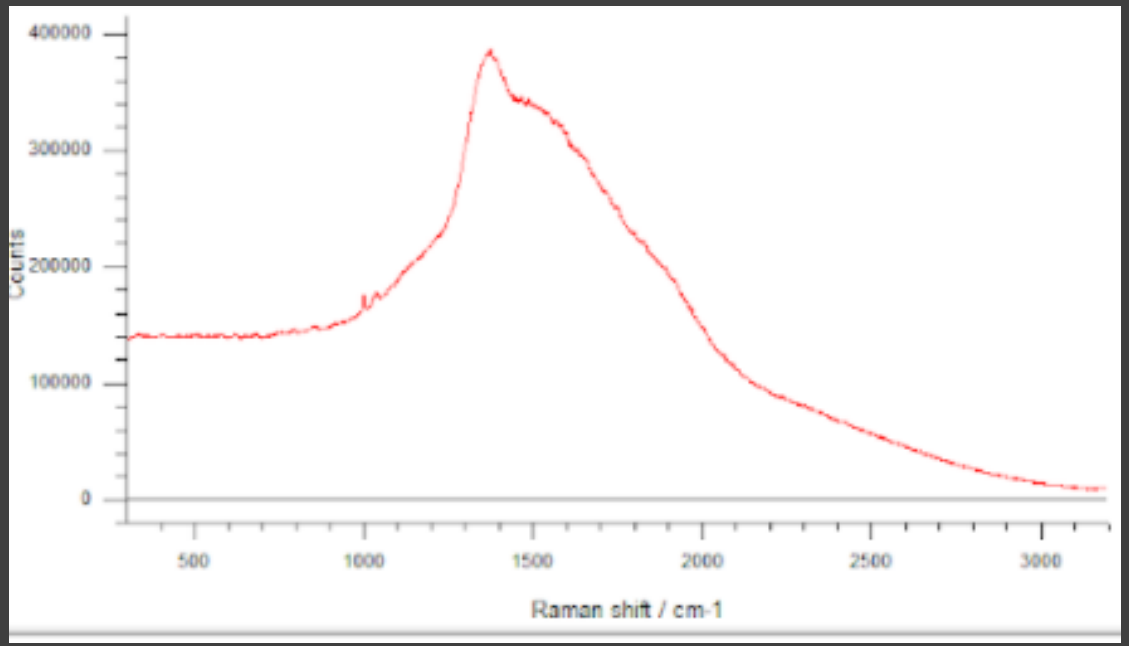








20 µm


Counts
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Sport
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Lifestyle
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Wildlife Energy Pollution
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Marine Pollution Bulletin 160 (2020) 111559
Contents lists available at ScienceDirect
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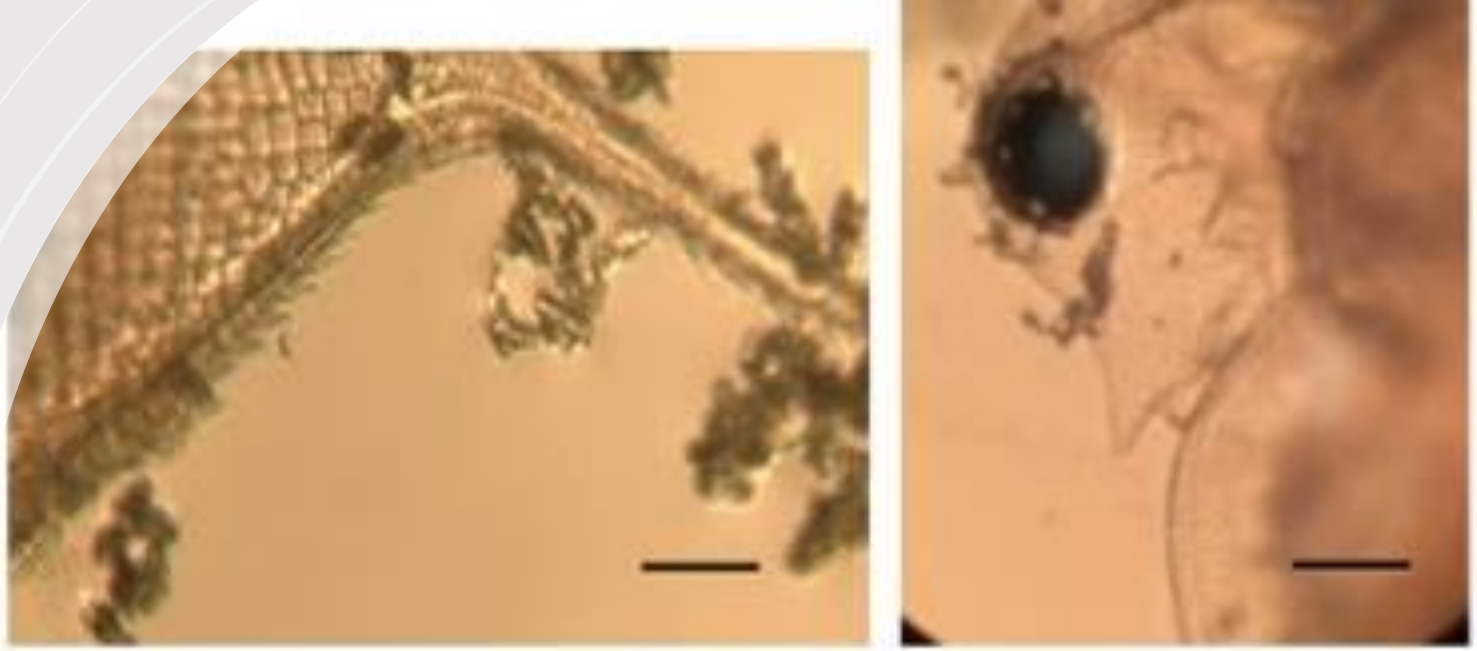
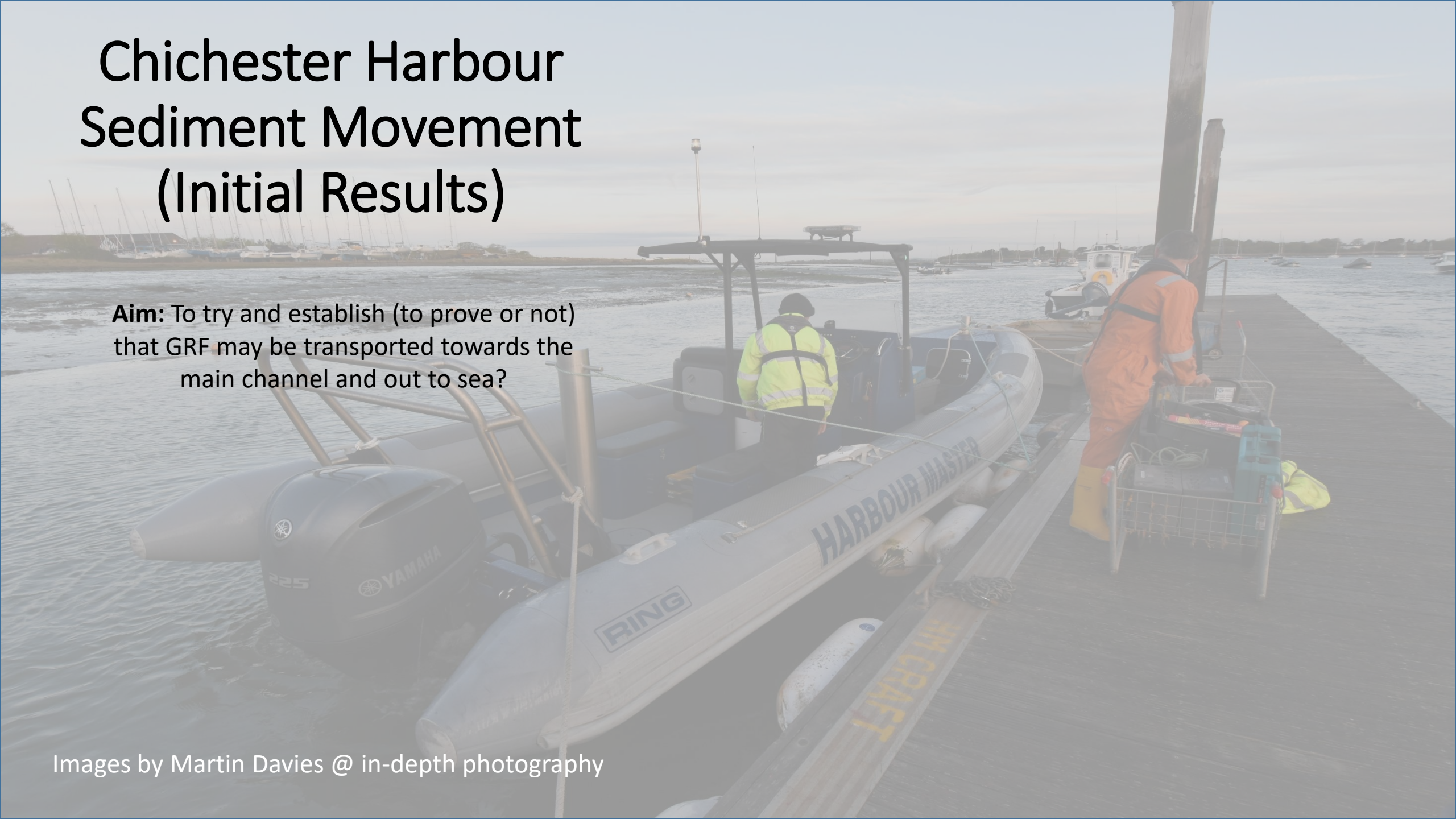
reinforced plastic (GRP) a new emerging contaminant - First evi
RP impact on aquatic organisms☆
a Ciocan, Petra Kristova, Claude Annels, Mael Derjean, Laurence Hopkinson
ABSTRACT
Plastics and synthetic materials are polluting the world's oceans. In this study
Mytilus edulis, to glass reinforced plastic (GRP) dust, under laboratory condition
7 days, to test for the morphological and potential physiological impacts of
revealed that the GRP resin material is poly diallyl phthalate. In mussels, par
detected in the digestive tubules and gills, with a suite of inflammatory features




500 µm

# Chichester Harbour Sediment Movement (Initial Results)

**Aim:** To try and establish (to prove or not) that GRF may be transported towards the main channel and out to sea?




Images by Martin Davies @ in-depth photography


**YSI EXO2 Sonde**

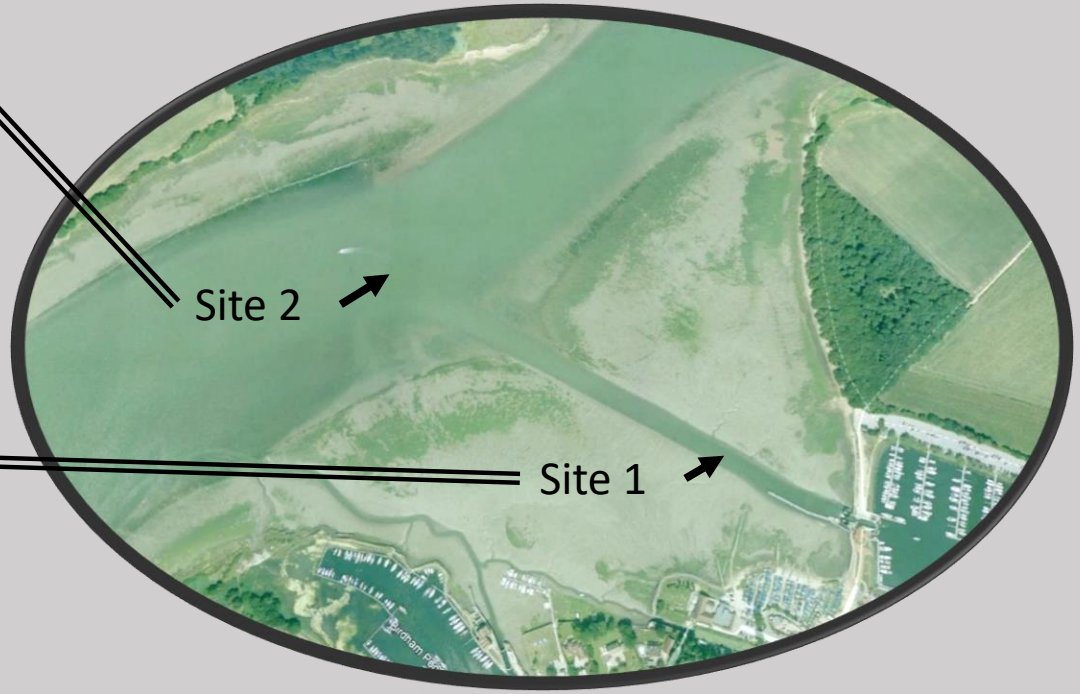
- Depth
- Temperature
- Conductivity
- Turbidity

# Locations


West Ashling
Emsworth
Southbourne
Nutbourne
Fishbourne
Chichester
Northney
Bosham
Stoke
Thorney Island
Dell Quay
Hunston
Itchenor
Birdham
Sidlesham
Wittering
Batchmere
Almodington
East Wittering

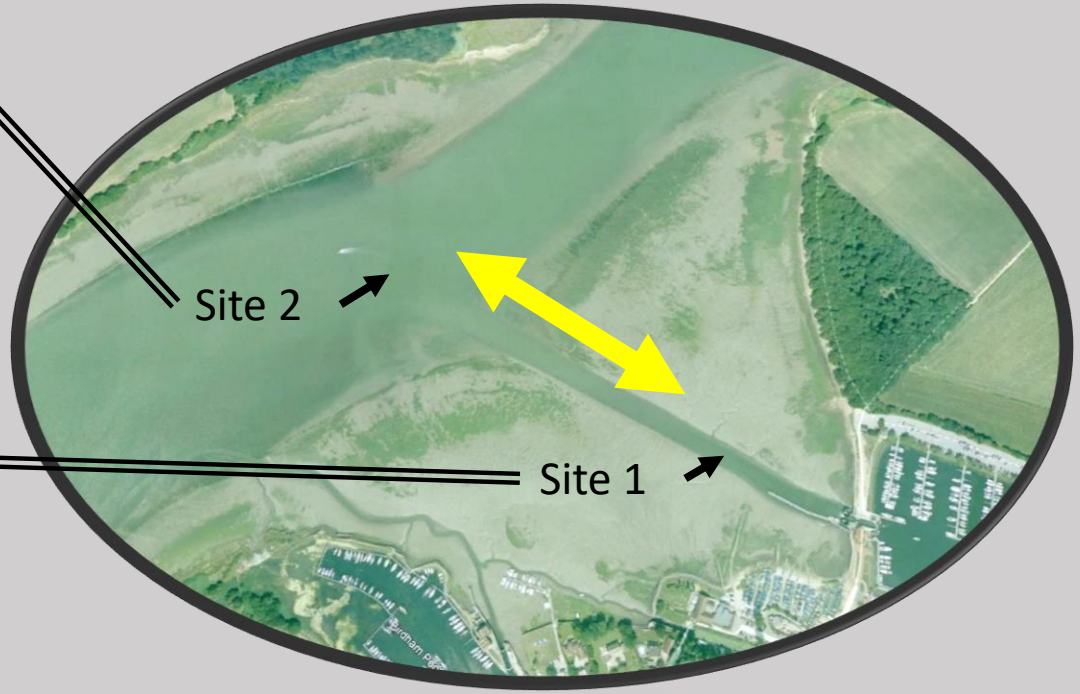

Site 2
Site 1

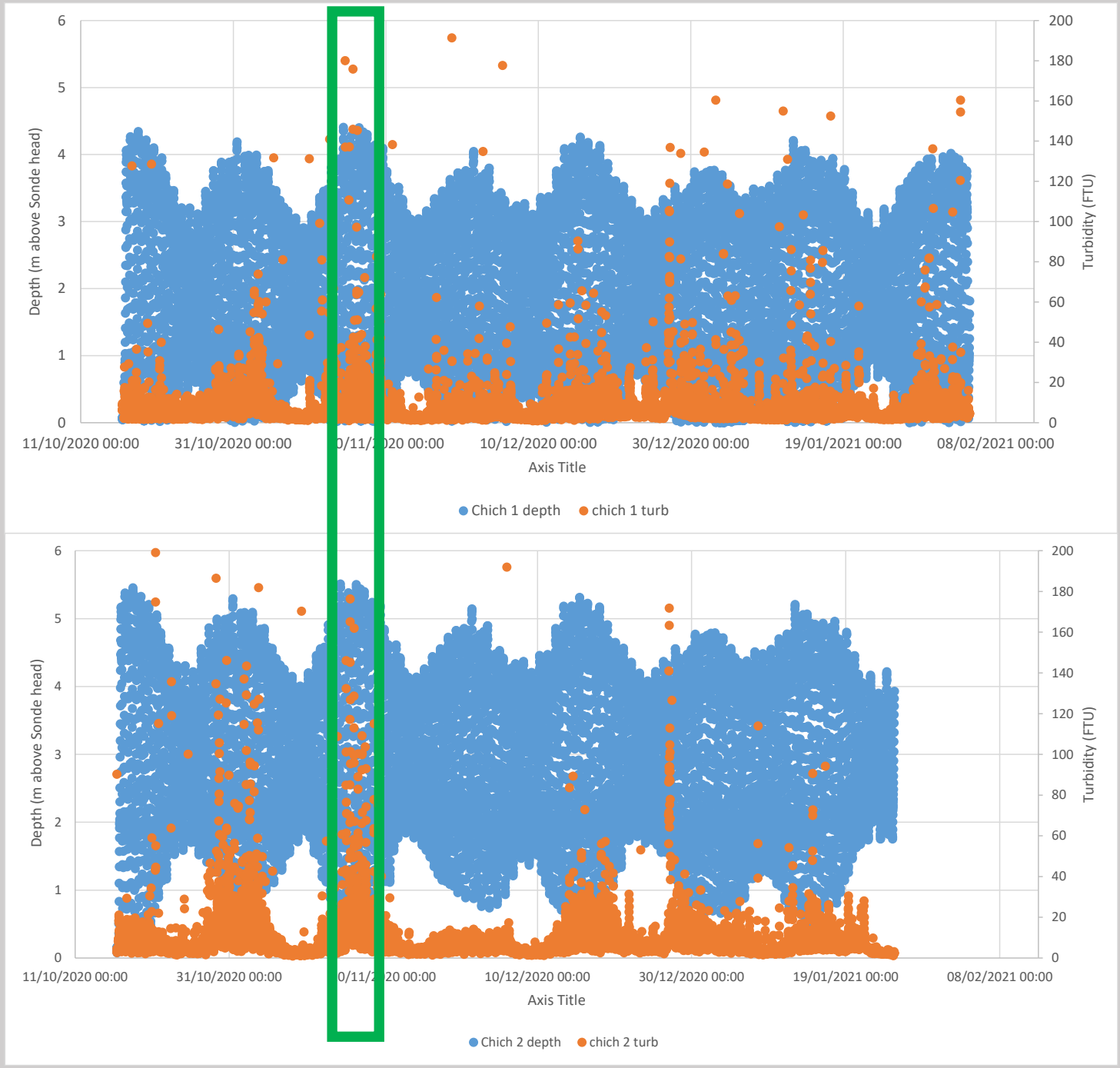
# Locations



# Locations

Evidence of sediment transport?






# General overview of the two sites:

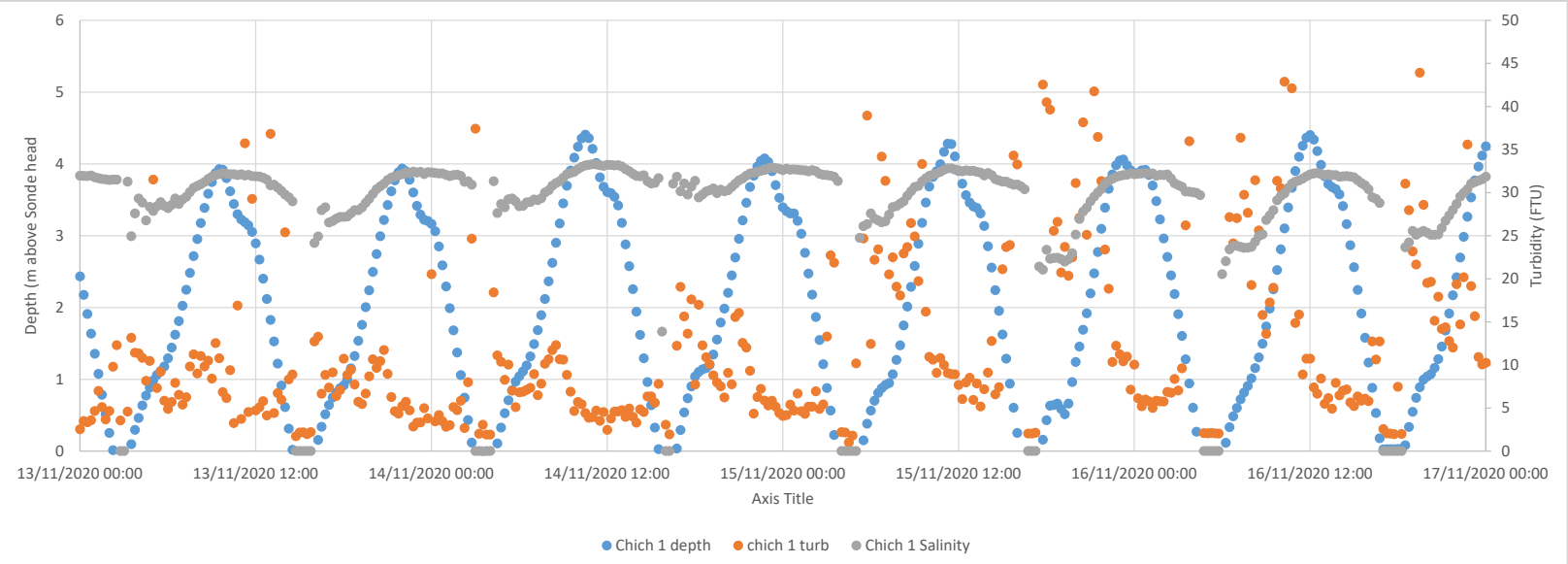
## Hydro

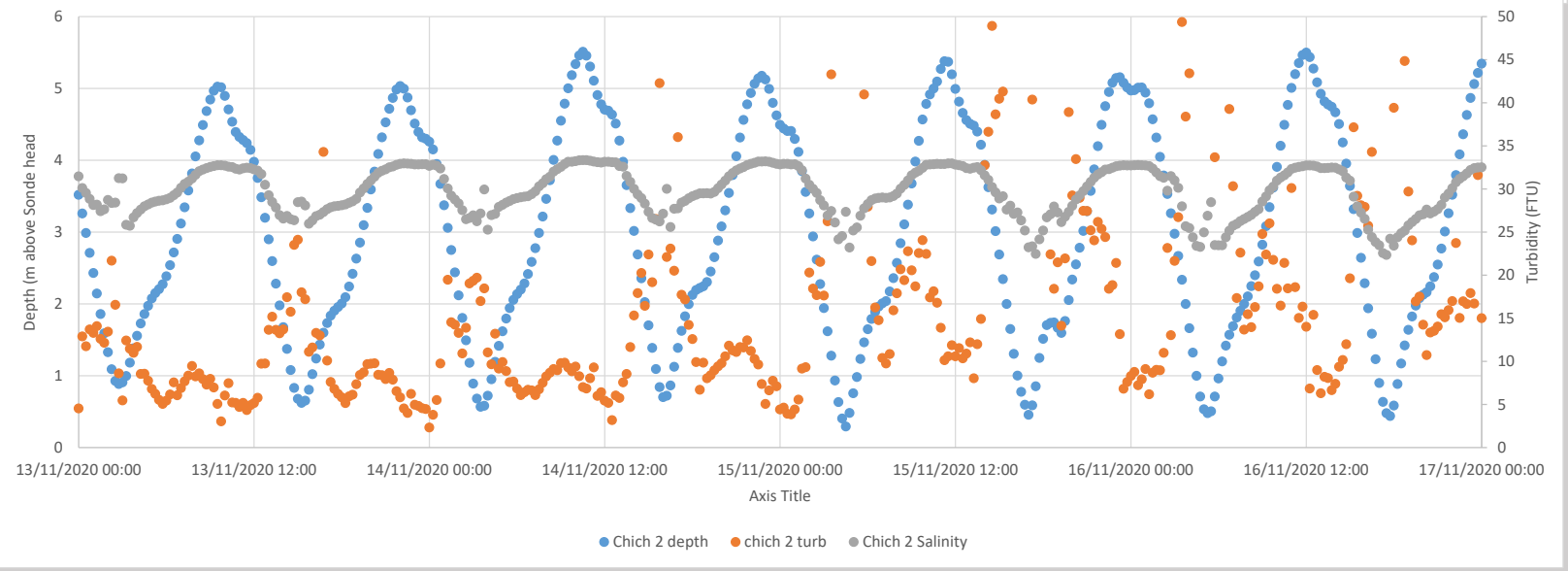
- Site 1 drying out during low-tide springs.
- Site 2, higher tidal range than the near shore Site 1.

## Sediment

- Turbidity levels are higher at site 1. (shallower and very close to an exposed mud flat)
- During high spring tides that sediment transport in the main channel (site 2) is considerably higher than in the side channel (site1).
- Westerly winds, waves move up channel = currents and breaking on mudflats.

# Focus on SPRING tides



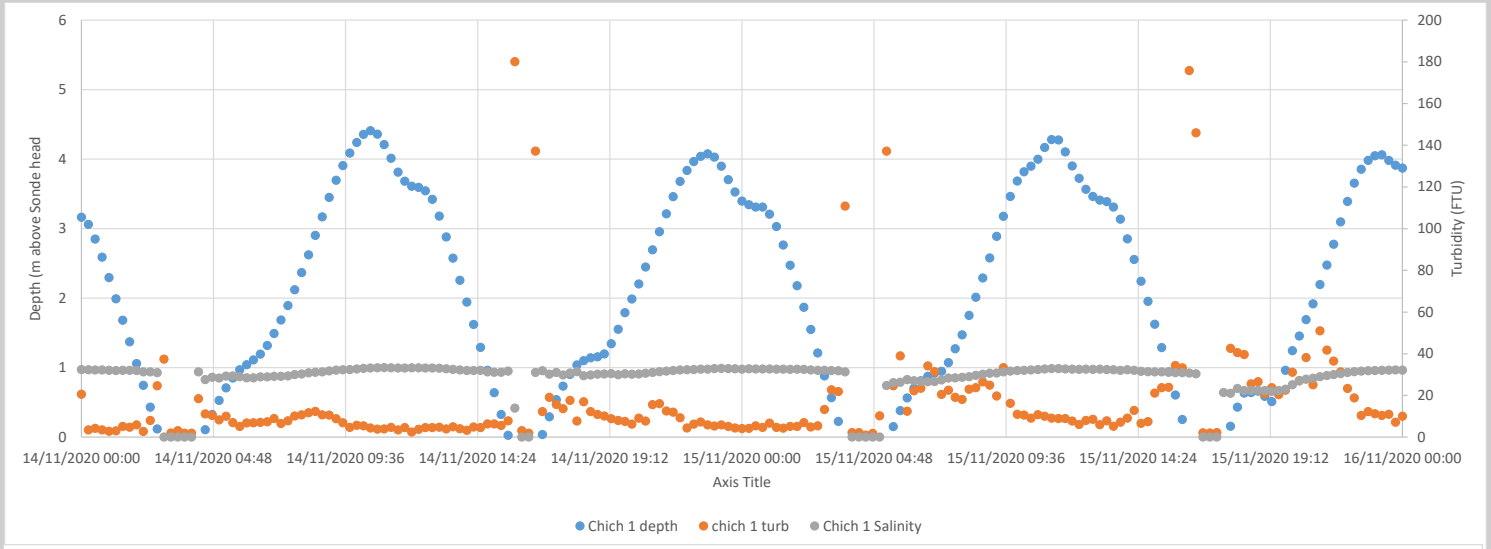

Spring tides = more sediment movement because of stronger currents.

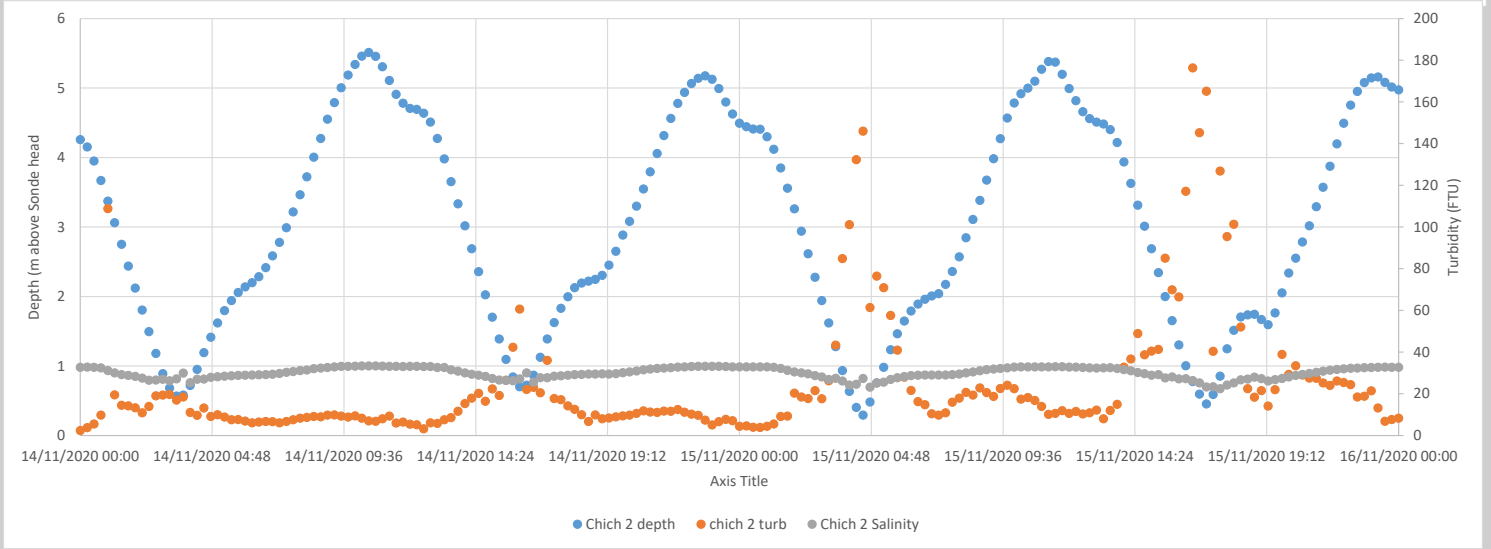
**Tidal range** at site 2 is at least 1m higher. High tide occurs at the same time for both sites.

**Salinity** has more range at site 1 (>2ppt difference). With strong evidence that the freshwater input from upstream is impacting after ebb slack tide.

**Turbidity** site 2 has higher levels or peak turbidity. See next pages…..

# Focus on SPRING tides

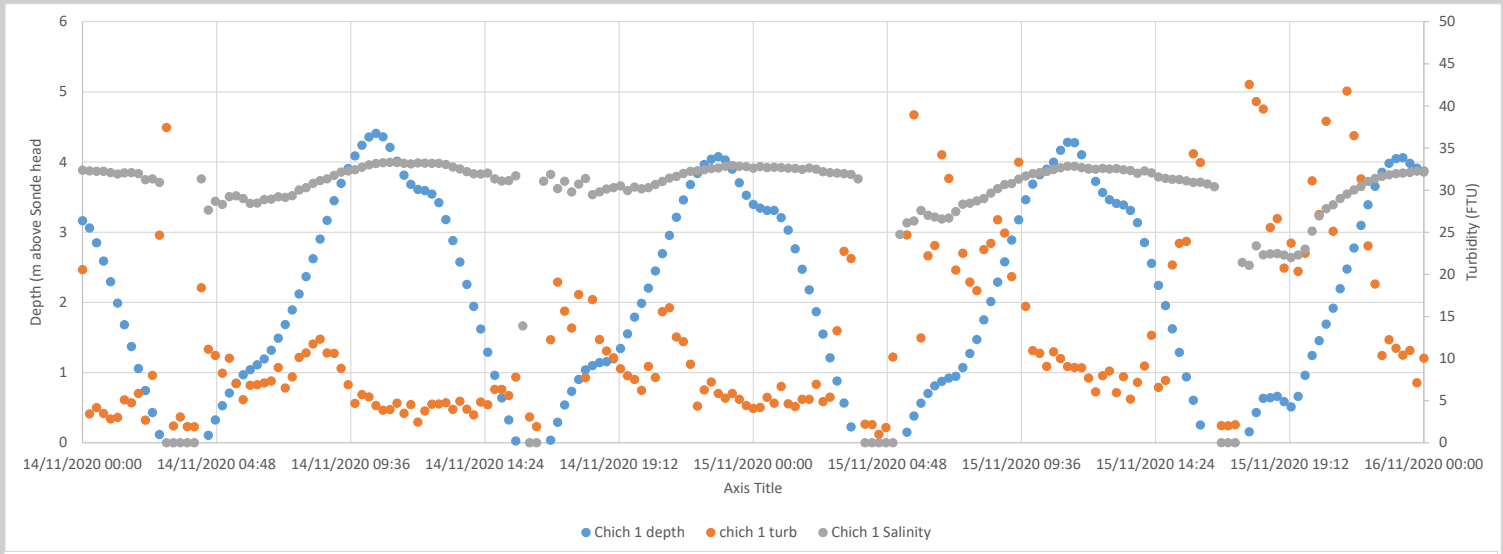


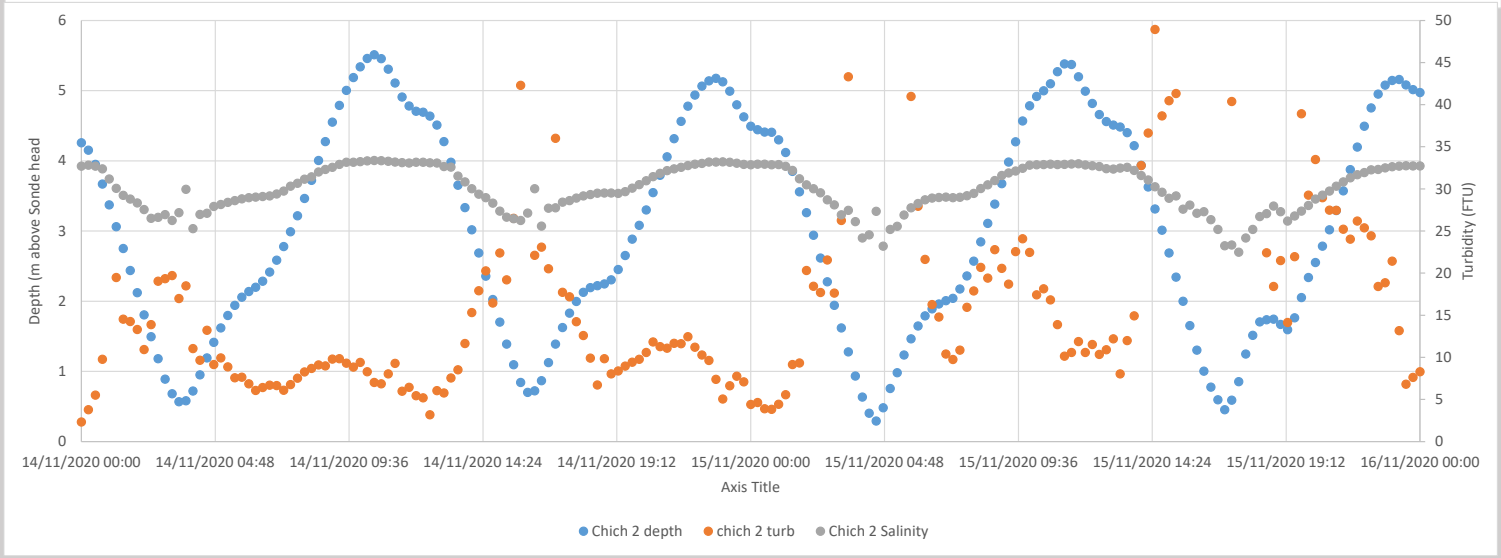




**Turbidity** with y axis 200FTU (limit of instrument) it is clear that peak. It is clear to see that site 2 peak coincides with low tide.

Need to check the weather conditions and other dates, as increased peaks may have been linked with runoff from the rain falling on the mudflats.

# Focus on SPRING tides




**Turbidity** with y axis set at 50FTU max.

**Hydro Pattern**: note rising slack, high tide slack, and falling leg slack and low slack. This happens on neaps too.

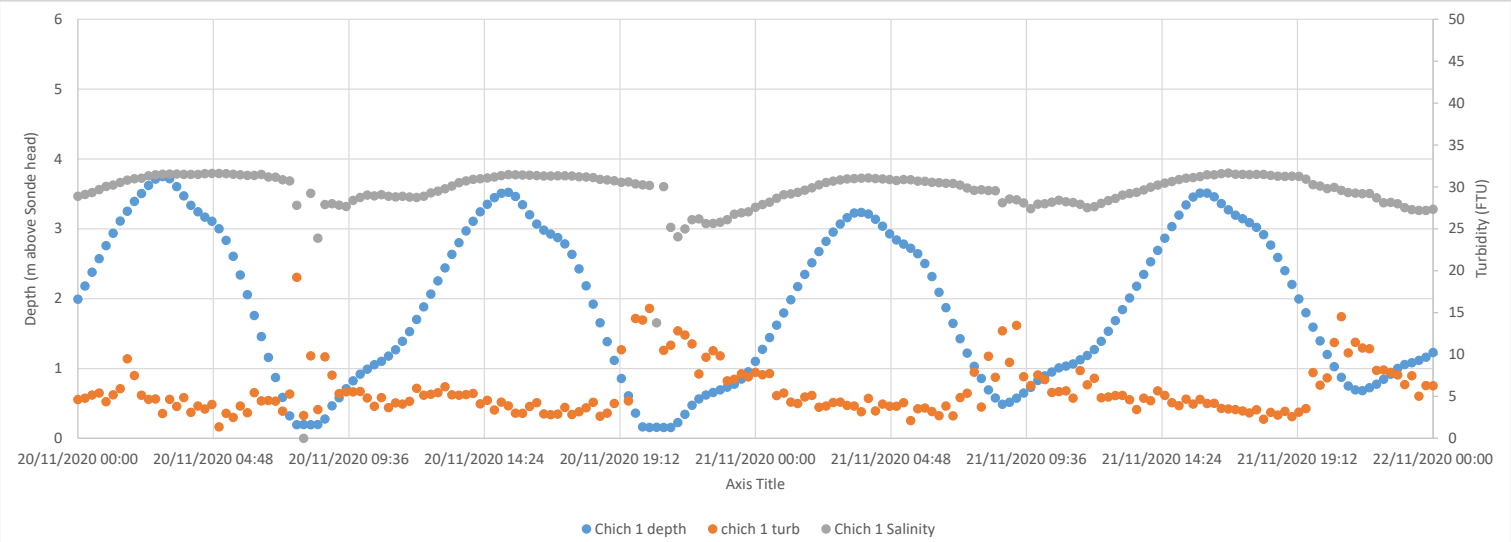
**Salinity** is impacted at both sites by the rising and falling slack tides.

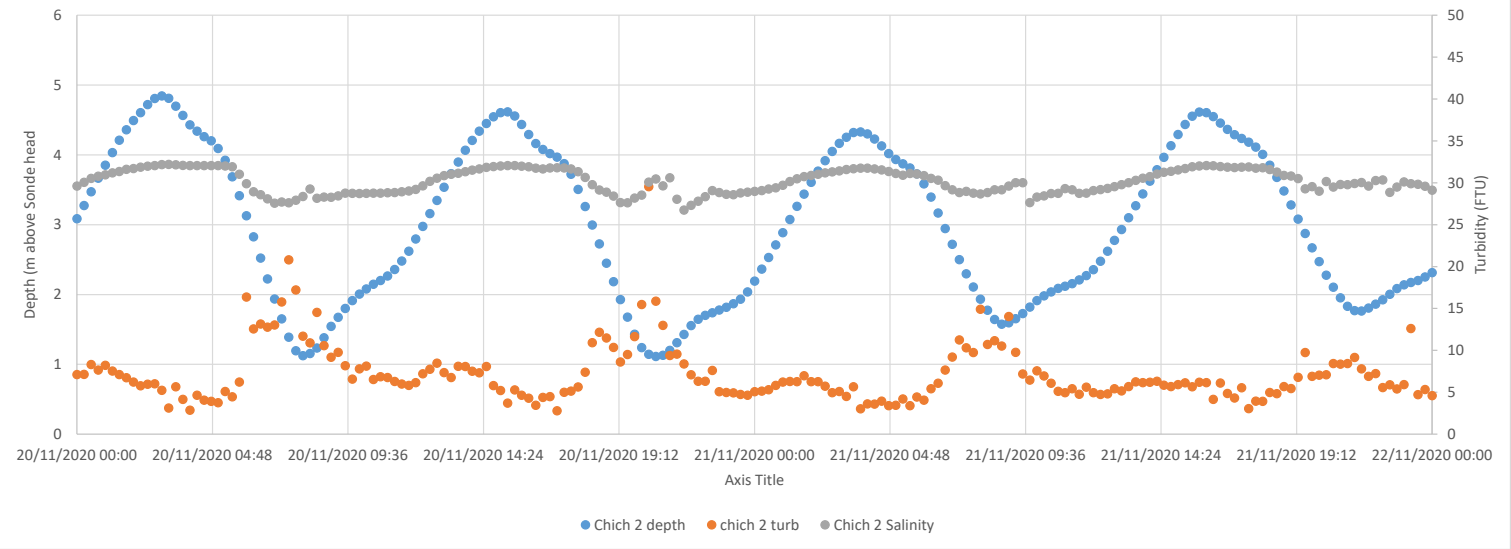
**Turbidity:**
Site 1, high over slack water, but probe is out of water so will be impacted.

Site 2, starts to rise just after falling slack when salinity levels start to drop. Peaking at low slack, then falling until small blip just after the point of rising slack.

Need to check:
Shape of channel at different tide times
Qf input
Weather – rain - wind

# Focus on NEAP tides




**Turbidity:** Peak level at both sites are similar.

**Site 1:** Steep towards the end of the flood tide and final water drains off of the flats, with levels continuing to drop even when tide is rising.

**Site 2:** Turbidity levels start to rise as salinity level start to drop (terrestrial sediment or mudflat runoff from further upstream). Falling Slack appears to impact on the turbidity. Turbidity levels continue to generally drop over rising tide, with the exception of the rising slack period which appears to influence turbidity levels.

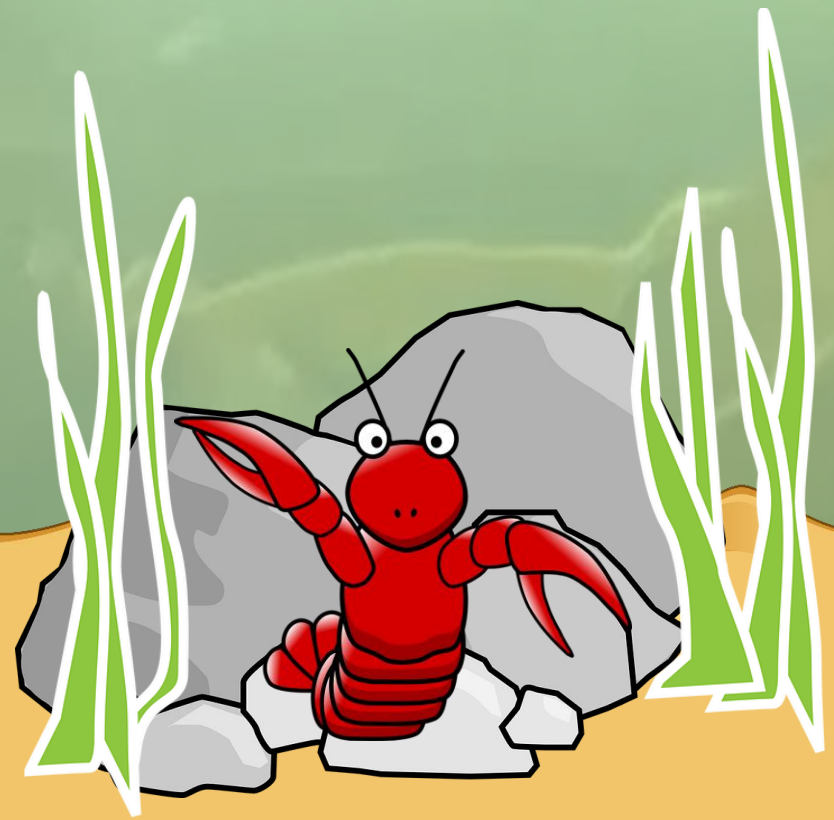
# In Progress…….

- Finish analyses of in Chichester data with Qf and weather, confirming findings so far.
  - What implications does this have for the boat rubbings
  - What implications does this have for the overall sediment transport around the harbour?
- EA probes now out at Site 2 and West Pole, data being transmitted. (funded by Woodger Trust and Sussex Kelp Restoration).
- Sediment Analyses v Lobsters heavy metals.
- CHASM project team's stakeholder network event: 14 June 2022 (Funded by University of Southampton).

Images by Martin Davies @ in-depth photography

# Ongoing and Future

**Applying for or accessing funding streams**

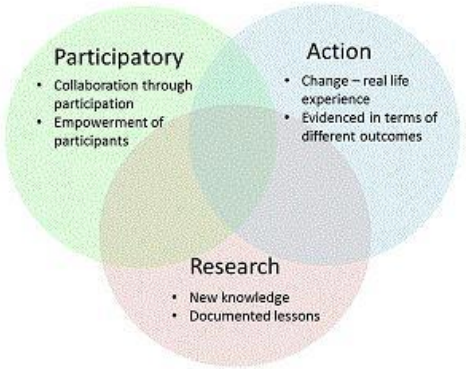


- Paper - Summary of what causes the sediment to move.
- Pharmaceuticals and pesticides in open water and in lobsters (Brunel University)
- Environmental DNA
- CHASM – Broken up into small areas for funding pots
- Mapping Sediment Plumes using satellite imagery.
- Coring of seabed sediment to understand historical events

# What are the options?


# Scuppered Dreams: A community action research project to explore the impacts of microfibre pollutants from abandoned boats on marine environments

*Dr. Corina Ciocan and Dr. Mary Gearey*






**The aims of the project are to work with community members to:**

- **Document aquatic craft care and disposal practices along the River Adur's estuary at Shoreham**
- **Assess likely levels of contamination from GRP pollution and discuss community responses**
- **Review current aquatic craft disposal practices in light of alternative options and make policy recommendations in support of reducing the incidence of GRP pollution**

# What will the project 'do'?

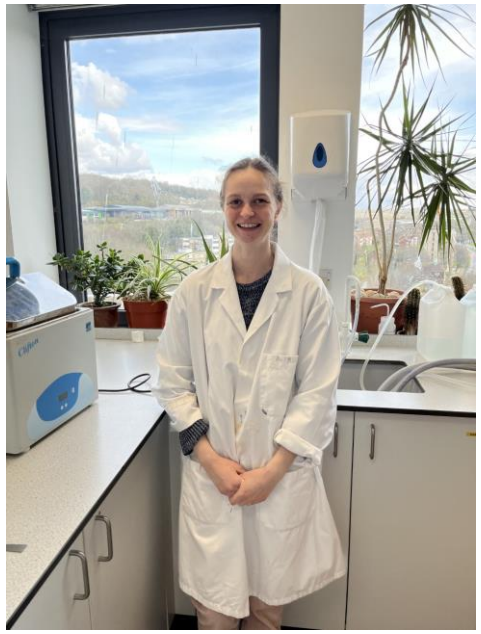
- Host a **community event** in Shoreham in late 2022 (tbc) to share the findings of the project and engage other local people with emergent aquatic pollution issues.

- **Publish** the project findings in academic papers, in university blog pages and in social and digital media platforms. Findings will be communicated through academic networks such as symposia and conferences. All participants will be co-authors.


- Develop a number of **policy recommendations** and working papers to petition for any statutory changes needed to reduce the incidence of GRP pollution.

- **Support local practitioners** in implementing environmentally friendly changes to end-of-life boat care and other aquatic craft disposal.

# Remediation potential



We'd love to hear your thoughts and answer any questions…


Help us develop **policy recommendations** and working papers **to petition** for any statutory changes needed **to reduce the incidence of GRP pollution.**