

Agenda item B3

From: Lead Scientific and Conservation Officer

To: Kent and Essex Inshore Fisheries and Conservation Authority – 26 November 2021

Subject: Update on native oyster projects

## Classification: **Unrestricted**

## Summary:

This report provides a review of the status of the native oyster stock based on the 2019 survey because the 2020 and 2021 spring oyster stock assessment surveys could not be completed due to the COVID-19 situation. The management, stakeholder engagement and future research plans are briefly stated, and Members are asked to review and approve the recommendations for management.

## Recommendation(s):

The Authority is asked to **APPROVE** the following management measures:

- (a) the Blackwater, Crouch, Roach and Colne Estuaries (BCRC) MCZ Native Oyster Fishery remains closed in 2021/2022 as there was no evidence of sustained levels recovery in native oyster populations in Blackwater, Crouch, Roach and Colne Estuaries in 2019 (KEIFCA 2019 Oyster Survey Report) and the projected time required to achieve these levels is highly unlikely within two years.
- (b) KEIFCA will endeavor to undertake the annual survey in 2022 to inform the November 2022 KEIFCA meeting when consideration will be given to the future management and opening of the native oyster fishery within the BCRC MCZ site.

## 1. Management

## Background

The native oyster fishery in the Blackwater, Crouch, Roach and Colne Estuaries Marine Conservation Zone (BCRC MCZ) was closed on 31<sup>st</sup> May 2015. Subsequently the BCRC MCZ Native Oyster Fishery Flexible Permit Byelaw came into effect in 2019. The purpose of this flexible permit byelaw is to continue the protection afforded to the depleted native oyster stocks in the BCRC MCZ. The byelaw provides the opportunity for native oysters to recover from fishing pressure while retaining the option to open the fishery when stocks are deemed to show a significant and sustained recovery in the future. For the BCRC MCZ oyster fishery to be considered for re-opening stock levels are required to satisfy two criteria 1) an estimated biomass exceeding 800 tonnes and 2) a sustained recovery trend. The committee approved the decision to keep the native oyster fishery in the BCRC MCZ closed in 2019 and again in 2020 based on the survey data collected between 2016 and 2019. The survey data last reported on in 2019, and the 2016 – 2018 data formed the basis for Dr Lown's PhD project, in which recovery times and stock estimates were presented. This evidence was used to inform the Authority of the stock status and population growth trends. Based on this evidence the Authority decided to keep the fishery closed (Figure 1).



Figure 1. Decision tree describing the process used to open or close the fishery

In 2021, no new evidence is presented because the annual oyster surveys could not be completed due to the restrictions imposed by the COVID-19 pandemic. Although twelve sampling stations were surveyed in 2020 just before the first lockdown measures were imposed, these are too few data points to inform new meaningful conclusions at this time.

Consequently, the survey data collected up to 2019 and Dr Lown's PhD thesis and resulting peer review publications remains the best available evidence to underpin responsible decisions supporting a sustainable native oyster fishery for the BCRC MCZ. The intention will be to undertake a survey as normal for 2022/2023 which will help inform future management.

## Biomass and population trends (2016 – 2019)

Dr Lown's work showed that the mean native oyster biomass estimates ranged between 134 tonnes to 412.5 tonnes over the study period (2016-2018) and were consequently well below the 800-ton requirement. Her work also showed the patchy nature of the stock, with the majority of the population concentrated to a few small areas, leaving the stock vulnerable to overfishing.

KEIFCA's annual survey results show that there has not been a sufficient increase in oyster stock density (density is used biomass calculations) to suggest that there has been a sustained trend in the MCZ overall since 2015.



Figure 2. Mean number of native oysters ( $\pm$  standard errors) per sample between 2016 and 2019.

## Population structure

Understanding the population structure is useful because it provides indications of potential for population growth and identifies bottlenecks to recovery of populations. An expanding population will have large cohorts of smaller/younger individuals being recruited into the population, and thus have many more small individuals in the population, than older larger ones.

A total of 596 native oysters were found from 99 dredge tows during the 2019 survey. The constrictive shape of the population size-class graph may suggest an elderly shrinking population: Size classes of oysters found in the MCZ in 2019 showed a lack of smaller individuals, with only 22 out of 596 oysters measuring below 39 mm shell length suggesting that recruitment success was low (Figure 3). Spatfall is a critical driver of population growth and is known to be highly variable between years in native oysters, and important to inform our understanding of the long-term status of the oyster population in the BCRC. Lown suggested that oyster population densities may have fallen below a critical threshold, where fertilization is compromised leading to low levels recruitment into the population. This finding

supports the work that ENORI is doing on promoting our understanding of recruitment dynamics in oyster populations.



*Figure 3. Size distribution of oysters in caught from research surveys in BCRC MCZ from 2019 survey results. Dashed line shows the mean size of oysters.* 

Dr Lown developed an Integrated Population Model (IPM) which predicts the recovery of the native oyster stock in the BCRC MCZ using parameters such as population size, recruitment, survival, growth, fecundity among others and is the best available tool to understand the native oyster population in the BCRC at the present point in time. The current predictions estimate a population doubling time over a minimum of 16 years (since publication), at which point a sustainable fishery could operate at 5% off take from the local population on an annual basis.

The IPM therefore supports KEIFCA's findings that overall, there is no evidence of a significant and sustained increase in the overall population of native oysters and further recovery is needed before opening a native oyster fishery.

## Conclusion

There was no evidence of a significant and sustained recovery of native oysters in the BCRC MCZ, and therefore the conclusion is that the fishery is to remain closed to allow time for a recovery of the depleted native oyster populations in the BCRC MCZ. Consequently, no Habitat Regulations Assessment or MCZ equivalent were carried out and under the byelaw it was therefore determined that the fishery was to remain closed.

## 2. ENORI

KEIFCA has continued to engage in ENORI meetings during 2021, which were hosted via online media platforms. Highlights from ENORI work programme for 2021 include continued monitoring of oyster numbers in the restoration areas. In

May 2021, 750 tonnes of gravel and shell cultch was laid down in the restoration area to study (and increase) oyster recruitment success within different substrata. ENORI has expressed keen interest in KEIFCA's continued long term monitoring programme of native oysters in the BCRC MCZ to help place their work in context of the wider native oyster population.

## 3. Anglian water – CEFAS oyster survey work

KEIFCA assisted CEFAS with survey work for Anglian water, who are collecting data on oysters (native and Pacific) as indicator species for hydrocarbon pollutants. KEIFCA supplied CEFAS with heat maps (based on density measures) of native and Pacific oyster densities from our 2016 to 2019 survey data, which CEFAS has used in turn to inform their survey design. FPV Tamesis was used to collect variable length dredge samples from X number of sites. Dale Belbin and CEFAS joined KEIFCA on surveys, collecting 10 oysters per sampling site along with water, sediment samples. Data are being analysed and the surveys will be repeated in March 2022 to supplement the Autumn survey with data from spring.



Figure 4. Native oyster density heatmap in the BCRC from KEIFCA 2016 - 2018 survey data.



Figure 5. Anglian water oyster survey aboard FPV Tamesis

## 4. Essex University

Essex University and Natural England, with Mersea Native Oyster company onboard, embarked on a study to assess the efficiency of dredging for oysters. In this study they cleared an area of oysters, and then returned oysters to a known density whereafter the efficiency of dredging can be assessed by repeating dredge passes over an area until it was depleted again. KEIFCA has lent the university its oyster dredge for the purposes of this study. Results have not yet been made available.

## 5. Natural England

Natural England commissioned a study carried out by Dr Pheline Zu Ermgassen and Thomas Cameron to review the appropriateness of the OSPAR definition of a native "oyster bed". The review included characteristics such as abundance, patch size, and population structure among other characteristics, and is currently in final draft before being circulated wider.

## 6. Bradwell B

KEIFCA is participating as a stakeholder in the Bradwell B consultation process feeding information into the design and survey process in efforts to minimize conflict between fishers and Bradwell B development Co. Bradwell B is in the early stages of development and has now concluded its first round of public consultation on its proposals in 2020. Currently the development is progressing its engineering feasibility assessments, specifically with respect to the reactor technology that they are planning to use.

# 7. Planned work for 2021/2022 and 2022/2023

Two planned pieces of research for 2022/23 includes 1) the annual survey, 2) a collaborative Industry/ KEIFCA project. However, it should be noted that all survey plans are subject to change brought about by the limitations that health and safety restrictions may impose on our ability to work at sea during the COVID-19 pandemic.

# 7.1 Annual survey

The annual native oyster surveys are planned for March 2022 when KEIFCA intends to carry out the annual survey over a larger area of the BCRC MCZ. During this survey all the sites surveyed in 2014 will be revisited. The last native oyster survey that covered the entire extent of the BCRC MCZ was carried out in 2014 while subsequent surveys (2015 - 2019) only included sites where oysters were found in 2014. Survey planning will consult with Essex University to make the most of the data gathered.

# 7.2 Collaborative survey with oystermen

## 8. Collaborative oyster fishermen survey

KEIFCA and oystermen have hoped to carry out a collaborative survey using variable length tows of oyster dredge equipment to review if dredge tow lengths are suitable for assessing oyster stocks. The survey had yet again to be postponed in 2021 owing to the COVID situation.

The aim of these collaborative surveys is to supplement the data obtained from existing annual surveys, from which it is clear that oysters have a patchy distribution which may therefore require higher levels of sampling to detect accurate measures. Furthermore, it shows a willingness from KEIFCA and the industry to collaborate to better understand the spatial and abundance patterns of the species. We remain hopeful that KEIFCA can engage in these surveys in 2022.

## 2021 Fishery Management Recommendations

The Authority is asked to **APPROVE** the following management measures:

(a) the Blackwater, Crouch, Roach and Colne Estuaries MCZ Native Oyster Fishery remains closed in 2021/2022 as there was no evidence of sustained levels recovery in native oyster populations in Blackwater, Crouch, Roach and Colne Estuaries (KEIFCA 2019 Oyster Survey Report);

(b) KEIFCA will endeavor to carry out the annual oyster survey in 2022 to inform the November 2022 KEIFCA meeting when consideration will be given to the future management and opening of the native oyster fishery within the BCRC MCZ site.