Agenda item B7

From: Philip Haupt, Lead Science and Conservation Officer

To: Kent and Essex Inshore Fisheries and Conservation Authority – 21 November 2023

Subject: North Kent Coast whelk mortality event monitoring update

Classification: **Unrestricted**

Summary:
This report updates Members on the investigation of the significant whelk mortality event that occurred in the late summer of 2022.

Recommendation:
Members are asked to **NOTE** the report.

Introduction

A significant mortality event of whelks (*Buccinium undatum*) occurred in the subtidal waters of the of the North Kent Coast during the late summer of 2022. Here we report on the results from the whelk population and water temperature monitoring programme that was implemented by KEIFCA in May 2023, and briefly reflect on the whelk fishery landings following this event.

Background

Throughout the late summer and autumn of 2022, KEIFCA received a steadily increasing number of reports of moribund and dead whelks from fishers fishing on the shallow subtidal seabed off the North Kent Coast. There was a concurrent drop in whelk landings in this part of the district, and visual inspection of whelks brought to port by KEIFCA Officers confirmed that whelks caught were moribund or dead.

Initial investigations included a wide variety of possible causes, including toxicology, disease, water quality and water temperature. In the summer of 2022, water temperature was abnormally high and sustained for several weeks (Marine Heat Wave), which either alone or in combination with other stressors like disease, was identified as a potential driver of this mortality event in 2022 with the strongest evidence.

In May 2023, KEIFCA and fishers from Whitstable Harbour initiated a mark-and-recapture programme to monitor the whelk population and water temperature over the summer of 2023 at two locations offshore from, 1) Whitstable (the core of the affected area), and 2) Margate (at the edge of the affected area).

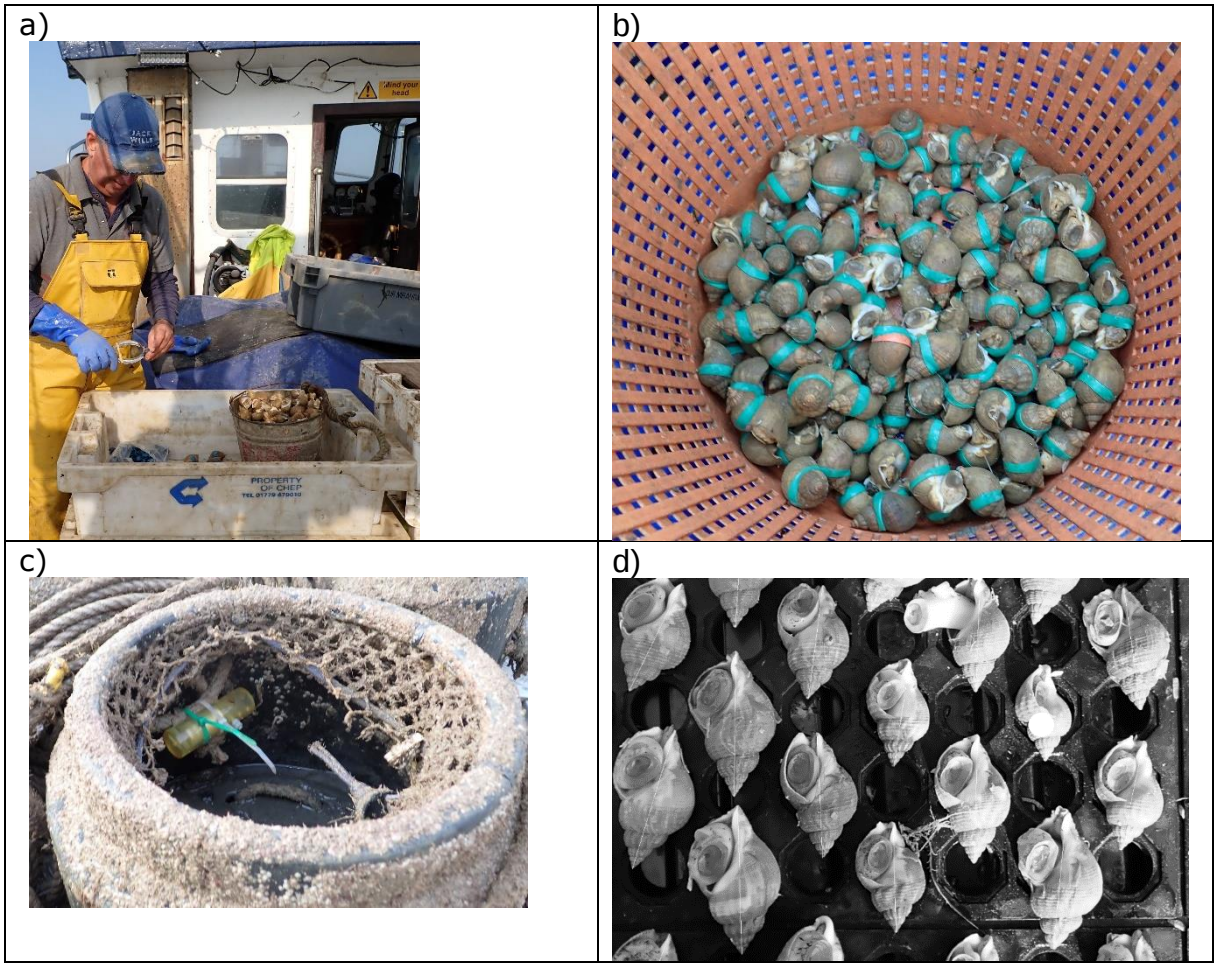

Figure 1. (a) Whitstable fishermen marking whelks during the mark and recapture study on fishing vessel, Suvera, (b) marked whelks, (c) water temperature data logger in whelk pot, and (d) size measurements being recorded from photographs taken of captured whelks using ImageJ software.

Results: Whelk population monitoring

The results from the mark and recapture programme showed that:

1) Extremely low numbers of whelks were caught (two from ten pots) during two separate trials at the core of the affected area. Capture rates at Whitstable were too low for further analysis but showed that numbers were extremely low during the summer of 2023.

2) Comparatively high numbers of whelks (3669 from ten pots) were caught (and marked) at the edge of the affected area (Margate) over three sampling occasions. The recapture rate of marked individuals was ~7 %.

3) Whelk densities at Margate were determined as approx. 1.5 – 3.2 individuals/m^2, based on an estimated bait attraction range of 30 – 50 m radius around sampling stations.

Results: Water temperature

We recorded water temperature at the seabed from May 2023 and are continuing to log data every 15 minutes at both sites.

Water temperature at seabed:

1) Water temperatures as high as 22° C were recorded during the early part of the Marine Heat Wave (MHW) in June 2023 (Figure 2),

2) Water temperature then dropped back down and fluctuation between approx. 18 - 19° C for most of July and August 2023.

3) Higher water temperature (22° C) briefly returned in late-August, but dropped back down (18° C) after a few days, and recently dropped further to 11° C by 6 November over the last three weeks.

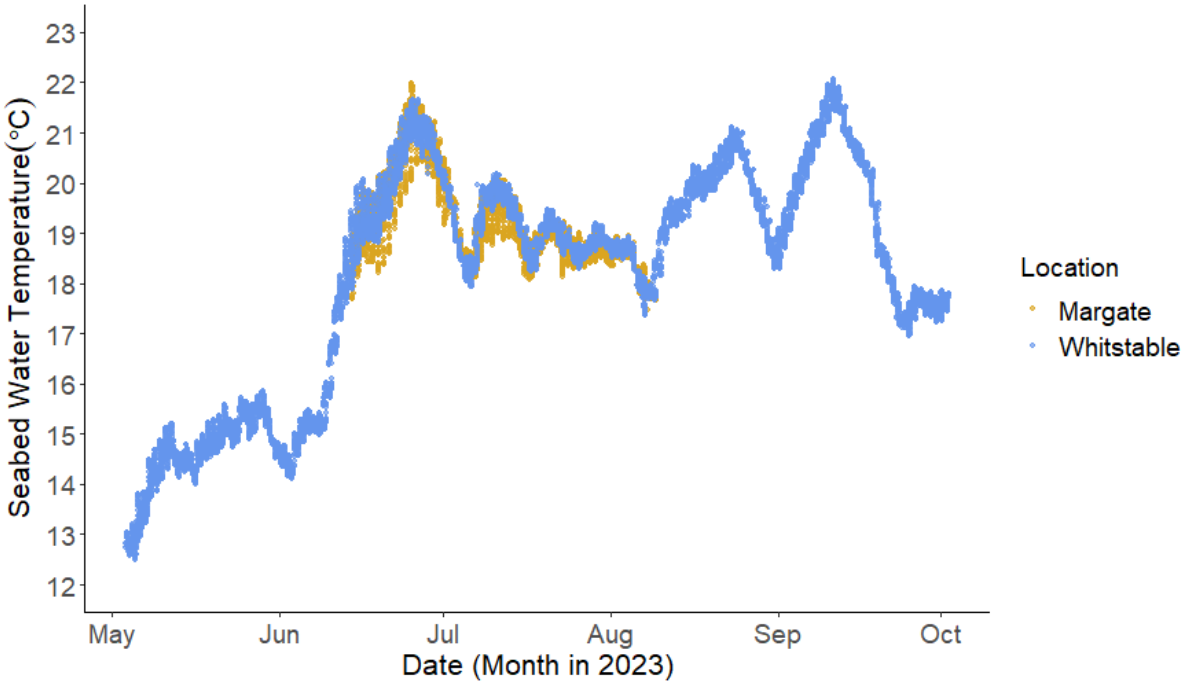

Figure 2. Water temperature time series from data loggers in whelk pots at Whitstable and Margate.

Sea surface temperature (SST):

Sea surface temperature (SST) data recorded by satellites in the affected area near Whitstable in the summer (between June and September) 2007 and 2023 confirmed that:

4) Water temperature in 2022 was extremely high: Average summer water temperature in 2022 was (~1.7° C) above long-term average summer water temperature (2007 – 2021).

5) Water temperature in 2023 was warmer than usual, but not as hot as 2022: Average summer water temperature was cooler in 2023 than in 2022, however, it was still warmer (~0.8° C) than the long-term average summer water temperature.

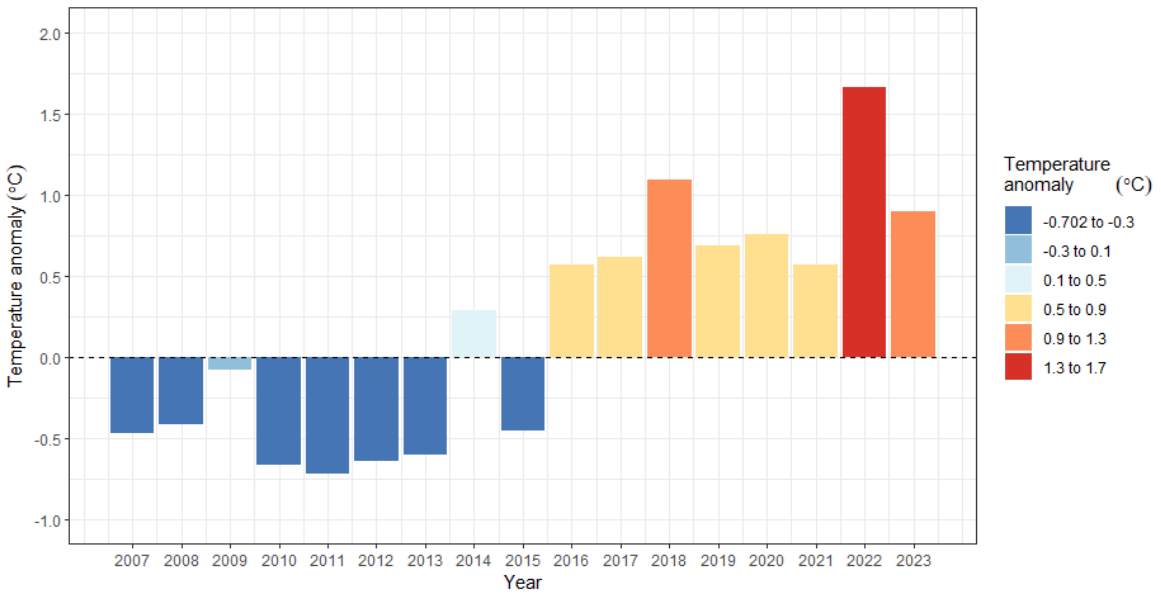

Figure 3. Summer (June – Sept) mean sea surface temperature (SST) anomaly (variation above or below the mean) for each year since 2007. The long-term average represents the mean water temperature between 2007 – 2021. The bars show the variation in degrees Celsius for a given year's mean summer water temperature from the long-term mean summer water temperature.

1) Whelk catches (tonnes of whelks caught - Figure 4) were substantially below average in whelk fishing Area 2 throughout 2023.
2) Summer is traditionally the slower time for whelk fishing in Area 2, but 2022 and 2023 were exceptionally quiet.
3) There are indications of a geographical shift away from high catches made off the Isle of Sheppey.

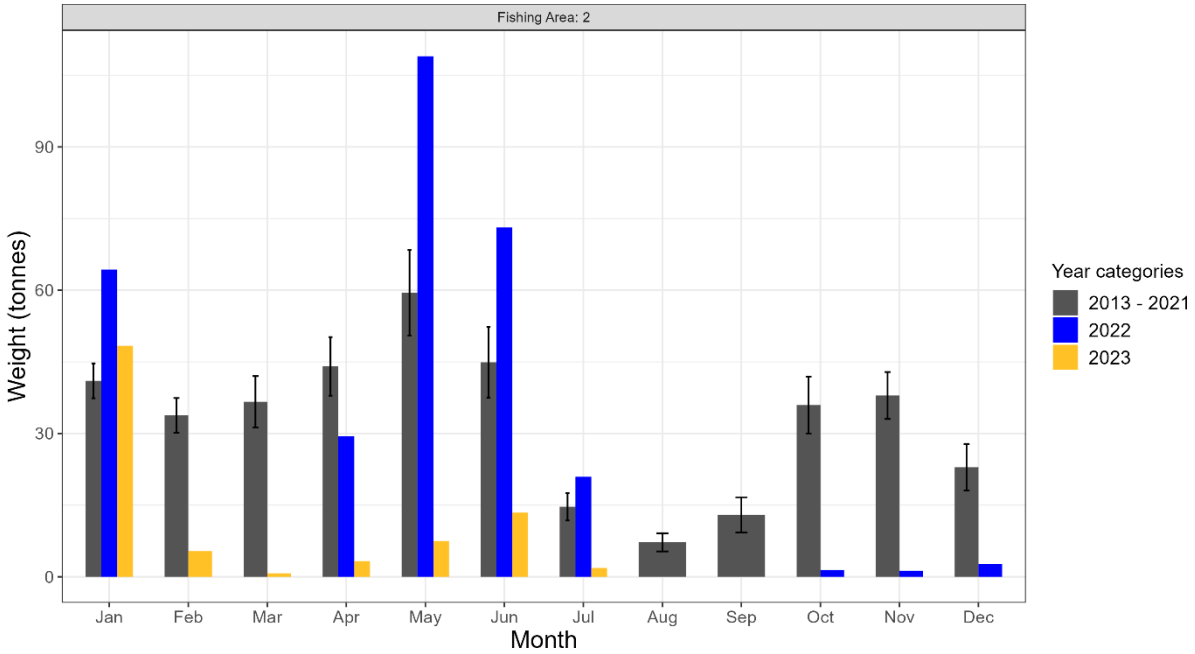

Figure 4. Long-term mean monthly total weights (tonnes) of whelks landed Jan-Dec 2013-2021 (grey) compared to the total monthly weights (tonnes) landed Jan-Dec 2022 (blue) and 2023 (yellow), in Whelk Management Area 2. (Missing data: Feb, Mar 2022).

Conclusion

We concluded that:

1) Catches and mark-recapture data showed that whelk abundance in Area 2 was still below average in 2023, but we did not see the significant drops that we saw in 2022. At present there is no evidence of a drop in the whelk population on the North Kent coast in 2023. While there was variation in number of whelks caught, it was in-line with expected fluctuation in response to seasonal variation.
2) We did not receive reports from fishermen of similar moribund or dead whelks in pots so far this year. However, the effects of the 2022 mortality event were only fully registered in the late autumn of 2022 and reports extended into November. While we are not expecting a mortality event, it will only be by winter (December/January), that we will know with greater certainty how whelk populations have responded over the course of 2023 summer.
3) The whelk population appears to have started re-establishing itself in 2023 in Area 2:
    a. Presence of whelk in core of affected area was recorded: While whelk abundance or catches at the core of the affected area has not yet returned to former abundance, and is still largely avoided by whelk fishers, the presence of whelks in certain patches near the Isle of Sheppey and near the Kentish Flats windfarm has been recorded by KEIFCA and was substantiated by local fishers.
    b. A sustained population abundance was recorded at the edge of the affected area: The comparatively high levels of catches at the edge of the affected area (in the mark and recapture study) suggests that the whelk population may have been less severely affected here than the population near the core of the incident. Whelks at the edge of the affected area may have had more opportunity to move away to deeper colder waters during the event and could subsequently have returned.
    c. Local fishers have started fishing areas in the edge of the affected area again recently and have said that while catches were not as good as it had previously been, some patches are worth fishing again.
4) While high water temperatures were recorded in the summer of 2023, they were not sustained for the same long periods as in 2022. There were 24 days in total at or above 20° C in 2023 compared to 2022 where there were 63 days at or above 20° C. The slightly cooler water temperatures experienced in 2023 may have meant that whelks avoided chronic thermal stress this summer but will report back again in January to confirm.

Engagement & communication

We have been working closely with Whitstable whelk fishers throughout the summer of 2023, collaborating in data collection, updating the fishers, the secretary and chairman of the Whitstable Fishermen's Association on developments of the research and monitoring programme and feeding back disease screening information when we received from the Fish Health Inspectorate. We were asked to contribute a newspaper article to Fishing News by their Editor which was published at the end of June 2023.

The results and conclusions from the study are to be provided to, Rosie Duffield (MP Whitstable) and DEFRA at a meeting currently planned (at the time of writing) in November 2023. Natural England, CEFAS and academic partners have also been updated on developments.

Coastal Health Livelihoods Programme
Government has recognised that that there is a need to develop a strategy for dealing with emerging diseases in wild populations, enable early detection and prediction of these events which will allow a well-coordinated response that aims to minimise the impacts of such events. The Coastal Health Livelihoods Programme was set up for the development of strategy and response framework from where a coordinated, multi-disciplinary investigation can take place to identify causal factors, with the hope to aid future avoidance and provide mitigation. It is a multi-year programme, and North-Eastern IFCA and Kent and Essex IFCA have so far agreed to be engaged in this DEFRA led project.

KEIFCA recognises that the Programme is a potential funding stream to support the development of a local response framework to manage emerging marine wildlife crisis. This would address an organisational need that was identified in the Authority meeting in January 2023 – which was the need to better develop a response plan to deal with future events like the whelk mortality in 2022.

The Association of IFCAs (AIFCA) identified the situation with whelks in Kent as such an event (along with the crab mortality event in the Tees) as two cases where such a plan would have been useful to IFCAs and recognises that there are lessons to be learnt from how the IFCAs dealt with these situations. By drawing on the lessons learnt and expanding on the process that we implemented during the whelk mortality event, we hope to provide a case study to inform the development of such a framework and strategy with project partners. The whelk mortality event is a suitable case study first to inform the framework, and this programme creates the opportunity for us to further develop our internal process to deal with situations like this, that will then be reframed to help inform local response strategy nationally.

Planned future work:
In 2023 and 2024 we plan to

1) Resume our mark-recapture study to monitor the subsequent change to the whelk population in winter of 2023, and again May 2024.
2) Continue recording water temperatures at the two sites throughout the year and expand the spatial coverage in the district in collaboration with Kings College London.
3) Collaborate with Essex University on an empirical study to assess whelk thermal tolerance to better understand the role of water temperature and marine heatwaves as a driver of mortality.
4) Participate in the Coastal Health Livelihoods Programme, to develop a response strategy and further investigative work such as mark-and-recapture, and toxicology and histology analysis.
5) Continue close monitoring of whelk condition and get more whelks tested (toxicology and histology) by Fish Health Inspectorate (FHI- CEFAS).

Recommendation:
Members are asked to **NOTE** the report.