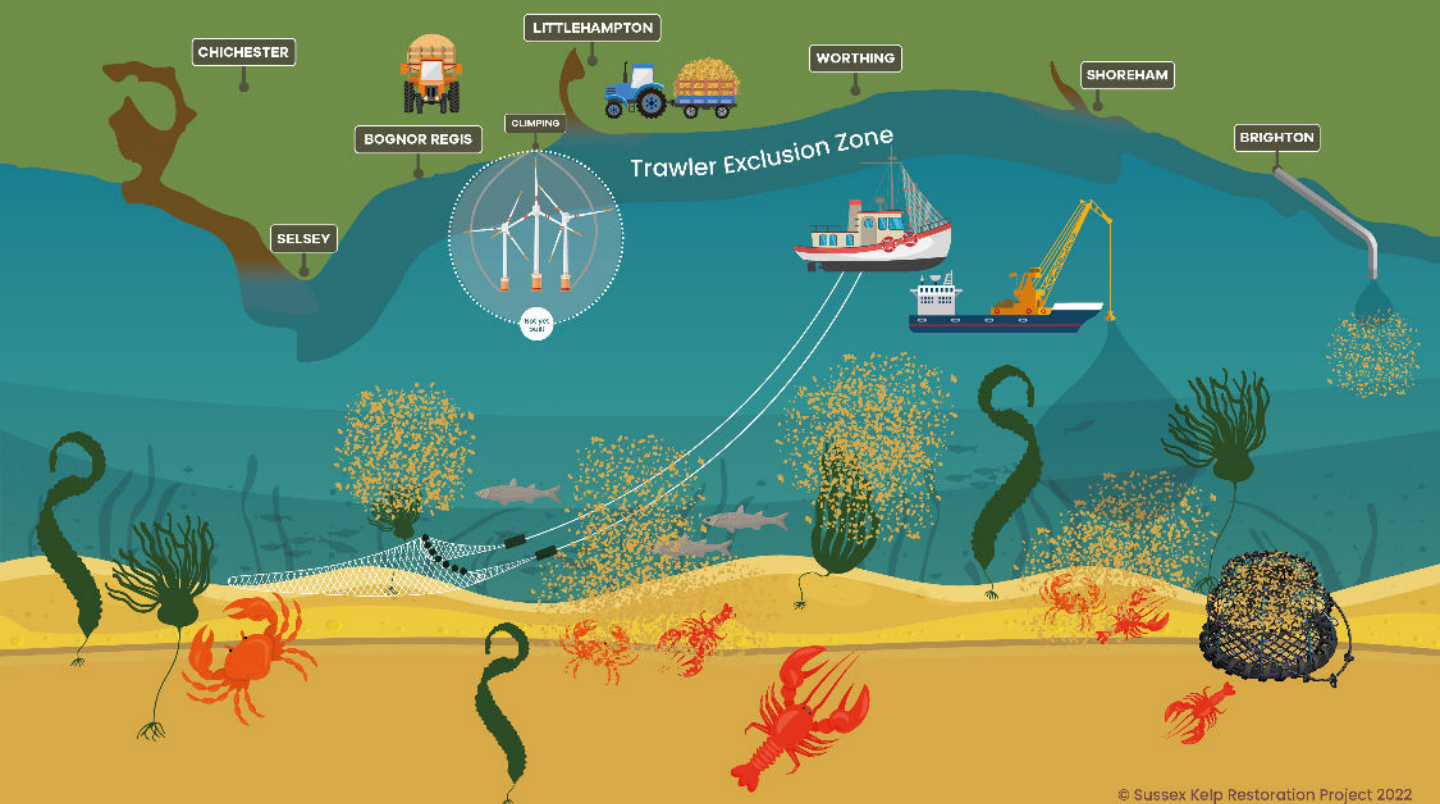




Sussex Kelp Restoration Project

Sediment in Sussex coastal waters Sea user survey results

June 2022



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Citation: Sussex Kelp Restoration Project (2022).

Sediment in Sussex coastal waters – Sea user survey results.

A report prepared for the SKRP by Blue Marine Foundation and Wayforward Brighton.

Overview: Kelp and sediment in Sussex

Vast kelp beds once stretched along 40km of the Sussex coast

This essential habitat served as shelter, feeding and breeding ground for many species such as seahorses, cuttlefish, lobster, sea bream and bass. The healthy kelp beds also improved water quality by filtering nutrients, helped protect the coast by absorbing wave power and acted as a carbon conveyor by transferring carbon from the atmosphere into long-term sediment stores.

Today just 4% of these kelp beds still exist

From the late 1980s, the amount of kelp declined sharply and now over 95% has disappeared, destroyed by increasing storm intensity, land run-off, trawling and dredging.

Removing pressures on the kelp beds to allow them to recover

While many factors may have contributed to the loss of the Sussex kelp beds, trawling with bottom-towed gear is a factor that's manageable. This form of fishing is particularly harmful as it involves dragging heavy weighted nets across the sea floor to catch fish, but in the process other creatures and plants on the seabed can be removed or destroyed.

In March 2021, the Sussex Inshore Fisheries and Conservation Authority (IFCA) introduced the Nearshore Trawling Byelaw. This prohibits the use of bottom towed gear (trawling) from over 300 km² of seabed, to protect essential fish and shellfish habitats and help the kelp beds recover.

This is a vital first step towards the restoration of the Sussex kelp beds but other factors, such as high levels of sediment, may also hinder its return.

The Sussex Kelp Restoration Project

Following introduction of the Nearshore Trawling Byelaw, the [Sussex Kelp Restoration Project \(SKRP\)](#) was formed as a collaboration of national and local organisations with a mission to *“champion, study and facilitate the restoration of Sussex kelp to support a thriving and sustainable marine ecosystem”*.

The SKRP is working to help restore the historic kelp beds through collaborative research, community engagement and minimisation of other barriers on kelp recovery.

Increased sediment levels were quickly identified as a key factor that could prevent kelp beds from recovering. Consequently, the SKRP is undertaking a series of activities to explore the causes and impacts of sedimentation. This includes hosting a stakeholder workshop in September 2021, undertaking a desk-based scoping study and gathering evidence from local sea users. This will feed into further stakeholder engagement to identify priority actions to reduce sediment inputs from its key sources.

What is sedimentation?

Sedimentation is a naturally occurring process that involves organic or inorganic particles being carried from one place to another by erosion, water, wind or ice. It can also be caused by human activity such as farming, dredging, trawling and urban development. Man-made sources can be particularly harmful as they may involve larger or more frequent volumes of sediment or particles containing toxins. In many parts of the world, increased levels of sedimentation and nutrient loading has been linked to the loss of kelp forests.

Overview: Survey summary

Gathering information from Sussex sea users

To understand the effect that sediment may have on the growth of kelp (as well as its impact on local fisheries, marine life and recreational activities), the SKRP is gathering data on its sources and impacts. A wealth of information is held by Sussex sea users, many of whom are active in, on or near the sea at least once a week and have been doing so for many years.

An online survey (Appendix I) was broadcast in early 2022. This invited Sussex sea users to record their observations on any changes in the type and level of sediment they may have seen over the years, the location of any changes to sediment and its impacts.

The online survey was promoted via email and social media to: local sailing, rowing, diving, swimming, kayaking and angling clubs and outlets; commercial fishermen via a feature in Fishing News (Appendix II); and existing SKRP networks. The survey was launched at the end of January 2022 and closed on 28th February 2022. This report is a summary of its observations.

What we learned

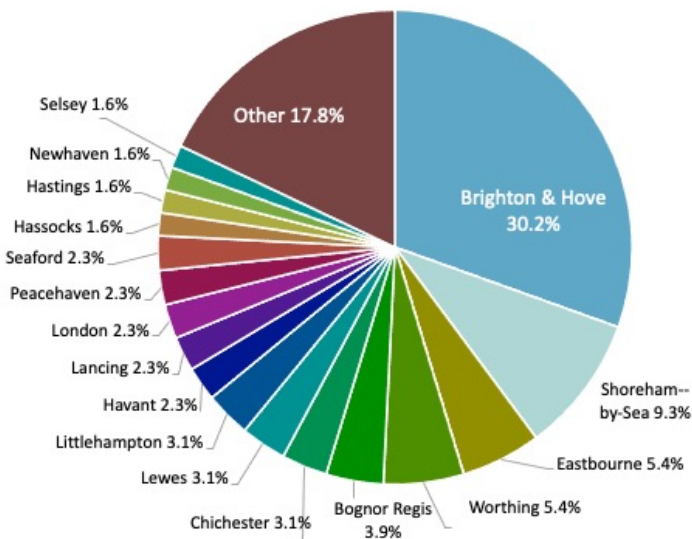
- 129 people responded to the survey.
- The majority (60%) of respondents are regular sea users, spending time on, in or by the sea most days (24%) or at least once a week (36%).
- 67% of respondents had noticed a change (of which 90% saw an increase) in the amount of sediment in one or more coastal environments - in the water, on the seabed, in rockpools.
- 'In the water' was the environment where a change to sediment was most observed (57% of all respondents). 41% of respondents observed a change to the amount of sediment on the seabed and 55% of those who'd listed rock pooling as an activity observed a change in chalk-based rockpools.
- Silt was the most commonly seen texture of sediment observed, followed by 'muddy' and 'patchy'.
- Changes are fairly recent - 58% of respondents observed changes in the last decade, with 34% of these seeing a change in the last couple of years.
- Common locations where changes to sediment have been observed include:
 - Brighton Marina to Salt Dean,
 - Selsey, Wittering and Bognor,
 - Littlehampton, Lancing and Worthing.
- Various sources of sediment were identified. Dredge spoil dumping was identified as the largest source of sediment by more people than other sources, followed by storm, aggregate dredging, rivers, trawling, land run-off, windfarm development and sewage.
- Respondents noted a number of impacts. The most commonly noted impact was a decline in marine life, followed by a decrease in enjoyment of sea-based activities.
- Some users observed impacts of reduced water quality and illness relating to sewage rather than sediment.
- For many respondents, the changes to sediment they'd observed is a cause for concern, affecting their experience of the sea and, in some cases, their health. Of particular concern was sewage and dredging near Brighton Marina.
- Broad support (89%) for the aims of the Nearshore Trawling Byelaw suggest that efforts to mitigate or reduce the causes and impacts of sediment would be supported by respondents.

Results: About the respondents

Where respondents live (% of respondents)

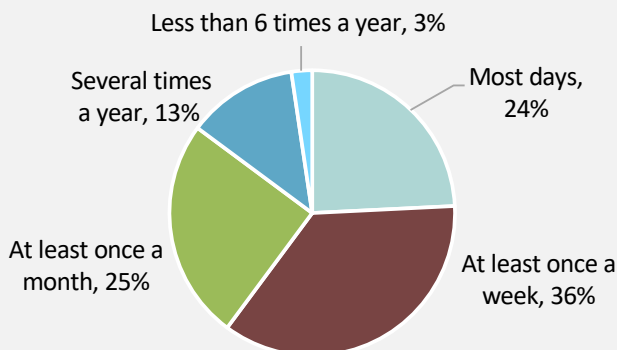
- Respondents to the survey live along the Sussex coast from Chichester in the west, to Rye in the east, with the largest number hailing from Brighton & Hove.
- Some respondents live further inland, with London, Tunbridge Wells and even Oxford represented.

Other: Arundel, Bexhill, Bosham, Burgess Hill, Crawley, Crowborough, Croydon, Devizes, East Grinstead, Gay Street, Guildford, Hailsham, Heathfield, Herstmonceux, Horley, Midhurst, Oxford, Portsmouth, Pulborough, Rustington, Rye, Steyning, Tunbridge Wells.



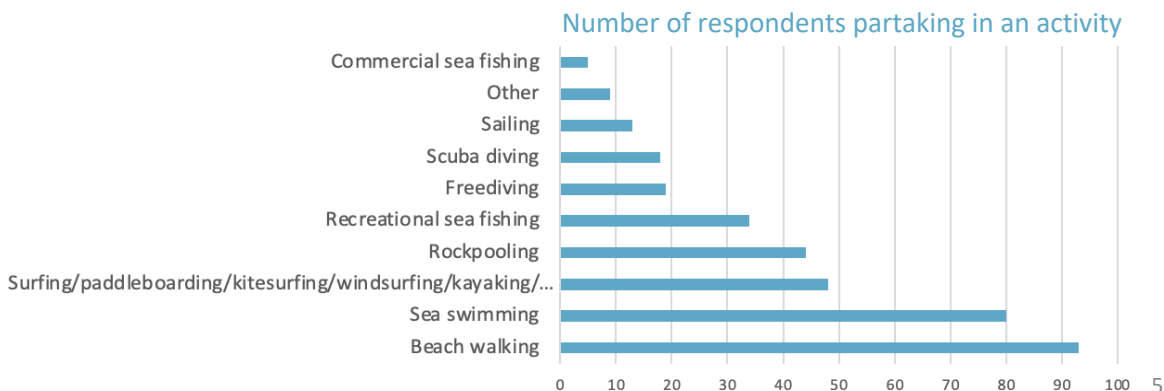
How often respondents are in, on or near the sea (% of respondents)

- The majority of survey respondents are regular sea users, with 60% telling us they are in, on or near the sea from between once a week to most days of the year.



What sea-based activities respondents do

- The most popular activities are beach walking followed by sea swimming.
- Sea users enjoy multiple activities related to the sea, with 79% undertaking two or more activities and just over half (52%) participating in three or more.
- All of those who ticked 'other' had an additional sea use related to work, including being a coastal engineer, a commercial skipper and a marine researcher.



Results: Awareness and support

We asked respondents to tell us if they were already aware of the historic kelp beds of Sussex or the Nearshore Trawling Byelaw, and whether they were supportive of the latter's aims

73%

of respondents
were aware that Sussex
had historic kelp beds

73%

of respondents
were aware of the
Nearshore Trawling Byelaw

89%

of respondents are
supportive of the
Nearshore Trawling Byelaw

Some verbatims about why respondents were supportive (or not)

"I want the sea kelp to recover as quickly as possible, to promote the wellbeing of the coastal waters and the creatures that live in them"

"I remember the large amounts of kelp that often were washed up onto the beach and to have these occur again is not something that I would want"

"It's not the trawling that is damaging the kelp, it's something else in the water. That's why it's not growing anywhere off of Selsey" [Selsey has not been trawled due to its rocky seabed]

"I have noticed a remarkable upturn in the abundance and variety of sea life around our shores since the ban came in"

"Trawling is the most obvious destructive practice practiced inshore"

"Allowing the kelp beds to recover has so many environmental benefits"

"Allow habitats to re-establish and replenish fish stocks and diversity of marine life"

"Nesting Black Bream within the zone can now reproduce without threat to their nests, and other plants and animals and the general ecology can revive in time"

"Reducing trawling will increase biodiversity, increase catchment for local fishermen and if good kelp banks develop, help mitigate storm effects from climate change"

"I want to see the restoration of sea life. I have dived on trawled beds and what is left behind is a marine desert"

"I am totally against unsustainable fishing and a supporter of the recovery and protection of ecosystems"

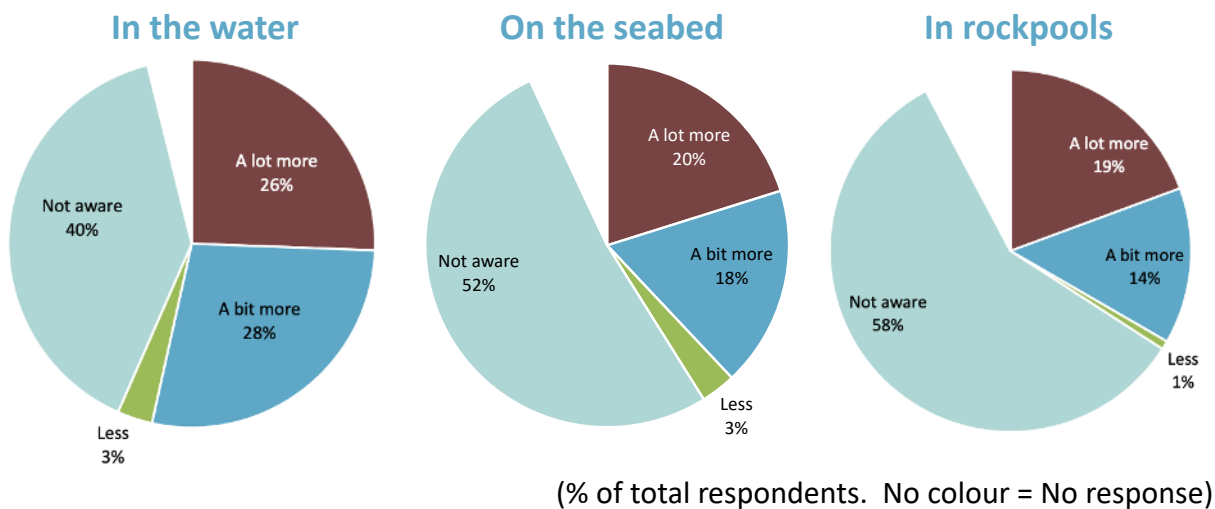
"Over the last 50 years the fishing in terms of fish numbers, fish size and variety of species has declined massively"

"Safe breeding grounds gives beach anglers a chance"

"It makes sense...as this protects local fisheries, local economy and builds resilience into maintaining local food supplies and related economies. Conversely there should be less need to source food from further afield, or abroad, or to use local money to buy expensive marine cuisine imports"

Results: Changes to sediment volume

We asked respondents to tell us if they'd observed any changes to the amount of sediment they'd seen in three coastal environments:



Those aware of changes:

- More people observed a change (either an increase or decrease) to the amount of sediment in the water than the other two environments, with 57% of survey respondents having seen this.
- 41% of survey respondents saw a change to the amount of sediment on the seabed.
- While just 34% of survey respondents saw a change in sediment in rockpools, this was over half (55%) of those who'd listed rock pooling as an activity they participate in.
- While a handful of sea users reported seeing less sediment in an environment, the vast majority of those aware of changes saw an increase, with more than a half reporting they'd seen 'a lot more' sediment.
- Weather is likely to be a factor in the visibility of sediment with some users noting an increase in sediment following disturbed weather and a decrease in calmer conditions.

Those not aware of changes:

- A large proportion of sea users were not aware of changes to sediment in one or more environments, and many had not observed changes in all three. A factor in this result may be the nature of the activities undertaken and whether they enable observation.
 - **For example, just 26% of all sea swimmers saw an increase in sediment in the water versus 77% of all recreational sea fishers and 62% of all scuba and free divers.**
- Where sea users spend their time may also be a factor with some locations being potentially some distance from, or protected from, sources of sediment.

"I haven't seen changes, I'm 37 and been surfing and paddle boarding in the same spot since I was 12. I think the Newhaven Arm stops the long shore drift and thus the sediment coming into Seaford Bay. This causes the beach to disappear because it's not being replenished so Seaford is always having shingle brought in by trucks"

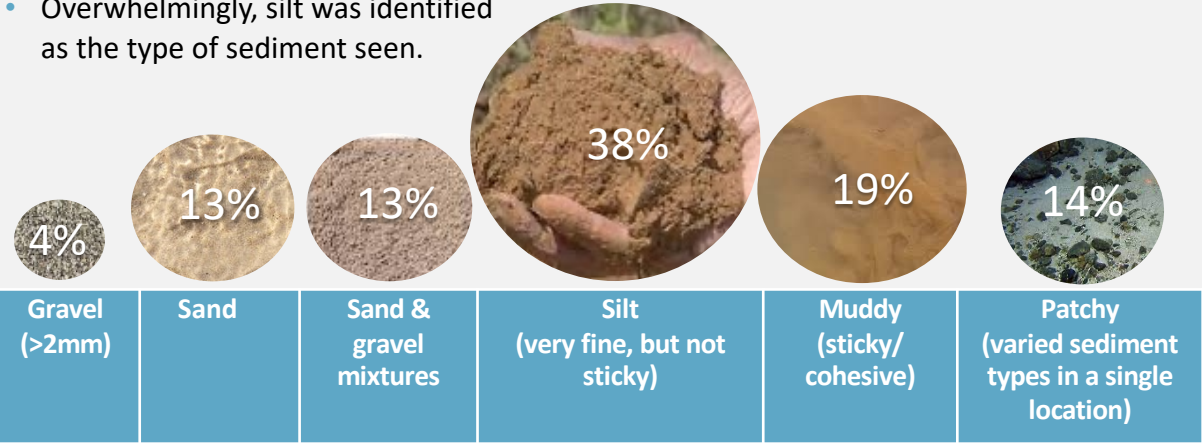
"Hard to tell because when I swim it's inshore and is cloudy when the sea has been rough but clears up after a week or two of calmer weather"

"When calm for a couple of weeks I can see the bottom in 20 feet of water from a kayak off Bognor"

Results: Type and sources of sediment

What was the type of sediment observed?

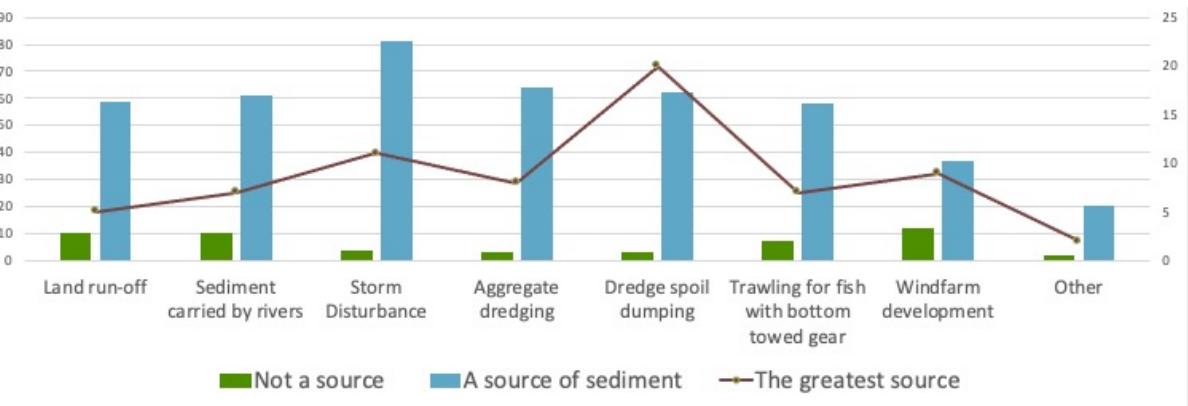
- Overwhelmingly, silt was identified as the type of sediment seen.



We asked respondents to tell us what they thought the main sources of sediment were, and what was the largest source of sediment in Sussex.

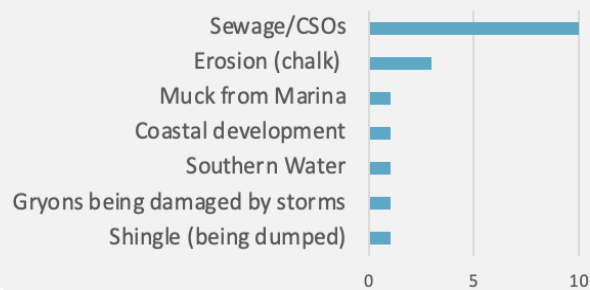
- Storm disturbance was viewed as a driver of sediment by the greatest number of respondents.
- The source seen by most people as ‘the largest source of sediment’ was dredge spoil dumping.
- Windfarm development was the least identified source of sediment.

Number of respondents selecting a **source of sediment**, the **largest source of sediment** and **not a source** from a list of prompted sources



For the 20 respondents who’d marked ‘other’ we asked what sources we’d missed. Sewage received the most mentions.

Mentions of other sources by number of respondents



“Poor water quality with Combined Sewage Overflows discharging to the sea”

“The elephant in the room - raw sewage”

“Water quality is generally better and more fish inshore since Bognor’s sewage pipe stopped discharging”

Results: Observations on sediment

Some respondents provided observations on how it looks or behaves

"There seems to be plenty of fine silt in the water. This makes it cloudy & brownish"

"It has a shine on the top of it a bit like fuel"

"Sediments at Sovereign Harbour smell bad, probably due to the discharge of sewage to the West of the harbour."

"It's easily disturbed and stays in suspension in the water for days"

"Oily, pumped straight out of the marina"

"Sediment is over the seabed and doesn't move away, been like it for years"

"Whenever shingle is replaced on the beaches it is full of gritty dirt"

"It stinks"

"In some areas in Bracklesham Bay underneath the sand there is black gunge."

"It tends to congregate together"

Further observations on how sediment appears and thoughts on causes

"The [increasing] frequency of cliff falls from Beachy Head... leading to suspended chalk in the water visible up to 1/4 mile after a fall"

"Too much seabed disturbance west of Selsey Bill that works its way around the area, causing poor visibility and high turbidity. From gravel extraction to dumping of dredge, bottom trawling, to multiple rivers flowing into the sea"

"Dredging aggregate has had a detrimental effect on cancer pegurus since the 70s. I believe capital dredging in Portsmouth for aircraft carriers and Southampton container ships has had a catastrophic affect on the local ecology stretching as far as Dungeness"

"Four weeks ago we lost a heavy rubber bucket overboard at my mooring in Brighton. Due to sedimentation clouding the water I was unable to retrieve it until a month later. On retrieving it we were surprised to measure 2" of fairly firm silt in the bottom of the bucket"

"Sediment build up has hugely increased in the entrances to Sovereign Harbour, Brighton Marina and Gosport Marina making them inaccessible at low water springs at LW +/- 2 hours"

"I have noted the nutrification of Pagham Harbour as evidenced by the algal growth on the grasses"

"These are very subjective and really should rely on evidence and not opinion. Not all material in the water column will be sediment but a layman won't know this"

"The amount of sediment you see as a diver varies from year to year, so hard to say if there is more or less. But I do know it is always worse when there is underwater engineering in progress, new pipelines, wind farms, dredging, etc."

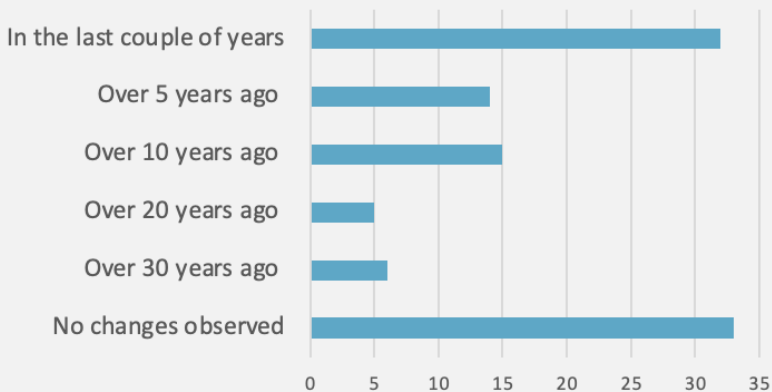
"When Brighton Marina is dredged you can see sediment drifting along the coast and onto the beaches to the East of the Marina"

"Flood tide dredging in Shoreham Harbour entrance deposits silt on Kinston beach"

Results: Location and timescale of changes

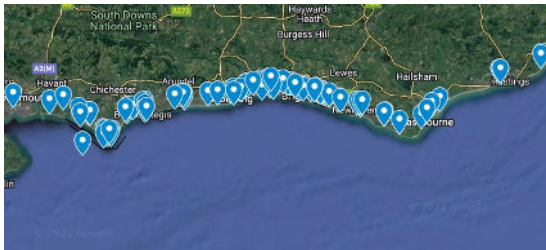
When were changes to sediment first observed? (Number of respondents)

- Changes are fairly recent; third (34%) of respondents have seen changes in the last couple of years.
- 59% of survey respondents have observed a change in the last decade.

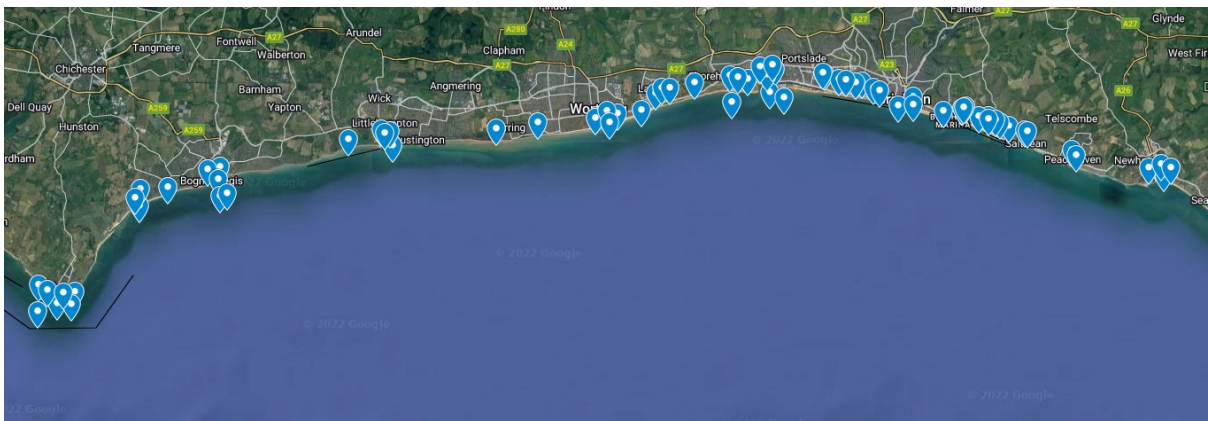


Where have changes to sediment been observed?

- 80 respondents gave the location where changes to sediment had been observed, with some providing details of multiple sites.
- Each location is represented by a pin on the map below (along with other details provided).



- Changes have been observed across the Sussex coast.
- The following areas had a greater share of pins than elsewhere:
 - Brighton Marina to Salt Dean
 - Selsey, Whittinger and Bognor
 - Littlehampton, Lancing and Worthing.



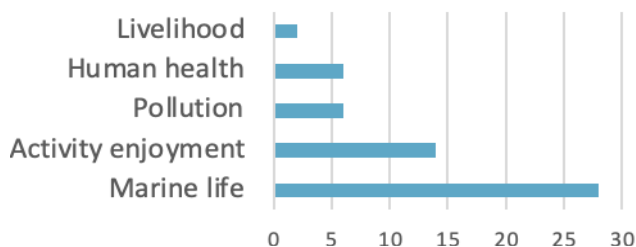
[Explore the interactive map](#)

Results: Observations on impacts

We asked respondents to tell us about any impacts to marine species, habitats, fisheries, recreational activities, or human health they believe are directly related to any changes in sediment levels or types they observed.

- 44% of respondents noted a number of impacts. Nearly half of these (49%) noted a decline in marine life.
- 26% noted a decline in the enjoyment of their activity (such as reduced visibility when diving or swimming, smell or looking unsightly).
- 11% noted an impact to human health such as ear infections, 11% noted pollution including sewage and 4% noted an impact to their livelihood.

Number of mentions citing a negative impact



"I fish here every day. Over the last 12 months I have been upset by the amount of dredging silt dumped inshore.... Especially as I watch the tides push it straight back"

"As soon as sediment decreases we find dramatic increases in growth of kelp & other plant life"

"The silt blocks out sunlight and decreases the oxygen. Coating breeding areas and nesting sites moving fish that have been coming to this area for years to other areas"

"Reduction of crustaceans due to loss of habitat. Subsequent reduction of fish species which used to prey on the shrimps and prawns. Sewage smell from Eastbourne treatment plant"

"All marine life over the reef has reduced but most noticeable are the lack of lobsters inhabiting the gully's and crevices in the rockpools that are now regularly full of silt"

"Lack of light has effected the whole area over the last thirty years and ear infections have increased dramatically in the past few years amongst the public using the sea"

"Over 17 years we have been diving, along the shore at Selsey a noticeable decline in lobsters, crabs plus fish species. The closer you get to the shore the worse it is"

"Sea fishing (Angling) from Sussex coastline in Shoreham, Littlehampton and elsewhere, is terrible these days. There are no fish left, not even mackerel! Where have the fish gone?"

"There was a small kelp forest off-shore from the Pagham harbour mouth, that is long gone, replaced by seasonal stringy algae and mini-kelp that get covered by bio-growth very quickly due to excess nutrients and then dies off"

"Chichester harbour is now permanently overrun/suffocated by algae. It used to die back in the winter, (along with the larger seal colony) this has caused the Flounder population to be decimated"

Results: Other comments

"Sediment reduces visibility for freediving, and changes the amount and type of marine life: the presence of different species depends on their requirements of kelp and visibility (and suspended sediment destroys both)"

"Sediment dredged out of Shoreham Harbour by the larger dredger has been deposited only 800 meters from the entrance on the up coming tide meaning the silt washes down across the Jennie Ground to the east of the harbour cutting out the light and restricting growth"

"Definitely more sediment build up in Pevensey Bay and this is constantly stirred up by trawlers. There are more trawlers off of Eastbourne now as the exclusion zone is narrower there. Some trawlers have relocated from Brighton to Eastbourne because of this"

"Much more sediment on the lobster pots. We fish from Shoreham Harbour westwards and the effect is pretty general, especially inside of 6 miles"

"Sediment often covers the nearshore environment - Jenny Grounds off Shoreham power station. Visibility inshore when scuba diving has decreased. Dredging of River Adur and dumping of spoil in the nearshore area affects visibility"

"Used to spend a lot of time in rockpools East of Brighton Marina. Many of the good rockpools for collecting decent sized prawns for bait have completely filled with silt (there's a pipe that dumps sediment within 400 metres of the shore, from the Marina)"

"Rock gullies and pools on the reef between Brighton and Newhaven seem worst affected by increased sediment. Firstly it changes the nature of the substrate from gravel/sand to silty mud...a less favourable habitat for traditional rock pool species. Secondly the trapped silt is lifted into suspension by very slight swells, causing longer periods of turbidity and a subsequent decrease in photosynthetic weed growth"

"Over the last 50 years, fish numbers, fish size and variety of species has declined massively"

"The 20 odd Scallop trawlers using Shoreham as a base are not only smashing up the bottom with their dredges but every scallop they take from the Channel is a filter feeder cleaning the water, this may not seem like much but multiply it by twenty boats once a week each catching 20 tons then again by 15 years and we are talking thousands of tons of filter feeders"

"Reduction of crustaceans due to loss of habitat. Subsequent reduction of fish species which used to prey on the shrimps and prawns"

"Water turbidity in Pagham is becoming a nearly permanent feature, with only occasional summer periods of clear water. During prolonged rainy days water seems to be carrying much higher sediment load than usual, not helped by frequent sewage discharges"

"The only improvement I have seen, due to the lack of trawling inshore, has reduced the disturbance of the bottom letting a lot more light into the water in the spring months with remarkable results even in the first year"

Full results

Respondents location, access and use of the coast

- 129 people responded, 30% live in Brighton & Hove, 59% live elsewhere in East or West Sussex, and 10% live outside of Sussex.
- 60% of respondents are regular sea users spending time on, in or by the sea most days (24%) or at least once a week (36%)
- Beach walking, sea swimming, and recreational water sports (such as rowing, paddle boarding surfing and kayaking etc.) were the most common activities undertaken by respondents

Respondents awareness and support of the Nearshore Trawling Byelaw

- 73% are aware of the historic kelp beds
- 73% are aware of the Nearshore Trawling Byelaw
- 89% are supportive of the Nearshore Trawling Byelaw

Respondents observations on changes in sediment

- 53% had observed a bit more or a lot more sediment in the water
- 38% had observed a bit more or a lot more sediment on the seabed
- 33% had observed a bit more or a lot more sediment in rockpools
- In each environment <3% of respondents observed less sediment
- 77% of recreational sea fishers observed an increase in sediment in the water
- 62% of scuba and free divers observed an increase in sediment in the water
- 26% of sea swimmers observed an increase in sediment in the water
- 55% of rock poolers noticed an increase in rockpool sediment

Respondents views on sediment change timescales and locations

- 59% of respondents had seen changes within the last decade
- 34% saw changes in the last couple of years.
- 10% of respondents saw a change more than twenty or thirty years ago
- 80 respondents provided location data, some giving details of multiple sites.
- Common locations where changes to sediment have been observed include:
 - Brighton Marina to Salt Dean,
 - Selsey, Wittering and Bognor
 - Littlehampton, Lancing and Worthing.

Consistency of sediment

- 41% of respondents thought the sediment had a silt-like consistency
- 20% of respondents thought it was Muddy and 16% thought it was patchy.

Respondents views on the sources of sediment

- Storm disturbance was viewed as a driver of sediment by the greatest number of respondents
- Dredge spoil dumping was the source identified by most respondents as the largest source of sediment followed by storm, aggregate dredging, rivers, trawling, land run-off, windfarm development and sewage

Respondents views on the impacts of sediment

- 44% of respondents noted a number of impacts. Nearly half of these (49%) noted a decline in marine life, 26% noted a decline in the enjoyment of their activity (such as reduced visibility when diving or swimming to smelling or looking unsightly), 11% noted an impact to human health such as ear infections, 11% noted pollution including sewage and 4% noted an impact to their livelihood.

Next steps

This survey and report are one of a series of activities being undertaken by the Sussex Kelp Restoration Project (SKRP) to investigate the sources and impacts of sediment on kelp recovery and will inform the identification of priority actions to reduce sediment inputs from key sources.

The survey report is publicly available and may be used by SKRP partners and the public to support initiatives to address local and regional sources of sediment.

The SKRP will explore the potential to maintain the interactive sediment location map for ongoing input of observations.

SKRP partners are supporting a new doctoral research project to deepen our understanding of suspended particulate matter (SPM) and its impact on kelp growth and provide evidence-based research on SPM and sediments to guide coastal policy and management interventions.

The SKRP partners hope that these survey results will support individual, collective and collaborative action to reduce inputs of sediment to Sussex coastal waters, maximising the opportunity for recovery of the once dense and productive kelp beds and their associated inshore fisheries.

**The Sussex Kelp Restoration Project is a collaboration
between the following organisations:**



BLUE MARINE
FOUNDATION



University of Brighton



Appendix 1: Survey questions (1/2)

1. Please tell us your name (if you prefer to remain anonymous, leave this blank)
2. What's the nearest town to where you live
3. What marine activity/ies are you involved in? (Select all that apply)
 - *Commercial sea fishing, Recreational sea fishing, Scuba diving, Freediving, Surfing/paddle boarding/kitesurfing/windsurfing/kayaking/rowing, Sea swimming, Rock pooling, Beach walking, Sailing, Other (please specify)*
4. How often are you on or in the waters off the Sussex coast? (Select one)
 - *Most days, At least once a week, At least once a month, Several times a year, Less than 6 times a year*
5. Were you aware that there used to be a large amount of kelp growing in Sussex's water but over 96% of kelp beds have disappeared since the late 1980s?
 - *Yes, No*
6. Were you aware of the Sussex Nearshore Trawling Byelaw which aims to help the kelp and other seabed habitats to recover by prohibiting trawling in nearshore waters along the Sussex coast?
 - *Yes, No*
7. Are you supportive of the Sussex Nearshore Trawling Byelaw aim?
 - *Yes, No, Not sure/undecided*Can you tell us your reasons for your answer?
8. Have you noticed any changes in the amount of sediment in the coastal waters of Sussex? (Sediment can be particles of soil, grit, sand or other matter, that might settle on the seabed or turn the water cloudy).
 - *Sediment in the water: I've noticed a bit more, I've noticed a lot more, I've noticed less, I'm not aware of any changes*
 - *Sediment on the seabed: I've noticed a bit more, I've noticed a lot more, I've noticed less, I'm not aware of any changes*
 - *Sediment in rockpools: I've noticed a bit more, I've noticed a lot more, I've noticed less, I'm not aware of any changes*

If you want to tell us more about your observations, let us know here

9. When did you first observe changes in sediment? (Select one)
 - *Over 30 years ago, Over 20 years ago, Over 10 years ago, Over 5 years ago, In the last couple of years, I have not observed any changes*
10. Where did you see changes in sediment occur? If you know the coordinates please write them below, and list as many as you think are relevant. If you are not comfortable using coordinates, you can also give us a description of where you've seen sediment e.g. in the water 1km out and 500m east of Worthing Pier.

Appendix 1: Survey questions (2/2)

11. How would you describe the consistency of any increased or different sediment you have seen? (Select all that apply).

- *Gravel (>2mm), Sand, Sand and gravel mixtures, Silt (very fine, but not sticky), Muddy (sticky/cohesive), Patchy (varied sediment types in a single location), No changes in sediment types in a single location, No changes in sediment amount or type observed*

12. Is there anything else about the sediment you've noticed?

13. What do you think are the main sources of the sediment you've seen? Please rank the following sources in terms of severity from 'not a source of sediment' to 'the largest source of sediment'.

- *Land run-off, sediment carried by rivers, storm disturbance, aggregate dredging, dredge spoil dumping, trawling for fish with bottom-towed gear, windfarm development, other*

14. In the question above, if you selected 'other' as a source of sediment no matter how small, what source(s) of sediment have we missed?

15. Do you have any more information or evidence to shed light on your answer to Q14?

16. Are there any impacts on marine species or habitats, fisheries, recreational activities, or human health that you believe are directly related to any changes in sediment levels or types you have observed? Please provide details and any examples.

17. Do you have any other observations or thoughts on the sources and impacts of sediment in Sussex coastal waters that you would like to share?

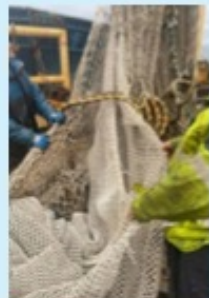
Appendix 2: Fishing news article

17 February 2022

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NEWS 5

Widespread media coverage of Margiris blue whiting spill



▲ The broken codend onboard the Margiris.

There was extensive mainstream media coverage of a film taken by the uber-vegan NGO Sea Shepherd of the Dutch-owned, Lithuanian-registered freezer trawler Margiris off the French coast on 3 February, reports Andy Read.

Surrounded by a blue whiting catch that had burst from a torn trawl after hauling, the 'sea' of dead fish received widespread condemnation from environmental groups.

The blue whiting stock has long been assessed as fished within sustainable limits, and fishermen and scientists have both confirmed the fishery as clean, with little bycatch.

The fishery had Marine Stewardship Council accreditation for several years, entering the process in 2014, and receiving full approval in 2016. This certification was removed in December 2020 after several 'northern' states, including Iceland and Faroe, issued themselves unilateral quotas that resulted in an overshoot of the TAC as previously agreed on the basis of scientific advice.

The 2022 TAC for blue whiting is 752,756t, in line with the scientific advice, but with the quota-sharing arrangement still under discussion between the UK, EU and the northern states including Iceland, Faroe and Norway.

Once fished exclusively for fishmeal, an increasing proportion of the blue whiting catch is now marketed for human consumption, mainly in West Africa.

Speaking to *Fishing News*, Tim Heddema, president of the European Pelagic Freezer-Trawler Association (PEFA), said: "PEFA members fish only for human consumption, and 90% of their catches are sold in West Africa. We have invested considerably in cold store infrastructure and generated considerable downstream employment for local fish sellers, often female independent entrepreneurs."

"We regret that the fish involuntarily lost by the Margiris will now not be available for human consumption, as a result of a broken codend – due, as the crew has analysed, to the exceptional individual and combined volume of the fish in this instance."

"The Margiris has implemented drastic measures to prevent similar accidents in the future. The trawls have been adapted and fishing patterns have been altered to deal with the unexpected characteristics of the fish currently in the area concerned."

The North Atlantic Pelagic Advocacy Group (NAPA), a regular commentator for the processing and retail sectors on pelagic matters, also focused on the bigger picture, saying in response to the photos of the spill: "100,000 blue whiting amounts to around 18t of discarded fish."

"While this is undoubtedly a concerning amount, in 2021, North East Atlantic coastal states set the quota for exactly the same blue whiting at 315,435t above scientific advice for sustainable fishing (929,292t). That's an overshoot of 34%."

NAPA executive director Tom Pickerell added: "Coastal states need to be held accountable for overfishing blue whiting, mackerel and herring at levels as high as 30-40% above scientific advice. Their actions risk the sustainability of these stocks and the balance of North East Atlantic ecosystems. This is the real scandal that the media should be writing about."

As the main European fishery starts west of Ireland in March, Killybeggs will likely see a steady procession of Scottish RSW trawlers landing there, with the fish destined for African consumers.

The fish produced, which has one of the lowest carbon footprints of any food source in the world, is also one of the few sources of affordable protein for families living on the UN Official Poverty Line, currently classified at £1.90 (about £1.40) per adult per day.

Escape panel reduces risk of blue whiting overspill – see page 19



▲ The fish loss, photographed by the NGO Sea Shepherd, was given widespread coverage on social media.

Sussex seabed survey launched



▲ The Sussex IFCA no-trawl zone. (Source: Sussex IFCA)

Sussex Wildlife Trust and the Blue Marine Foundation, as part of a collaboration within the Sussex Kelp Restoration Project, are asking Sussex fishers to participate in a survey on sedimentation of the seabed in the area, following growing concerns about the impact of dredge spoils in the eastern Channel.

In 2021, the Sussex IFCA Nearshore Trawling Byelaw closed an area close to Brighton Marina to all trawling activity, including a large area out to 4km between Selsey and Shoreham by Sea, and the Selsey Bill and the Hounds MCZ.

The byelaw, which forced several trawlers off some traditional towed ground, has resulted in the recovery of some areas of kelp, as documented by the project at a recent workshop. However, a much wider concern has been widespread reports of siltation of many areas of the eastern Channel, as a result of dumping of aggregate spoils.

Jim Partridge, a fishing industry representative on the Sussex IFCA, and owner of the Shoreham vessel that supplies his shop in Shoreham Harbour, told *Fishing News*: "Twenty-five years ago, the kelp forest here was so thick that in many cases even working static gear was impossible. But it provided great habitat for juvenile fish, lobsters and crabs, and was a real asset to the overall fishery."

"Since the sedimentation began, we've witnessed not only the chalk and rock features silting up, but silt on the pots, and a decline in the kelp coverage, to a position where now we are seeing vast areas of what was kelp forest, completely bare."

"It is no coincidence, in my view, that at the same time, we have seen lobster catch rates plummet. Juvenile lobsters have nowhere to hide, and there is an explosion of congers on the area which have a new source of food. On top of that, many of the few lobsters left are either weak when caught, or are dying soon afterwards."

The Sussex Sediment Sea User Survey aims to gather further information from sea users including commercial and recreational fishermen, divers, snorkellers and surfers.

Observations of sediment changes and impacts on fisheries, recreational activities and marine life will help build a picture of where sediment levels may have changed, over what timescale and from which key sources, so that actions can be effectively targeted.

The short survey is online at: bit.ly/5JeqgAb, and there's no requirement to provide any personal details unless you wish to receive a copy of the survey report. It closes on 28 February.

For more information, contact Sam Fanshawe at: sam@bluemarinefoundation.com

Fishing News will be taking a wider look at the reasons for the decline in pot fisheries in general, and lobster in particular, in a forthcoming issue, including an investigation into dredge spoils disposal both from Brighton Marina and further afield. Please contact us at: fishingnews.ed@kelsey.co.uk if you have any views or comments you would like to contribute to this.

Brexit 'failing to deliver promises on fishing'

Benefits to the UK fishing industry from Brexit are falling far short of the government rhetoric, according to analysis by researchers from the University of York, the New Economics Foundation, the University of Lincoln and ABPmer.

The government's promises of radical reforms to help the industry take back control of UK waters and increase quota shares, while minimising trade impacts, are 'starkly at odds' with the reality of what has been achieved, says their report.

Despite government statements that Brexit would result in

hundreds of thousands of tonnes of extra catch for UK fishermen, the report calculates that the increase will only reach 107,000t per year, or 12.4% by value for all species, by 2025.

Additionally, UK fisheries management continues in a state of interdependence with EU legislation; significant EU access to UK waters remains, including in the 6-12nm zone; and new regulations and logistical barriers brought in by the Brexit TCA mean that exporting seafood costs more and takes longer, say the researchers.

Lead author of the study Dr Bryce Stewart, from the Department of Environment and Geography at the University of York, said: "Government promises on Brexit and its benefits for the fishing industry were far in excess of what could be delivered. The industry became an icon of Brexit, with claims it would correct past injustices and breathe new life into neglected coastal communities, but our study reveals the stark delivery gap between rhetoric and reality."

Co-author Suzannah Walmsley, a fisheries and aquaculture specialist at ABPmer, added:

"There was much talk about 'zonal attachment', where quota shares are determined based on the proportion of fish stocks in each party's waters. Our analysis of just 24 out of more than 100 stocks included in the deal shows that it falls short of this by at least 229,000t or £281m."

In the absence of a full government analysis of Brexit effects on fisheries, the researchers analysed all available data on quotas, landings and the proportions of different species living in UK waters.

Dr Stewart said: "Most of the significant increases in catch

quotas are for just a few fisheries such as western mackerel and North Sea sole and herring. Most fishermen, particularly those in small boats, have seen few if any benefits, so due to new challenges around trade are likely to be worse off."

"Many people in coastal communities who were pinning their hopes on post-Brexit reforms feel betrayed, and this comes at a significant cost to their wellbeing and mental health."

"The Brexit deal and United Kingdom fisheries – has reality matched the rhetoric?" can be read at: bit.ly/5B6Xm2Q

Annex 1: Tell us the reason for your answer (whether you are supportive or not of the Nearshore Trawling Byelaw)

Nearest town to respondent's home	Commercial sea fishing	Recreational sea fishing	Scuba diving	Free-diving	Surfing/paddle-boarding/kitesurfing/windsurfing/kayaking/rowing	Sea swimming	Rock pooling	Beach walking	Sailing	Can you tell us your reasons for your answer?
Open-Ended Response										
Arundel										I remember the large amounts of kelp that often were washed up onto the beach and to have these occur again is not something that I would want.
Bexhill										I want to see the damage to local marine wildlife by practices such as dredging and bottom trawling reversed so these habitats can thrive once again.
Bognor Regis										Reduced damage to sea floor is desirable.
Bognor Regis										Reducing trawling will increase biodiversity, increase catchment for local fishermen and if good kelp banks develop, help mitigate storm effects from climate change
Bognor Regis										Safe breeding grounds gives beach anglers a chance But I would like to see nets pushed out to 2 miles as some were 50 meters from low tide between Littlehampton last summer
Brighton & Hove										I am passionate about conservation and would love to see an increase in biodiversity around the Sussex coast
Brighton & Hove										There are multifaceted benefits to stopping inshore trawling. It will reduce the disturbance of the seabed and the damage this causes, allowing the fauna and flora to begin to regenerate, e.g., kelp/black bream spawning beds, likely sequestering carbon and increasing biodiversity, in time this may lead to benefits to the local economy e.g., recovery of fish stocks which will benefit local fisheries, ecotourism
Brighton & Hove										To help increase the health of the ocean
Brighton & Hove										Passionate about supporting nature's recovery - this marine initiative is innovative and inspirational
Brighton & Hove										Help with restoration of natural habitat
Brighton & Hove										Regeneration of kelp forests encouraging sea life habitat and healthy seas
Brighton & Hove										I've seen too many inshore trawlers and dredging from the marina to less than a mile away
Brighton & Hove										It's a destructive and completely unsustainable method of fishing.
Brighton & Hove										I want the sea kelp to recover as quickly as possible, to promote the wellbeing of the coastal waters and the creatures that live in them.
Brighton & Hove										Sea creature and human survival is dependent on a thriving ocean habitat.
Brighton & Hove										It makes sense to look after natural habitats, especially when they are out of sight, and so, often out of mind
Brighton & Hove										Protection of habitat is important, we do so much to protect animals and habitat on land and its made no sense to me that the marine world is different, minimising any damage caused by invasive gear types is only a good thing.
Brighton & Hove										The boost to habitat, biodiversity and animal populations would be huge if the kelp forest was able to reestablish.
Brighton & Hove										Always supportive of efforts to help marine life
Brighton & Hove										Underwater habitats and ecosystems are incredibly important to support marine life and also combat climate change.
Chichester										Restoring the native kelp habitats can only be a good thing.
Chichester										Because it's not the trawling that is damaging the kelp, it's something else in the water that's why it's not growing anywhere off of selsey.
Croydon										It makes sense that increasing the biodiversity of our waters is a good idea. If trawling is damaging the kelp forest or if its responsible for its demise, it makes sense that it stops.
Devizes										To help restore the kelp rich marine habitat which is so crucial for the ecology of the region.
East Grinstead										I believe passionately in the importance of rewinding our marine environment and especially kelp forest.
Eastbourne										I am concerned about the dredging which occurs annually to replace lost shingle.
Eastbourne										I want to see the restoration of sea life. I have dived on trawled beds and what is left behind is a marine desert.
Gay street										yes but it is wrong to blame the trawlers for the kelp loss
Guildford										Trawlers destroy everything and take up too much life.
Hailsham										To insure and maintain the natural habitat for marine life
Hassocks										As a biologist and long term resident to the area I understand how the algal flora has dramatically changed since c. 1986 following gales and dredging and the need to control trawling.
Hassocks										Allowing the kelp beds to recover has so many environmental benefits
Hastings										Important to protect these habitats for marine life but also health and quality of our bathing waters
Havant										I agree that destructive trawling methods should be banned in areas of sensitive marine habitat
Havant										Fishermen have destroyed the environment for many years, its time to stop the devastation and restore back to normality.
Heathfield										Allow habitats to re-establish and replenish fish stocks and diversity of marine life
Herstmonceux										Over the last 50 years the fishing in terms of fish numbers, fish size and variety of species has declined massively.
Horley										Trawling is the most obvious destructive practice practiced inshore. It may not be the only cause of the demise of the Kelp, but is the easiest one to remove from the list of probable causes. In doing so it also removes the threat to other organisms at risk from the Trawls whatever kind is used. Nesting Black Bream within the zone can now reproduce without threat to their nests, and other plants and animals and the general ecology can revive in time.
Lancing										Nature is as important as us. We should encourage balance of life
LANCING										I have noticed a remarkable upturn in the abundance and variety of sea life around our shores since the ban came in.
Lewes										Unnecessary Environmental Damage
Lewes										Keen to see the restoration / recovery of seabed
Littlehampton										Protection of reefs and breeding areas. Long over trawled with very damaging results
London										Trawling destroys structure and kelp, and that has large downstream impacts on marine life.
Midhurst										Because the fishing stocks have been depleted as evidenced by the poor catches when beach casting. I can remember large cod being caught on trot lines and mackerel netted from the shore at Barrack Lane in 1970s.
Newhaven										It makes sense to protect our marine habitats as this protects local fisheries, local economy and builds resilience into maintaining local food supplies and related economies. Conversely there should be less need to source food from further afield, or abroad, or to use local money to buy expensive marine cuisine imports.
Peacehaven										I am keen to see the restoration of the natural underwater environment and sealife that dwells there.
Pulborough										To allow for restoration of the Kelp beds which will lead to a healthier more sustainable ecosystem in Sussex seas.
Rustington										Because kelp is good for the water, and home to a lot of marine life
Selsey										It's not trawling that has killed off the kelp
Shoreham-by-Sea										Carbon Reduction and restoration of marine habitat
Shoreham-by-Sea										I have been a eye witness to the devastation over the last 30 years and almost total annihilation of the local ecosystem.
Shoreham-by-Sea										Due to my lifelong love for the seas and its inhabitants I have worked for many marine charities and currently work for Worthing Coastal Office so this is a very important byelaw to have passed by IFCA and is the first step to helping give space for the kelp to regenerate not only for the kelp itself but for marine life, sediment and coastal erosion.
Shoreham-by-Sea										Have seen changes in near shore ecology in last 20 years
Shoreham-by-Sea										To protect juvenile fish species and sand beds in west Sussex
Shoreham-by-Sea										I have seen the destruction caused by the trawlers over the last 30 years
Steyning										A long overdue chance for the ecosystem to recover
Worthing										I am totally against unsustainable fishing and a supporter of the recovery and protection of ecosystems
Worthing										I am ever concerned with seaweed returning on our beach that stinks and encourages flies. I have yet to hear how it will be dealt with. I remember it back in the 1950's that gave the council a huge logistical problem of removing it. It's not just a few lorry loads, 100's.

Annex 2: If you want to tell us more about your observations (on changes in the amount of sediment in the coastal waters of Sussex) let us know here

Nearest town to respondent's home	Commercial sea fishing	Recreational sea fishing	Scuba diving	Free-diving	Surfing/paddleboarding/kitesurfing/windsurfing/kayaking/rowing	Sea swimming	Rock-pooling	Beach walking	Sailing	
Arundel										If you want to tell us more about your observations, let us know here
Bognor Regis										These are very subjective and really should rely on evidence and not opinion. Not all material in the water column will be sediment but a layman won't know this. Also there are very few rock pools along many sections of the Sussex coast so asking if they are suffering from sedimentation is very scientific. You need to base your work on firm evidence and not opinion.
Bognor Regis										Water turbidity in Pagham is becoming a nearly permanent feature, with only occasional summer periods of clear water. During prolonged rainy days water seems to be carrying much higher sediment load than usual, not helped by extremely frequent sewage discharges from two Southern Water outlets in Pagham. In summer nutrient rich run-off from Pagham Harbour seems to be causing occasional but regular eutrophication events near the Harbour mouth - at least two noted in 2021, one with green algal sludge on the surface
Bognor Regis										When calm for a couple of weeks can see the bottom in 20 feet of water from kayak off bognor
Bognor Regis										big decrease in the amount of sand at times on our beaches. As much damage done by council's constantly moving shingle only for it to move with the tide wrecking habitat and wildlife
Brighton & Hove										The sediment appears roughly the same since I have known it. I have lived here for 10 years now since 2011 and while the clarity of the water changes often due to the weather, the basic sediment levels in the water don't appear any different to my untrained eye.
Brighton & Hove										When sediment is dumped in the nearshore at Brighton Marina the rockpools become coated in sediment out to Ovingdean and Rottingdean.
Brighton & Hove										I can only comment on the area east of Brighton marina from Ovingdean to Saltdean. I've seen an awful change over the last 20-25 years most recently due to the marina's dredging and dumping so close to the shore. We would regularly forage the rockpools for bait and for fun with the kids and would come across many lobsters every time but I haven't seen a single lobster over the last four years on the reef.
Brighton & Hove										I surf on the chalk reefs to the east of Brighton a lot and there seems to be more seaweed on those than there used to be
Brighton & Hove										Generally the water seems cloudier than it used to, there are few days that it's possible to see the sea bed
Brighton & Hove										Seabed refers to the intertidal along the Lancing to Worthing frontage which I have taken photographs of on my commute to work
Brighton & Hove										Used to spend a lot of time in rockpools. East of the Brighton Marina, many of the good rockpools for collecting decent sized prawns for bait have completely filled with silt (there's a pipe that dumps sediment within 400 metres of the shore, from the marina).
Brighton & Hove										In the time I have spent in the waters off Brighton, over the last decade, the sediment has always been significant with very few days of clarity. Recent construction at sea and on the coast has only increased this.
Brighton & Hove										To the east of Brighton marina through to peacehaven is covered in sediment and silt and fuel due to Brighton marina dumping silt and sediment dredged from inside Brighton marina
Brighton & Hove										Plenty of sediment in rock pools East of Brighton Marina. One of the main issues there is that the Dredger that dredges out the marina for ~6months of each year, does not go out to sea far enough. It literally dumps the sediment a couple of hundred yards off the beach.
Crowborough										In January 2022 at Hope Gap I noticed the sea was remarkably clear and blue. You could see the gunnels in the chalk platform from the cliff. I've grown up in Sussex and I am used to seeing The Channel look brown and soupy from the suspended sediments. This was a calm day and approaching high tide which will have helped.
Eastbourne										Whenever shingle is replaced on the beaches it is full of gritty dirt.
Eastbourne										It is hard for me to gauge locally due to natural cliff erosion around Beachy head.
Gay street										More sediment on the lobster pots
Hassocks										As a diver I have noticed and documented through Seasearch the increase sediment on rocks.
Hastings										Lack of sea life in the rock pools.
Hastings										The waters at West St Leonards, Central St Leonards and Pelham Beach, where I tend to bathe, have looked very cloudy for a while now, I am not sure of whether this is normal or not. I began sea swimming throughout the year in October 2020. I do feel that it has been more consistently cloudy than when I first moved down here in 2017 (though I was only swimming during the summer months for the first 2 1/2 years).
Havant										I'm more often in Hampshire waters and over the last year I think the in-water visibility has been worse more often in the last 2 years
Havant										There is too much seabed disturbance to the west of Selsey bay that works its way around the area, causing poor visibility and high turbidity in the inshore and offshore reef. From gravel extraction to dumping of dredge, bottom trawling, to multiple rivers flowing into the sea.
Herstmonceux										I used to catch prawns in the deeper rockpools between Pett Level and Fairlight, many of these pools are now filled with sand/ sediment and no longer hold prawns. Sediment build up has hugely increased in the entrances to Sovereign Harbour, Brighton Marina and Gosport Marina making them inaccessible at low water springs at LW +/- 2 hours.
Horley										Brighton Marina has over the last 10 years started to silt up rapidly. Each slack water after rough weather, a layer of sediment is added to the silt within the Marina. This is more apparent after rough weather or a Cliff Fall within the Beachy Head West MCZ. The beach East of Brighton has been subject to Cliff fall over hundreds of years and yet history tells us that the chalk gullies are somehow cleaned over a short period of time, by the tidal flow and waves. We are made even more aware of this cleaning action, when we consider the licenced dumping of natural marina silt into the MCZ annually by the owners of Brighton Marina. However, I had my eyes open recently to the severity of the suspended particles that enter the sheltered waters of the marina on every tide. Exactly 4 weeks ago we lost a very heavy rubber bucket overboard, at my mooring in Brighton. Due to sedimentation clouding the water, I was unable to retrieve the bucket until 1 month later. The water was crystal clear on a low tide, and we could see the bucket standing upright on the bottom. On retrieving the bucket with a boat hook we were surprised to measure 2" of fairly firm silt in the bottom of the bucket. Probably not a scientific indicator of suspended particles, but 2" is a surprising amount.
Littlehampton										The amount of sediment you see as a diver varies from year to year, so it is hard to say if there is more or less. But I do know it is always worse when there is underwater engineering in progress, new pipelines, wind farms, dredging, etc.
Midhurst										I have also noted the notification of Pagham Harbour as evidenced by the algal growth on the grasses.
Newhaven										I haven't noticed in the last two years of observation as I haven't been looking for changes. I've noticed very clear water along the Seaford Bay, in some of the summer months, during prolonged calm periods. I assumed this was a product of lack of storms and their impact on bottom disturbances.
Peacehaven										When Brighton Marina is dredged you can see sediment drifting along the coast and onto the beaches to the East of the marina.
Peacehaven										Since the construction of the marina, and the seemingly ever increasing amount of silt being dumped ludicrously close to the shore off Ovingdean that simply washes back in, its been a terrible decline on the reef especially lobsters, crabs and prawns compared to the 90s Yr on yr its been shocking
Rustington										Sediment in the water varies greatly with the sea conditions, so hard to tell. The seabed where I live is a lot sandier than it was, but a couple of miles further east is much less sandy. There aren't really any rock pools here but the gaps in the boulder groyne have filled, covering a lot of anemones.
Seaford										Over by Seaford Head and The Seven Sisters I must say the water was particularly clear in the summer, I could easily view the rock pools through the water at a depth of 3 metres.
Selsey										Some on East side of Selsey but the further west you go towards Bracklesham the worse it gets
Selsey										A lot of rocks have been berried by the shingle they've dumped on the beach off Selsey
Shoreham										I believe this is also partly due to heavy discharge of sewage by southern water
Shoreham-by-Sea										I organised a four years study on juvenile fish in our west sussex nearshore waters to find evidence to justify a ban on the pair trawling. We had noticed a vast reduction in sand beds during that period and even before that, as a angler since our kelp beds were destroyed.
Shoreham-by-Sea										Occasional times when there is dark slime in rock pools and beach-ovingdean
Shoreham-by-Sea										The sediment dredged out of Shoreham Harbour by the larger dredger has been deposited only 800 meters from the entrance on the up coming tide meaning the silt washes down across the Jennie ground to the east of the harbour cutting out the light and restricting growth. Also the pipe depositing waste from the ballast plant on (Basin road south) on the dropping tide means it circulates down to the west before feeding back into the east going tide down by the harbour arm. Yet again cutting down the vizability to the east of the area. The 20 odd Scallop trawlers using Shoreham as a base are not only smashing up the bottom with their dredges but every scallop they take from the Channel is a filter feeder cleaning the water, this may not seem like much but multiply it by twenty boats once a week each catching 20 tons then again by 15 years and we are talking thousands of tons of filter feeders. Ballast dredgers are working out the south west of the Sussex area hovering thousands of tons of aggregates and anything else that gets in the way this is blasted around huge pumps liquefying any marine organism and pumping the remains back over the side. The area they are working means all the disturbance and silt comes across the Sussex bay and towards the shore on the prevailing South West winds. The only improvement I have seen, due to the lack of trawling inshore, has reduced the disturbance of the bottom letting a lot more light into the water in the spring months with remarkable results even in the first year. Brighton Marina they have been dumping the sludge from the Marina consisting of Diesel sewage antifouling and many other things built up over the last thirty years to the east right on top of the nature reserve to the east this is flowing right down almost to the Newhaven Arm.
Shoreham-by-Sea										Sediment often covering near shore environment- Jenny Grounds off Shoreham power station
Steyning										The rock gullies and pools on the reef between Brighton and Newhaven seem worst affected by increased sediment. The gullies have an increased sediment load, this seems to have two major impacts. Firstly it changes the nature of the substrate from gravel/sand to silty mud, and consequently provides a less favourable habitat for traditional rock pool species. Secondly the trapped silt is lifted into suspension by very slight swells, causing longer periods of turbidity and a subsequent decrease in photosynthetic weed growth. I have heard allegations of toxins present in dumped silt, but this is outside of my experience.

Annex 3: Is there anything else about the sediment you've noticed?

Nearest town to respondent's home	Commercial sea fishing	Recreational sea fishing	Scuba diving	Free diving	Surfing/paddleboarding/kitesurfing/wind surfing/kayaking/rowing	Sea swimming	Rock pooling	Beach walking	Sailing	Open-Ended Response
Bognor Regis										If anything the sea bed started changing when the gravel boats dredged inside eastbrough head. This was the start of the sand disappearing from the in shore ground example the trawl sands south of felpham was sand banks between bognor rocks and the Shelley rocks now it's hard bottom mostly
Bognor Regis										On at least a couple of occasions water colour looked grey and one of those occasions very faint sewage smell was noted
Brighton & Hove										Oily, pumped straight out of the marina
Brighton & Hove										To me there seems to be plenty of fine silt in the water. This makes it cloudy and brownish
Brighton & Hove										Not sediment but I notice so much fishing equipment washed on the beach - ropes, string, wire, rubber sections
Brighton & Hove										Looking at aerial photography over the last 30 odd years there does not seem to be a noticeable wider spread change of intertidal sediment cover.
Brighton & Hove										It has a shine on the top of it a bit like fuel
Brighton & Hove										It can smell
Chichester										It tends to congregate together.
Crawley										Some of it is related to the military sea defences which were installed on Clymping beach and still partially remain.
Devizes										It's easily disturbed and it statins in suspension in the water for days.
East Grinstead										I believe it is restricting seaweed distribution
Eastbourne										The frequency of cliff falls from Beachy head seems to be increasing, leading to suspended chalk in the water visible up to a 1/4 mile from the cliff edge after a fall.
gay street										goes hard
Guildford										It stinks
Hailsham										It's killing the worm habitat
Havant										In some areas in Bracklesham bay underneath the sand there is black gunge.
Herstmonceux										Sediments at Sovereign Harbour smell bad, probably due to the discharge of sewage to the West of the harbour.
Lancing										It stinks! This leads many to suspect it is raw sewage
Peacehaven										I've noticed the lack of life both before and after dumping of the shingle often when prevailing winds n tides wash it all in
Selsey										It's killing inshore sealife
Shoreham										Smelly
Shoreham by sea										To much of it their is no reason in this day and age to dump sediment within 5 Kilometers of the shore. it all evolves around money cheapest
Shoreham-by-Sea										Chalky to the west of the area due to the trawlers going right down to the bed rock of chalk over the years.
Blank										Darkened the water, brown slick

Annex 4: Do you have any more information or evidence to shed light on your answer to Q14 (What do you think are the main sources of the sediment you've seen?)

Nearest town to respondent's home	Commercial sea fishing	Recreational sea fishing	Scuba diving	Free diving	Surfing/paddleboarding/kitesurfing/wind surfing/kayaking/rowing	Sea swimming	Rock pooling	Beach walking	Sailing	Open-Ended Response
Arundel										Are you considering beach management activities in this when large volumes of sediment may be moved or deposited on the beach?
Bognor Regis										Water quality is generally better and more fish inshore since bognor sewage pipe stopped discharging and the water temperature has increased over the years I believe this hampers the growth of seaweed in general
Bognor Regis										river arun was heavily polluted for a few weeks this year
Brighton & Hove										Yes. Video of silt pumping from the marina
Brighton & Hove										Sea sometimes milky
Brighton & Hove										It's a very public place to observe, the pipe is constantly there, over the East Harbour wall.
Brighton & Hove										There is more waste building materials, gravel, sand, cement on the beach since the construction of the i360 and seafront generation. Sitting on sections of the beach feels like sitting on a builders yard (especially in close proximity of the i360) and these materials end up in the sea due to the weather and land run off. The sea bed also seemed to have been significantly disturbed during the windfarm construction with significant levels of seaweed washed up on the beach and higher sediment levels.
Devizes										More vegetative life in and around the coastline, both in the water and on shore, would help to reduce the amount of silt build up. Onshore vegetation would help to keep the topsoil from being washed into the sea from rain and water run off. Having an increase in marine vegetation would allow more of this nutrient rich sediment to be absorbed and also pinned to the sea bed by root systems etc.
East Grinstead										I have lots of photographs of sediment variation from my study site in west wittering if it's useful
Eastbourne										Visual observation from above Beachy head to cuckmere haven. I walk this route 6+ times a year in all weathers.
Herstmonceux										The sediments sometimes smell sewage. Sometimes there is a strong sewage smell when sailing past the sewage treatment (is it even treated?) plant. This may have contributed to the disappearance of shrimps from Pevensy Bay (although the lugworms seem to like it)
Lancing										It's accumulating outside the kitesurf teaching zone at low tide in the rock pools/flint bed
Lancing										I rely on the Surfers Against Sewage pollution warning alert app., which compiles reports from other water users to produce an alert. The area I have outlined consistently triggers an alert every time there is significant rainfall and/or storms
London										Sediment disturbance from storms etc is somewhat unavoidable, but structure and kelp helps it settle faster.
Peacehaven										Just 30 yrs of my fishing and walking diaries
Selsey										It's choked the ground where I've already mentioned, the evidence is out there,
Shoreham by sea										Yes no regular inspections of the offshore sewage infrastructure.
Shoreham-by-Sea										Waste water dumped on dropping tide from east circles down to Shoreham arm before being pulled back across the Jennie Grounds cutting out the light stopping growth.
Blank										Only news reports on the activities of local water companies

Annex 5: Are there any impacts on marine species or habitats, fisheries, recreational activities, or human health that you believe are directly related to any changes in sediment levels or types you have observed?

Nearest town to respondent's home	Commercial sea fishing	Recreational sea fishing	Scuba diving	Free diving	Surfing/ paddle boarding/ kitesurfing/ wind surfing/ kayaking/ rowing	Sea swimming	Rock pooling	Beach walking	Sailing	Open-Ended Response
Arundel										No. Most scuba diving sites have not changed wrt to species and habitats seen.
Bognor Regis										Increased tidal flow Temperatures
Bognor Regis										fish observed dead on surface
Bognor Regis										I have been paddling and snorkelling in Pagham regularly every year since 2004, apart from a 7-year period when I lived in Hayling. Between 2008 when we left to 2015 when we came back, the biodiversity and health of the area has been slowly declining and it seems to have accelerated in the last few years. In 2009-10 there was a small kelp forest off-shore from the Pagham harbour mouth, that is long gone, and is now been replaced by seasonal stringy algae and mini-kelp that get covered by bio-growth very quickly due to excess nutrients and then dies off. The number and diversity of fishes and crabs has dropped noticeably, with large crabs and even small lobsters being a common occurrence around 2010-12, now the area next to harbour mouth all the way to my last marked point in Google are a biological desert, just rock, sand and mud, and perversely, in summer last year I paddled into a rich garden of green lettuce algae kept by rock crabs, located on the near-shore side of Bognor Rocks, which I suspect got a 'helping' hand from the Southern sewage discharge nearby.
Brighton & Hove										I fish here every day. Over the last 12 months I have been upset by the amount of dredging silt dumped inshore.... Especially as I watch the tides push it straight back
Brighton & Hove										I have heard from others who fish and have been here for 30 years that the sediment is increased and the fish have decreased.
Brighton & Hove										When running Beach Schools with SWT, the sediment makes rockpooling less safe for children. the sediment also mixes with sewage and leads to it depositing on the rockpools. sediment deposition seems to be associated with a decrease in fauna abundance and diversity.
Brighton & Hove										All marine life over the reef has reduced but the most noticeable are the lack of lobsters inhabiting the gully's and crevices in the rockpools that are now regularly full of silt.
Brighton & Hove										Harder to see when swimming crawl and negative impact on my flat's plumbing and washing machine....
Brighton & Hove										Used to spend a lot of time in rockpools East of the Brighton Marina, many of the good rockpools for collecting decent sized prawns for bait have completely filled with silt (there's a pipe that dumps sediment within 400 metres of the shore, from the mariner). Crabs have also been noticed as very much in decline.
Brighton & Hove										Most rock and rock pools are covered in silt and most rock pool species are affected and struggle to breathe
Brighton & Hove										Overflow pipes continually pumping raw sewage into sea
Chichester										Chichester harbour is now permanently overrun/suffocated by algae. It used to die back in the winter, I believe (along with the larger seal colony) this has caused the Flounder population to be decimated.
Crawley										I don't think I've ever seen any fish in that stretch of water, and I haven't seen many dead fish on the shore line. I don't often see cetaceans on the south coast, either (the odd grey seal but rarely, and never a herd). Compared to Cornwall or Scotland, its pretty devoid of marine life generally.
Croydon										The recreational shore fishing is better when the sediment levels are low.
Devizes										Trawling destroying marine vegetation both directly and indirectly through the marine animals it removes from the ecosystem on a large scale. And an decrease of land use for agriculture close to the shore line. More and more housing and land is too expensive to farm for example close to the shore in many places, Brighton for example. Land close to shore has been cleared for humans.
East Grinstead										Yes. I believe the sediment is now the overriding factor determining kelp location and depth.
Eastbourne										Judging by the suspended sediment in outer Sovereign Harbour, harbour dredging seems to be significant at a local
Gay street										Crabs and lobsters
Guildford										The sediment carries an awful smell and can be harmful to kids and swimmers. At Bognor and Selsey the reef gets covered in the stuff and fish life seems to dwindle.
Hailsham										Beam trawling too close to the shore line
Hassocks										Reduced diversity in some area, probably; analysis of Seasearch data required.
Hastings										The sea foam that appears regularly appears full of detergent rather than naturally occurring.
Havant										human made coastal barriers may cause sediment concentrations
Havant										There is a distinct lack for marine life in Bracklesham bay and the Selsey area, the lobster and crab population has been devastated by over fishing and possibly marine pollutants, very few flat fish are seen and only a handful of bottom dwellers exist in the mud.
Heathfield										No longer able to swim in clear water, Sedimentary levels giving rise to additional needs of dredging to clear harbour ways. Brighton Marina being a prime example
Herstmonceux										Reduction of crustaceans due to loss of habitat. Subsequent reduction of fish species which used to prey on the shrimps and prawns. Sewage smell from Eastbourne treatment plant.
Horley										Any sediment that lays for any length of time is detrimental to the bottom ecology, including plants and animals. Sewage dumping which is on the rise, produces toxic sediment loaded with deadly chemicals, viruses and bacteria, and when mixed with natural sediment produces a dangerous environment for all, including us.
Lancing										The granite gathering in the rock pools could be considered a health and safety risk for water uses when it is submerged at shallow heights of the tide
Lancing										Anecdotaly, many regular water users get sick if they are in the water here after a storm. Typical are streptococcal infections in the ear and gastro-intestinal complaints. It's grudgingly considered an occupational hazard for anyone who is regularly immersed in the sea around our coast
Iewes										reduced visibility swimming, enjoying marine nature
Littlehampton										Soft corals and filter feeders are easily smothered by large sediment deposits and they don't recover quickly
Littlehampton										The silt blocks out sunlight and decreases the oxygen. Coating breeding areas and nesting sits moving fish that have been coming to this area for years to other areas. Large patches of coloured water pass over the kingmere rocks area and the owens bank every year and is getting worse.
London										Sediment reduces visibility for freediving, and changes the amount and type of marine life: the presence of different species depends on their requirements of kelp and visibility (and suspended sediment destroys both)
Newhaven										SouthEast Water storm water (sewage) run off must have an impact on marine life, sea simmer and surfer health as well as promote phytoplankton blooms. I have felt unwell after swimming in Brighton Bay more than a few times. An example, of how sewage can affect the marine life we eat can be found, here: https://www.theguardian.com/lifeandstyle/2011/dec/05/fat-duck-restaurant-norovirus-outbreak
Peacehaven										Fish numbers caught when angling reduce significantly
Peacehaven										I have been rock pooling and fishing and keeping diaries here since 1998
Portsmouth										Increased sediment is unlikely to be caused by trawling because trawling has never taken place off Selsey Bill. Trawling has taken place in an area known as the Park that lies east of Selsey, but most fishing in potting, or
Pulborough										Sea fishing (Angling) from sussex coastline in the area of Shoreham, Littlehampton and elsewhere, is terrible these days. There are no fish left, not even mackerel! Where have the fish gone? I believe their habitats have
Rustington										If anemones are covered in sand, I assume there is a limited time they can survive.
Seaford										Southern Water dumping untreated sewage into the rivers
Selsey										Over 17 years we have been diving along the shore at Selsey a noticeable decline in Lobsters and Crabs plus fish species. The closer you get to the shore the worse it is.
Selsey										It's killing/killed marine life
Shoreham by sea										Lack of light has effected the whole area over the last thirty years and ear infections have increased dramatically in the past few years amongst the public using the sea.
Shoreham by sea										Visibility inshore when scuba diving has decreased
Shoreham-by-Sea										Worm beds in West Sussex have been decimated with a decline in sperm beds (sand beds) through the loss of the Kelp forest.
Shoreham-by-Sea										A lot more ear infections amongst water users and the suffocation of growing mussel beds in the spring months.
Steyning										See above information. The variety and abundance of marine life on the reef seems to have significantly decreased. I do not know if there is a causal relationship with the increased sediment levels, but it does seem a
Worthing										Raw sewage
Blank										Lack of dredging in Cuckmere. Sewage pollution

Annex 6: Do you have any other observations or thoughts on the sources and impacts of sediment in Sussex coastal waters that you would like to share?

Nearest town to respondent's home	Commercial sea fishing	Recreational sea fishing	Scuba diving	Free diving	Surfing/paddleboarding/kitesurfing/wind surfing/kayaking/rowing	Sea swimming	Rock pooling	Beach walking	Sailing	Open-Ended Response
Open-Ended Response										Open-Ended Response
Bognor Regis										as said previously shingle movement
Bognor Regis										The big local sources of sediment and nutrients impairing water quality in Pagham are simple: industrial farming in the land at the back of the village, and Southern Water discharging sewage
Brighton & Hove										Im sure plastic refuse has an impact too
Brighton & Hove										I hope to learn more and that the shoreline and seabed is protected
Brighton & Hove										I am saddened by Southern water consistently dumping sewage in the sea. They pay the huge fine imposed, then do it again.
Brighton & Hove										I'm quite sure it's worse for the fish than for me!
Chichester										There is no weed growing off of selsey or through the moorings where the fishing boats moor up , ie , kelp weed , lace weed . We notice there is no weed on our lobster pots after a gale of wind , because it doesn't grow , it's not towed away by trawlers .
Crawley										I'm not sure about sediment on its own, but the health of the sea seems pretty poor in the areas I visit. I wonder how much impact the regular sewage dumps have, and I really wish the MOD would do something about the state of the broken invasion defences on clymping beach- they're a real hazard and they're contributing to the poor health of the coastline. We have work to do.
gay street										dredging aggregate has had a detrimental effect on cancer pegasus since the 70s. i believe that the capital dredging of portsmouth for the aircraft carriers and the southampton container ships has had a catastrophic affect on the local ecology now stretching as far as dungeness. when they started dredging aggregate near the owers the first year we caught a lot more crab and then disaster, when they started at shingle bank the same thing happened.
Hailsham										Too many large boats fishing too close to the shore.
HASTINGS										Raw sewage being dumped from CSOs at West St Leonards and Pelham
Hastings										I notice very small tufts of kelp growing on the sea bed at Pett Level nearer and nearer the nature reserve. The beach is quite protected by Groynes and has less human activity.
Havant										Dumping spoil at NAB should stop, just because you can does not mean you should in this day and age.
Herstmonceux										There is definitely more sediment build up in Pevensey Bay and this is constantly stirred up by trawlers. There are more trawlers off of Eastbourne now as the exclusion zone is narrower there. Some trawlers have relocated from Brighton to Eastbourne because of this.
Horley										I suspect that the cliffs falls that seem to have increased along with the weather trend of windier wetter weather, are responsible for the apparent rise in the particle suspension and cloudy seas we observe every ebb tide from Brighton to West of Little Hampton. This changing weather pattern is also responsible for the heavy silt laden waters after heavy rain, of our major rivers that discharge along our coast from Cuckmere Haven in the East to The Arun in the West.
Lancing										When the pipe was removed from Brookland's it became very evident that the longshore drift effect became stronger. The evidence of this is natural sand being washed away with the low tide exposing flint bed. Also the pace in which the shape of the shingle beaches change through the season is so much quicker. The granite groins are disappearing into the sea through storms
Littlehampton										Too much dumping of spoils back of Isle of Wight and dredging in owers area..
London										It's early days, it will take a long time to see significant changes along most of the sandy areas of seabed.
Peacehaven										I accept that the dredging needs to take place but think a better solution needs to be found for dumping the sediment, possibly just further out to sea.
Rustington										Southern Water allowing discharges into the sea. Not sediment as such, but evidence is washed up on the beach daily, mostly in the form of decaying and bits of sanitary products.
Selsey										Various factors, when I started fishing in 1975 those years and for about the next twenty there was lots of kelp on the rock. Kelp grows on rock & is knocked off and dies each year helped by the storms in the fall, just as trees do, it grows again in the spring. Trawlers don't tow on the rock, nothing to do with trawling, very little has been going on for last twenty years. It's pollution. We shall see or rather not, how the kelp grows....
Shoreham by sea										As soon as the sediment decreases we are finding dramatic increases in the growth of Kelp and other plant life. Light makes life in the sea.
Shoreham-by-Sea										Nothing should be dumped within 4 ks of the shore. After that the natural easterly flow in the channel will take it away from the shore. The scallop trawlers are taking hundreds of tons a year further out to sea and scallops are all filter feeders cleaning the sea.
Worthing										Dredging for beach nourishment is an issue, run off and possibly dredging around Chichester Harbour. Suspension of sediments from the construction of the wind farm(s). Can this be offset by construction of reefs around the farms?