# Cromer Shoal Chalk Beds Marine Conservation Zone Education Pack

When the Marine Conservation Society's Agents of Change project consulted local people about the Cromer Shoal Chalk Beds Marine Conservation Zone (MCZ), it found that raising awareness of the MCZ and educating local people about it was considered very important. These resources have been produced to aid primary school teachers to do just that!

## Why use these resources?

The MCZ provides a real-life context to teach a range of subjects across the curriculum. There is a fascinating world hidden below the surface of this popular seaside area: an amazing rare chalk reef, wonderful wildlife and Cromer crabs. This pack contains teaching ideas and resources for learning about them, the local landscape and the people that interact with it. If you can visit the coast here, it will really bring their learning to life!

## How do I use them?

The pack contains a mixture of lesson ideas and resources under different themes. The MCZ provides a great focus for a topic in its own right, or you can dip into the resources for use in specific subjects. The overview shows you the National Curriculum objectives that can be covered under each theme so is a good starting point.

MARINE CONSERVATION SOCIETY

NORFOLK COAST
AREA OF OUTSTANDING NATURAL BEAUTY

seafarers UK
Supporting the maritime community

The Wash and North Norfolk Marine Partnership
Protecting Nature and Culture

Life

# Cromer Shoal Chalk Beds Marine Conservation Zone National Curriculum links

Ages 7-11

## Local Geography

**Geography:**

Describe and understand key aspects of:

human geography, including: types of settlement and land use, economic activity including ~~trade links, and~~ the distribution of natural resources including energy~~, food, minerals and water~~

Use maps, ~~atlases, globes~~ and digital/computer mapping to locate countries and describe features studied

Use the eight points of a compass, four and six-figure grid references, symbols and key (including the use of Ordnance Survey maps) to build their knowledge of the United Kingdom and the wider world

**Citizenship**

That resources can be allocated in different ways and that these economic choices affect individuals, communities and the sustainability of the environment

## Local viewpoints & values

**Citizenship**

To reflect on spiritual, moral, social, and cultural issues, using imagination to understand other people's experiences

**Health Education**

That mental wellbeing is a normal part of daily life, in the same way as physical health

How to recognise and talk about their emotions, including having a varied vocabulary of words to use when talking about their own and others' feelings

The benefits of physical exercise, time outdoors, community participation, voluntary and service-based activity on mental wellbeing and happiness

## Wildlife (Science)

**Science**

**Year 3 Animals including humans:**

Identify that some animals have skeletons and muscles for support, protection and movement

**Year 4 Living things and their habitats:**

Recognise that living things can be grouped in a variety of ways

Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment

Recognise that environments can change and that this can sometimes pose dangers to living things

**Year 4 Animals including humans:**

Construct and interpret a variety of food chains, identifying producers, predators and prey

**Year 5 Living things and their habitats:**

Describe the life process of reproduction in some plants and animals.

**Year 6 Evolution and inheritance:**

Identify how animals and plants are adapted to suit their environment in different

ways and that adaptation may lead to evolution

**English**

Non-chronological reports - wildlife fact files

# Cromer Shoal Chalk Beds Marine Conservation Zone National Curriculum links

Ages 7-11

## Plastics

**Citizenship:**

To talk and write about their opinions, and explain their views, on issues that affect themselves and society

To face new challenges positively by collecting information, looking for help, making responsible choices, and taking action

To research, discuss and debate topical issues, problems and events

To recognise the role of voluntary, community and pressure groups

**Science**

**Year 4 Living things and their habitats:**

Recognise that environments can change and that this can sometimes pose dangers to living things

Construct and interpret a variety of food chains, identifying producers, predators and prey

**Year 5 Properties and changes of materials:**

Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency and response to magnets

Working scientifically - plan and carry out a fair test

**Geography:**

Name and locate counties and cities of the United Kingdom and key topographical features (coasts and rivers),

Describe and understand key aspects of rivers

**Art:**

To record their observations and use them to review and revisit ideas

To improve their mastery of art and design techniques, including drawing, painting and sculpture with a range of materials

**Maths:**

Interpret and present data using bar charts, pictograms and tables

Interpret and construct pie charts

**English**

Persuasive writing, narrative writing

## Fishing in the MCZ (Crab & Lobster)

**Design and Technology**

Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques

Understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed

**Geography**

Describe and understand key aspects of human geography, including: types of settlement and land use, economic activity including trade links, and the distribution of natural resources including energy, food, minerals and water

**Citizenship**

To research, discuss and debate topical issues, problems and events

Why and how rules and laws are made and enforced, why different rules are needed in different situations and how to take part in making and changing rules

To recognise the role of voluntary, community and pressure groups

# Cromer Shoal Chalk Beds Marine Conservation Zone National Curriculum links

Ages 7-11

## Beach safety

**Citizenship:**

To recognise the different risks in different situations and then decide how to behave responsibly

**Science Year 5:**

Describe the movement of the Earth relative to the Sun

Describe the movement of the Moon relative to the Earth

Describe the Sun, Earth and Moon as approximately spherical bodies

Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object

**Health education**

About safe and unsafe exposure to the sun, and how to reduce the risk of sun damage, including skin cancer

How to make a clear and efficient call to emergency services if necessary

**English:**

Explanation writing

## Other Maths & English ideas

**Maths:**

Data collection and handling

**English:**

Descriptive writing, recount, acrostic poems, speech punctuation

## Local History

**History:**

A local history study

## Rocks and fossils

**Science**

**Year 3 Rocks:**

Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.

**Year 6 Evolution and inheritance**

Recognise that living things have changed over time and that fossils provide

information about living things that inhabited the Earth millions of years ago

# Beach visit support

A visit to the coast near the Marine Conservation Zone will bring the learning to life. For students, standing on the beach looking at the sea and thinking about the wildlife they've learned about beneath the waves is awe inspiring! There are ideas for beach activities throughout the resources to support a self-led visit or you can gain support for a visit from the following:

## Norfolk Wildlife Trust

Rockpool and fossil sessions at West Runton: https://www.norfolkwildlifetrust.org.uk/discover-and-learn/teachers/sessions/primary-sessions

## Sheringham Learning, National Trust

Beach sessions including rockpooling and push netting. For more information contact: sheringhamlearning@nationaltrust.org.uk

# Field trip ideas

## Scavenger hunt

A great way to explore the beach is to get the children to complete a scavenger hunt. They could work in pairs or small groups to collect a variety of things. These might include something:

- Smooth
- Rough
- Hard
- Soft
- Shiny
- Dull
- Colourful
- Twisted
- Jagged
- With a hole in
- Man-made
- Dead
- Natural but never alive
- An interesting stone
- A shell/three different types of shell
- Seaweed/three different types of seaweed

## Land art or sand sculptures

Everyone loves building a sandcastle at the beach! Broaden it out into a sand sculpture, perhaps focusing on something you're learning, or create artworks using found materials.

Andy Goldsworthy can provide inspiration; he has made lots of artwork on the beach using pebbles. Check online to see his work.

# Rocks and Fossils

## Rocks

A wide variety of rock types can be found on beaches along the North Norfolk coast. At low tide, exposed chalk can be seen, with large flints embedded. The cliffs are sedimentary, so they erode relatively quickly. Discuss the safety aspect of this and why they should stay away from the cliffs.

In teams, get the children to collect as many different looking rocks as they can.

Can they identify any of them?

Can they group them into rocks that look similar?

Can they group them into rocks that have been formed in a similar way: sedimentary, metamorphic and igneous?

Gather the group together to go through their rocks and sort into the three groups.

See video for a quick explanation: bbc.co.uk/bitesize/topics/z9bbkqt/articles/zsgkdmn

This website shows examples of the different types of rock: geolsoc.org.uk/ks3/gsl/education/resources/rockcycle/page3445.html

Printable fact sheet here: geolsoc.org.uk/~/media/shared/documents/education%20and%20careers/Resources/FactSheets/Rock%20cycle%20factsheet%20draft%20KS2%20v2/Rock%20cycle%20factsheet%20FINAL.pdf?la=en

The Field Studies Council has a comprehensive photo guide for different rock types here: field-studies-council.org/shop/publications/rocks-guide/

## Fossils

The North Norfolk Deep History Coast is well known for its fossils, particularly the West Runton Mammoth.

Visit Cromer Museum for their Deep History Coast session which includes a fossil hunt at the beach. Schools can also borrow their Deep History Coast Loan Handling Box. museums.norfolk.gov.uk/cromer-museum/learning

Norfolk Wildlife Trust have a fossils session available at West Runton: norfolkwildlifetrust.org.uk/discover-and-learn/teachers/sessions/primary-sessions/fascinating-fossils

Include a fossil hunt when you visit the beach. Belemnites are commonly found along the coast, particularly at East and West Runton.

Information about where and how to fossil hunt is available here: visitnorthnorfolk.com/Deep-History-Coast/deep_history_coast_fossils.aspx

# Plastics

## Teaching resources

**Marine Conservation Society Marine Litter resources for ages 7-11:**
mcsuk.org/what-you-can-do/fun-learning/primary-learning/teaching-resources/ks2-p7/marine-litter/

**Final Straw Foundation:**
finalstrawfoundation.org/get-involved/schools-and-resources/resources-for-schools-and-home-learning/

**Kids Take Action:**
youtube.com/watch?v=hKFV9IquMXA&t=41s

**BBC**:

bbc.co.uk/newsround/42810179

bbc.co.uk/programmes/articles/11CnCQR0GJfkDgJs57sR5Ps/war-on-plastic

**WWF:** wwf.org.uk/get-involved/schools/oceans-and-plastics

**Primary Stars:**
plprimarystars.com/resources/world-ocean-day

**Kids Against Plastic:**
kidsagainstplastic.co.uk/learn/lesson-guides/

## Applying the learning

Write **persuasive letters** to national or local businesses or family members persuading them to ditch single use plastic. Or create persuasive leaflets.

Read and explore the story **The Tin Forest** by Helen Ward. Rewrite the story as The Plastic Ocean. Make models of the plastic ocean using plastic rubbish.

Read **The Journey** by Neil Griffiths and Scott Mann. Rewrite the story to be about a plastic bottle dropped in a city and ending up in a river. Describe the journey to the sea. What does it pass? What creatures does it see? Who picks it up?

## Organise a litter pick or beach clean

Organise a litter pick of your school grounds, local environment or beach. If you head to the beach, remember to check tide times. Useful information on organising a Beach Clean is available here:

mcsuk.org/what-you-can-do/join-a-beach-clean/useful-guides-and-resources/guides-and-resources/

Details of volunteers that may be able to help with equipment or leading your beach clean in north Norfolk can be found here:

norfolkcoastaonb.org.uk/partnership/beach-clean-events/691

## Surfers Against Sewage: Plastic Free Schools

Sign up your school to get support for auditing single use plastic in school, ditching it and challenging government and industry. Includes sacks and gloves for a litter pick. Work towards Plastic Free School Status.

plasticfreeschools.org.uk/

# Beach safety

## Beach safety

**RNLI Beach Safety teaching resources for upper primary:**

rnli.org/youth-education/education-resources/upper-primary

**General beach safety information here:**

rnli.org/safety/beach-safety

**Arrange a visit from RNLI to your school:**

rnli.org/youth-education/educational-visits

## Sun safety

Lesson plans and resource from Care In The Sun (note Northern Irish resource with different key stages):
careinthesun.org/sun-protection/school-activities

Register for free to access resources:
soltansunready.com/for-schools

SKCIN is a national skin cancer and melanoma UK charity that has free resources available to schools that register and work towards gaining Sun Safe School Accreditation:
sunsafeschools.co.uk

## Tides

Make links with Earth and Space science teaching to learn about the effect of the moon and sun on tides.

bbc.co.uk/teach/class-clips-video/little-stargazing-the-moon-and-the-sea/zb7tf4j

Always check tide times before visiting the beach. In Maths, children could study tide tables to work out the best day and time to visit the beach. Buy a Norfolk tide table to plan ahead. Free predictions for up to 4 months ahead are available here:

tides4fishing.com/uk/england

## Applying the learning:

- Write explanations about how to keep safe at the beach.
- Design beach safety posters or leaflets.
- Visit a beach and get the children conduct a risk assessment at the start of the visit.
- At the beach, could students draw diagrams in the sand of the earth, sun and moon to explain the tides?

# English ideas

## Speech punctuation

Children can apply what they have learned in English lessons about punctuating speech.

Children could select two pictures of creatures from the wildlife resources. They imagine what the creatures might say to each other. This could be carried out in pairs with each child being one of the creatures. You might want to focus the conversation to be about fishing, plastic pollution or life in a rockpool.

Children could then write some dialogue using speech bubbles or the punctuation they have been learning.

## Acrostic poem

Children could write an acrostic poem on a theme of your choice. It could be about a sea creature, plastics, crab pots or chalk...

## Reading and narrative writing

The Secret of Black Rock by Joe Todd-Stanton tells the story of a mysterious and misunderstood black rock. Explore the story and how the feelings of the characters about the black rock change. The children could rewrite the story to be 'The Secret of White Rock' giving it a local twist using the chalk, the creatures that live in the MCZ and crab and lobster fishing.

## Descriptive recount

Write a description of diving under the sea to see the Cromer shoal chalk beds.

Discuss description, noun phrases and using the senses. Children to collect notes on a planning sheet as they watch one of the videos. Pause from time to time to discuss adjectives/ names for things/phrases/emotions.

Snorkel - Sheringham:
youtube.com/watch?v=YKv5IyHqCBs

Scuba dive - West Runton:
youtube.com/watch?v=WEgLWIsvhDk

The children could find a partner and tell them about the amazing snorkel/ dive they went on. What did you see? Hear? Feel?

As a class share write the opening paragraph then the children should write their recount.

5-10 minutes before the end, encourage them to end their description and sum up how they feel about their experience.

# Maths – Data handling

## Formulate questions

Explain that not many people know about the Cromer Shoal Chalk Beds MCZ. This week's homework will be to interview a grown-up about the sea around Cromer and Sheringham. What questions could we ask?

In groups, children should discuss questions they could ask, decide on 5 and then write and draw out on A3 paper. They will need to be able to analyse data so multiple choice or scale agree-disagree or yes/no answers will be needed. Groups should feedback to class and as a class draw up a list.

## Collect data

Create a questionnaire sheet with the agreed questions. Children should take a couple of sheets home and use them to survey family members or neighbours.

## Data analysis

Pool data from whole class - it may be easiest to do this digitally so they can be printed for children to access results during the lesson.

What does our data show? How can we make these numbers easier to see? Bar chart/pictogram/pie chart...

Model drawing a bar chart for one of the questions. Go over numbering and labelling axes, gaps between bars, title etc. Give groups a set of data to draw a bar chart for on squared paper. You may want to give some children pre-drawn axes.

They should then write a sentence to explain what it shows. Get each group to explain what they found out. Was there anything that surprised them?

## Example questions:

**Have you heard of the Cromer Shoal Chalk Beds Marine Conservation Zone?**

Yes/no

**Do you know when it was created?**

a) 1953 b) 1986 c) 2005 d) 2016

**Do you know about the purple sponge in the sea here?**

Yes/no

**Do you know much about the creatures in the sea here?**

A lot/a bit/nothing

**What do you most like doing in the sea?**

Surfing/swimming/snorkelling/paddle boarding/none of these

**On a scale of 1 to 5 how much do you love the sea?**

(1) not at all, to 5) loads)

# Local history

## Museums

The area provides an opportunity for a local history study to find out about local seafaring history and culture.

The following museums in Cromer and Sheringham provide information, school visits and resources:

**Henry Blogg Museum**
rnli.org/find-my-nearest/museums/henry-blogg-museum

**Cromer Museum**
museums.norfolk.gov.uk/cromer-museum/learning

**Sheringham Museum**
sheringhammuseum.co.uk/index.php

## Fishermen, lifeboatmen and shipwrecks

Visit the RNLI Henry Blogg museum to find out about the RNLI's most decorated lifeboat volunteer – Henry Blogg. Groups can join storytelling, immersive drama or science workshops to explore Cromer's incredible history of saving lives at sea.

Visit Sheringham Museum to see 5 lifeboats dating from 1867 and find out more about life in Sheringham in the past.

## Tourism

Visit Cromer Museum for their Seaside Special workshop to find out about Victorian holidaymakers in Cromer (ages 4-7).

# Introduction to the Cromer Shoal Chalk Beds Marine Conservation Zone

Ages 7-11

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# Cromer Shoal Chalk Beds Marine Conservation Zone

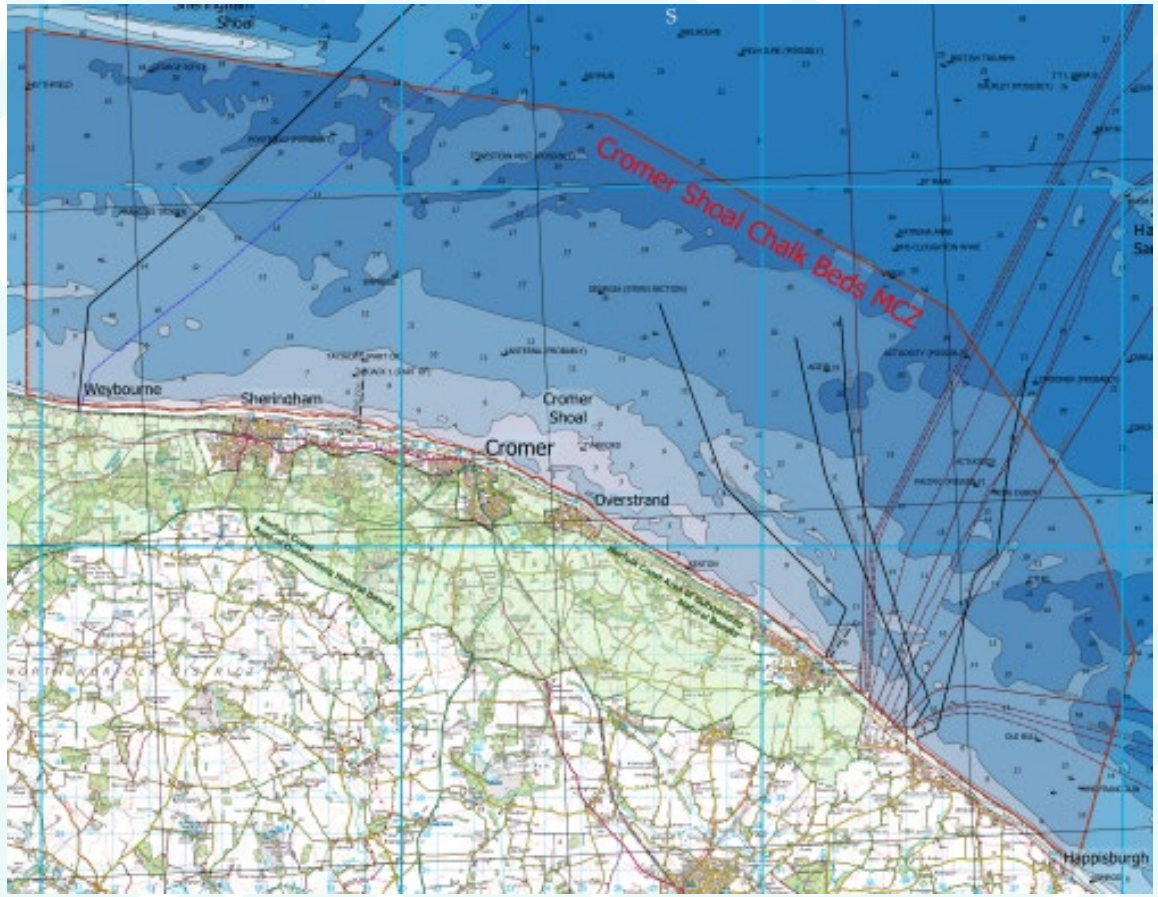
# Cromer Shoal Chalk Beds Marine Conservation Zone

A shoal is a **shallow area of sea**.

Can you see the different shades of **blue** on the map?

The pale parts on the map are shallow.

Cromer Shoal is the shallow area of sea near Cromer.



# Cromer Shoal Chalk Beds Marine Conservation Zone

Chalk is a **fragile, white rock**.

This refers to the sea**bed** or **sea floor** that is made of chalk.

It is Europe's largest chalk reef.

There is a mixture of chalk, other rocks, peat, clay and sand in the MCZ.

Photo: Paul Naylor

# Cromer Shoal Chalk Beds Marine Conservation Zone

**Marine:** relating to the sea.

**Conservation:** To keep it from being changed or spoiled by human activity

# Cromer Shoal Chalk Beds Marine Conservation Zone

**Zone**: An area with particular characteristics, purpose or use.

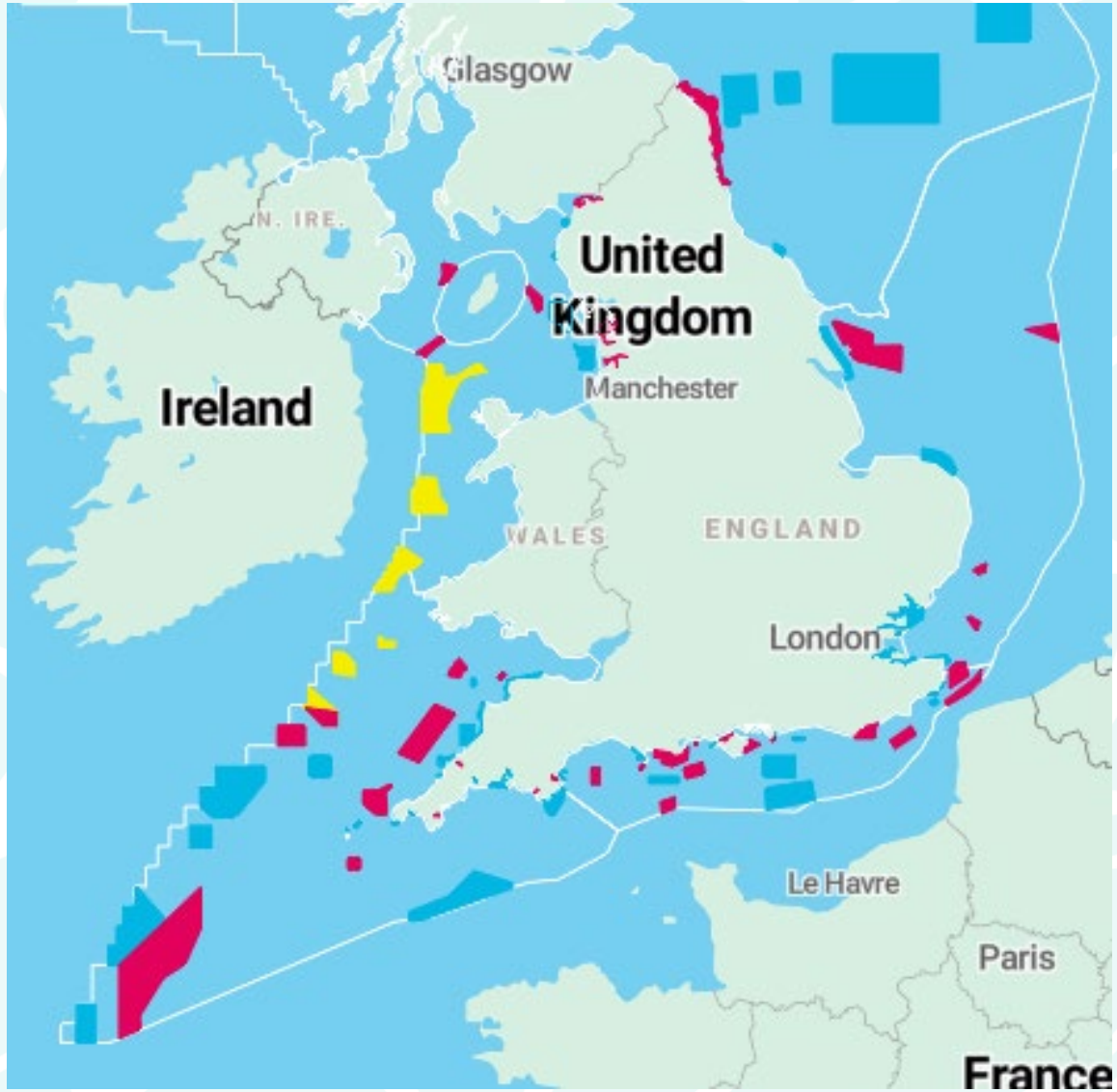
In this case: **the area where marine conservation happens.**

# Let’s find out a bit more about the Cromer Shoal Chalk Beds Marine Conservation Zone

Cromer Shoal Chalk Beds Marine Conservation Zone was designated in **2016**.

This map shows the **91** Marine Conservation Zones.

Can you spot the Cromer Shoal Chalk Beds MCZ?




Taken from: https://www.wildlifetrusts.org/marine-protected-areas/england

It starts 200m off the beach and extends about 10km out.

It covers over 300km².

Cromer Shoal Chalk Beds Marine Conservation Zone is part of a network of Marine Protected Areas around the coast of the UK.

These are known as the ‘Blue Belt’.

All the Norfolk coast has designations to protect it.

Taken from: https://jncc.gov.uk/our-work/marine-protected-area-mapper/

The chalk beds have holes, arches and ridges up to 3m high. These provide great places for wildlife to live and hide from predators.

Photo: christaylorphoto.co.uk

The chalk also provides a surface for marine life such as sponges and seaweeds to attach or burrow into.

These crabs attach pieces of sponge to their shells for camouflage!

Photo: Paul Naylor

In 2011 some divers noticed a purple sponge and with the help of scientists they realised it was new to science! It is the only place in the world where it is known to live.

In 2021, a naming competition was organised that a local schoolgirl won. She named it **Parpal Dumplin** because it is purple and looks a bit like a dumpling!

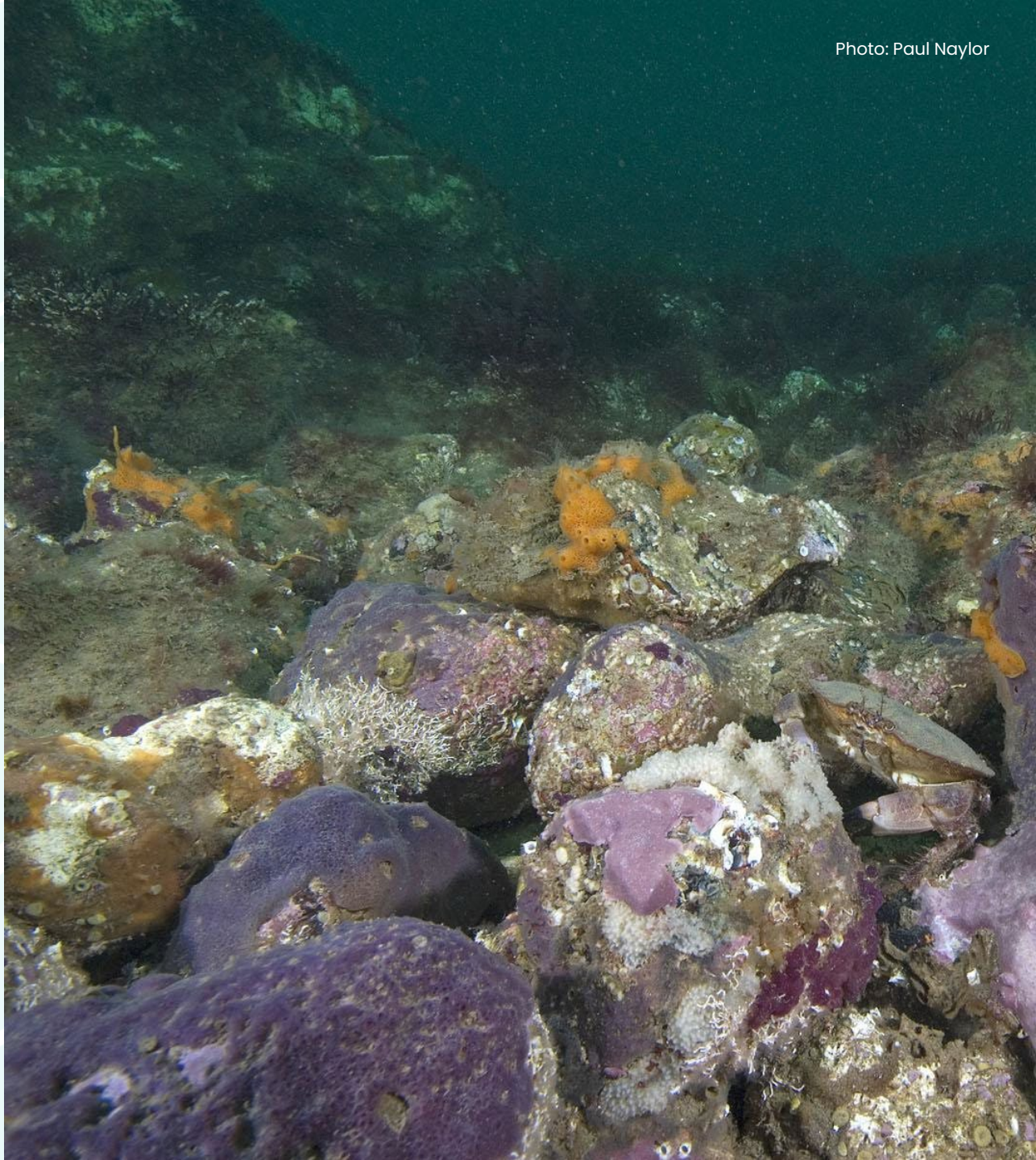


Photo: Paul Naylor

This video shows lots of the amazing wildlife that lives in the Marine Conservation Zone:

# Fishing

Fishing is the main activity in the MCZ but not for fish... for crabs and lobsters!

There is a long history of fishing here and it is an important industry for the area.

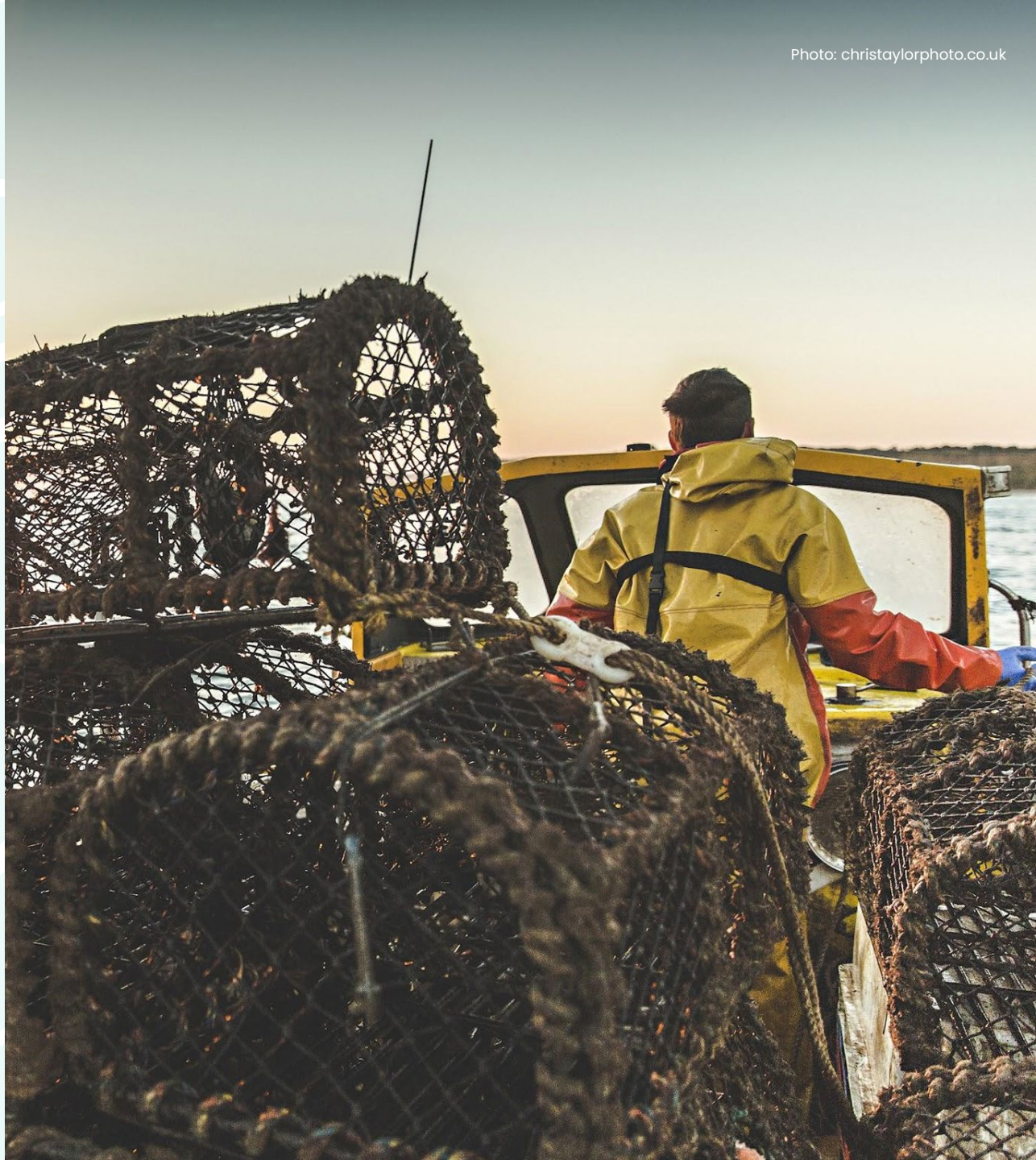


Photo: christaylorphoto.co.uk

# Crabs

Cromer crabs are famous! The crabs love hiding in the holes in the chalk.


## Tourism

Lots of people visit the area on day trips or for their holiday and visit the beach.

Other activities in the area include boating, diving and snorkelling.

## What does the Marine Conservation Zone do?

The role of the MCZ is to:

- Maintain it in favourable condition
- Provide social, environmental and economic benefits

It is a ‘sustainable use site.’ This means that fishing and other activities can continue in a Marine Conservation Zone if they are **sustainable**.

## What does sustainable mean?

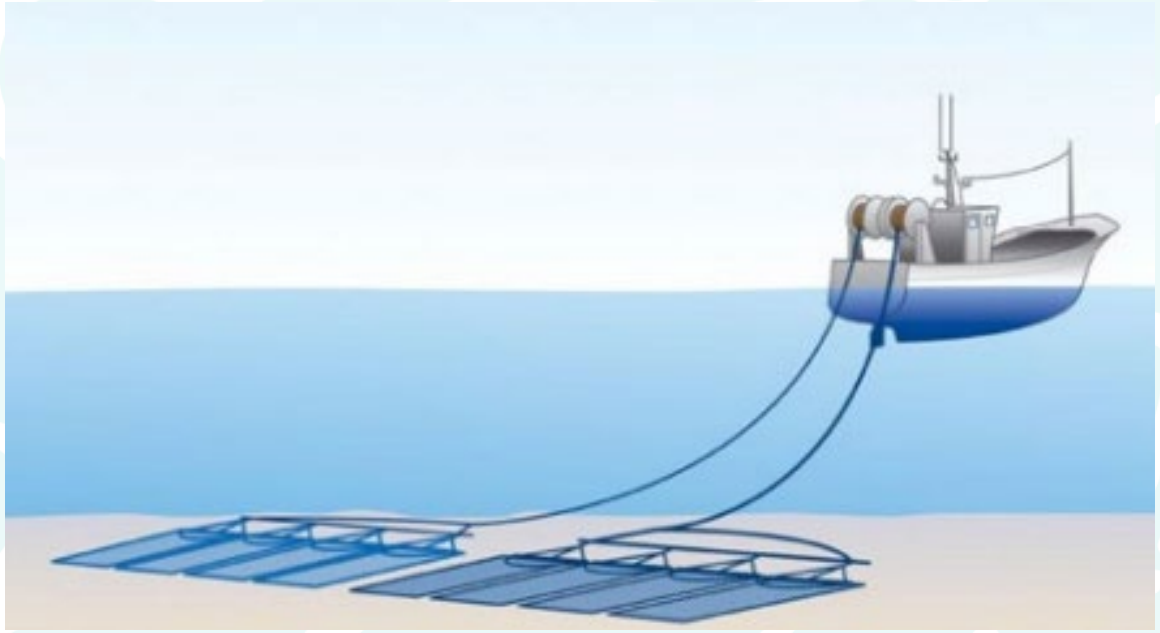
## Sustainable = Able to carry on without harming the environment

If humans damage or harm the place and its wildlife, they won't be able to keep fishing, boating and diving here as there wouldn't be crabs and lobsters to catch or wildlife to see.

There are laws and guidance that protect the area, and these may change over time.

# Damage from trawling and dredging in the MCZ

Most (93%) of the MCZ is a no-trawl and no-dredge area.



# Overfishing

The crabs and lobsters could be at risk from overfishing. Crab numbers are measured to monitor the crab population.

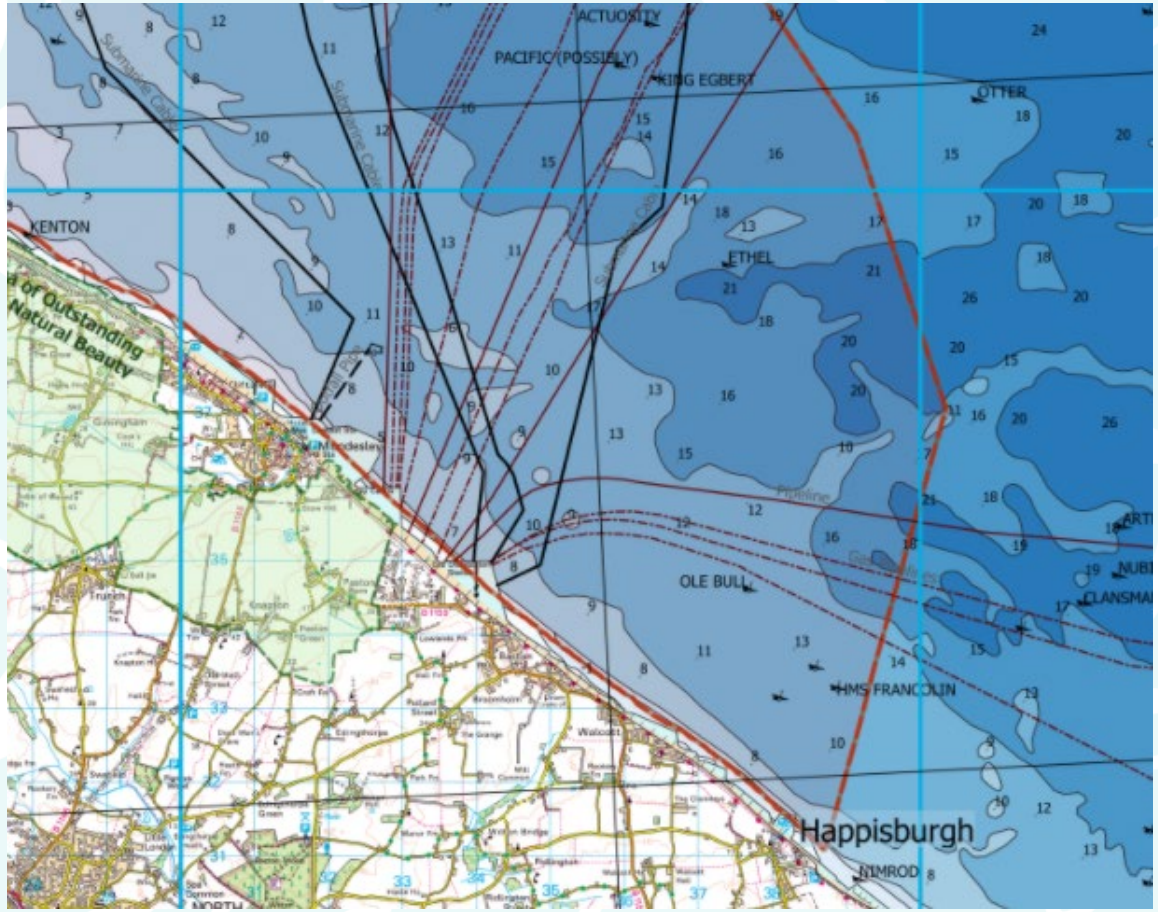
Fishers measure the crabs they catch. Crabs that are too small must be put back. The bigger crabs that are allowed to be caught have lived long enough to lay eggs.


Rob Coleman

# Oil, gas and windfarm development

The MCZ designation means extra considerations need to be made before permission is granted for development within the area.

A new wind farm altered its planned cable route to avoid the MCZ.



# Beach cleans

Litter is sometimes dropped by visitors or fishing gear can get lost. This can cause a problems for wildlife, particularly with plastics.

People volunteer at beach cleans to collect rubbish to keep it out of the sea.

Photo: Rob Coleman

## Summary

- Cromer Shoal Chalk Beds Marine Conservation Zone is a special place.
- The chalk on the seabed provides a special habitat for lots of wildlife.
- Fishing is an important industry in the area.
- Humans need to make sure they do not damage or harm this place and its wildlife.

# Local geography

Ages 7-11

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# Curriculum links – Geography objectives:

Ages 7-11

## Map skills using the MCZ map

**Geography**

Use the eight points of a compass, four and six-figure grid references, symbols and key (including the use of Ordnance Survey maps) to build their knowledge of the United Kingdom and the wider world.

## Electricity and gas and the MCZ

**Geography**

Describe and understand key aspects of:

human geography, including: types of settlement and land use, economic activity including trade links, and the distribution of natural resources including energy, food, minerals and water

Use maps, atlases, globes and digital/computer mapping to locate countries and describe features studied.

## Electricity and gas and the MCZ (continued)

**Citizenship**

That resources can be allocated in different ways and that these economic choices affect individuals, communities and the sustainability of the environment.

## Activity 1 Gus the Gull

**Compass directions**

Using the MCZ map pdf resource and Gus the Gull children can practise using compass directions. Example questions:

- Gus is flying above Cromer. If he flies north what will he see? Use this opportunity to reinforce the name of this sea: *North Sea*.
- Gus is in Weybourne. If he flies east, what is the first town he will come to?
- If Gus flew from Mundesley to Cromer, which direction would he be travelling?
- What direction should Gus fly to get from Mundesley to Haisborough Sands?

The children could work together to come up with other questions for the class.

**Map key**

Using the MCZ map and Gus the Gull, children can practise using the key. Example questions:

- What direction should Gus fly to get from Mundesley to Haisborough Sands? What else travels along a lot of this route?
- How deep is the sea where the word 'Cromer' is written?
- How many wrecks can they find within the Marine Conservation Zone?
- How shallow does the sea get at Haisborough Sands?
- What is laid under the sea from West Runton?
- What two things travel under the sea from Weybourne? *The telephone cable goes to Denmark and was laid in 1950.*

The children could then work together to come up with other questions to challenge the class.

## Activity 2 Grid references

**Four-figure grid references**

Use the pale blue grid lines on the map with the National Grid Eastings (along the bottom) and National Grid Northings (along the left-hand side) to introduce grid references. To do this we will ignore the zeros to begin with, so 610000 will be 61.

See this Bitesize guide for a step-by-step guide to grid references.

Recap using coordinates in maths - along the bottom (x axis), then up the side (y axis). Note that when giving Ordnance Survey Grid references there are no brackets or commas.

Give the children four-figure grid references. Can they put their finger on it/point to it on the board?

Can the children find the grid references for particular locations? E.g. Cromer = 6234.

Can the children find the four-figure grid references for:

Happisburgh 6333
Haisborough Sands 6434
Weybourne 6134 and Sheringham 6134? (These last two are the same).

**Six-figure grid references**

When the children are secure finding four-figure grid references they can move onto six-figure grid references. To do this they will need to estimate where the tenths are in each square.

Hopefully, they noticed that Weybourne and Sheringham were in the same square 6134. Six-figure grid references are more accurate for stating the position of a place.

## Activity 2 Grid references (continued)

Model using the grid reference for Weybourne 612343 (the village not the name label). Can they see the four-figure grid reference for the square inside it? **61**2**34**3

The children could have a go finding 616343. Which part of Sheringham does it locate? *The centre*.

Can the children find the locations for the six-figure grid references below?

612344 Weybourne beach
638332 Happisburgh beach
634335 Bacton Gas Site
622342 the centre of Cromer.

As an extension children could choose their own locations to write the grid reference for.

## Activity 3 Energy sources

**Power from wind and gas**

The distribution of electricity and gas through the MCZ provides an opportunity to cover some geography and citizenship National Curriculum objectives.

This topic provides an opportunity to make links with English. Children could look at the pros and cons of wind farms, have a debate and write persuasive texts or balanced arguments.

All development out at sea must be approved by the Marine Management Organisation.

**Fossil fuels, renewable energy and climate change**

The comparison of the wind farms in the North Sea with the gas site at Bacton provide a good opportunity to discuss energy sources and their impact on climate change.

This Bitesize video and article on fossil fuels introduces the topic.

A PowerPoint and further teaching resources are available under Energy Resources from the Geological Society.

Lesson 5 in our Protect the Ocean lesson series, Climate, the sea and me, develops understanding of the importance of the sea in relation to climate change.

**Energy from gas**

Children could explore the Marine Conservation Zone map, using the key to see what the various lines are through the sea. They will notice that there are a lot of lines - cables and pipelines - that join the coastline here. Many terminate at Bacton gas site bring oil and gas from rigs out at sea.

Ask the children questions: Once the oil and gas is processed, how does it get to our homes? Pipelines are laid underground to distribute it around the country - this is called 'mains gas.' Despite having the gas site at Bacton, the houses in Bacton and surrounding villages are not connected to mains gas!

Gas is used to generate electricity in Norfolk. Great Yarmouth and King's Lynn have gas fuelled power stations. To compare the amount of electricity produced Great Yarmouth produces 420 MW, King's Lynn produces 325 MW and Sheringham Shoal's 88 wind turbines can produce up to 316.8 MW.

This YouTube video discusses oil and gas extraction from the North Sea.

# Activity 3 Energy sources (continued)

**Energy from wind**

Children can explore the online maps of offshore wind farms here: 4coffshore.com/offshorewind/

They can see where the wind farms are and their state of development using the key. By clicking on each windfarm they can find out the number of wind turbines and the capacity (MW).

Ask the children questions:

Once the power is generated how does it get to our homes and school? Cables need to be laid to bring it onshore and underground to be distributed around the country, including relay stations and electrical substations. Watch the video How offshore wind farms work for more information.

The proposed Norfolk Vanguard wind farm plans to lay cables under the sea near the Marine Conservation Zone coming ashore at Happisburgh. The route avoids the MCZ.

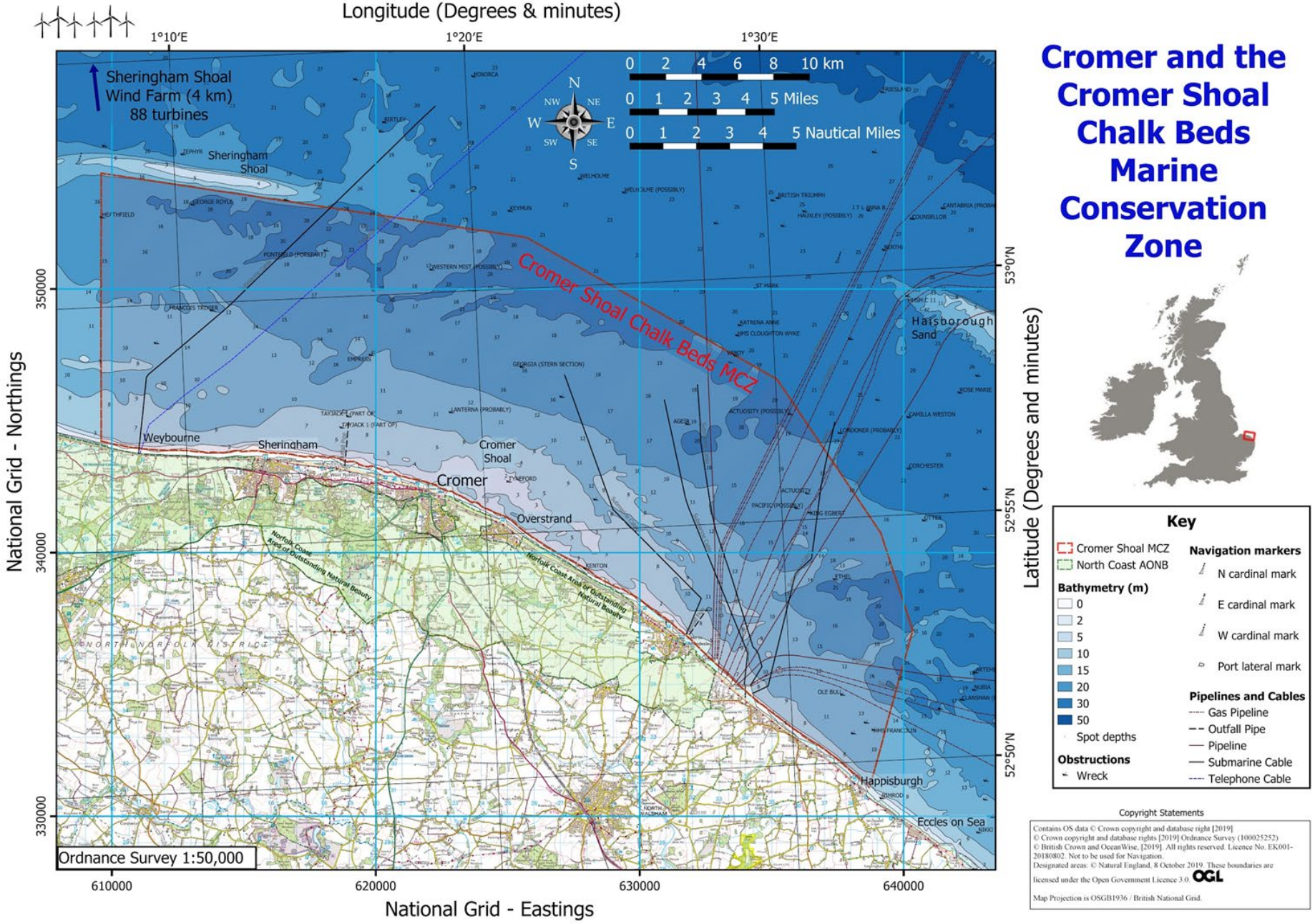
This video on the Impact on Norfolk of offshore wind farms gives an idea of some of the issues.

This video briefly explains some of the ecological impacts of wind farms: Ecological impact of wind farms.

Do the children think wind farms are a good thing? How do they compare to gas?

# Meet Gus the gull!

Photo: Rob Coleman




# Cromer and the Cromer Shoal Chalk Beds Marine Conservation Zone



## Key

- Cromer Shoal MCZ
- North Coast AONB

**Bathymetry (m)**

- 0
- 2
- 5
- 10
- 15
- 20
- 30
- 50
- Spot depths

**Obstructions**

- Wreck

**Navigation markers**

- N cardinal mark
- E cardinal mark
- W cardinal mark
- Port lateral mark

**Pipelines and Cables**

- Gas Pipeline
- Outfall Pipe
- Pipeline
- Submarine Cable
- Telephone Cable

# Wildlife in the MCZ

Ages 7-11

MARINE CONSERVATION SOCIETY

NORFOLK COAST
AREA OF OUTSTANDING NATURAL BEAUTY

seafarers UK
Supporting the maritime community

The Wash and North Norfolk Marine Partnership
Protecting Nature and Culture

Life

# Wildlife in the MCZ

The wildlife of the MCZ offers an interesting context for teaching about habitats, classification and feeding relationships. There are some slides to introduce the wildlife of the MCZ before looking in more detail at a particular unit. Rockpooling sessions provide great hands-on learning experiences linked to science.

## Science – National Curriculum links (ages 7-11):

### Living things and their habitats

**Year 4**

- Recognise that environments can change and that this can sometimes pose dangers to living things.
- Recognise that living things can be grouped in a variety of ways
- Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment

**Year 6**

- Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
- Give reasons for classifying plants and animals based on specific characteristics

### Animals, including humans

**Year 3**

- Identify that some animals have skeletons and muscles for support, protection and movement.

**Year 4**

- Construct and interpret a variety of food chains, identifying producers, predators and prey.

### Evolution and inheritance

**Year 6**

- Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution

### English

- Non-chronological reports

MARINE CONSERVATION SOCIETY

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Life

## Activity 1 Skeletons

A field trip to some rockpools provides an ideal opportunity to embed children's learning about skeletons. Explore the rockpools at Sheringham or West Runton beach at low tide to find a variety of life.

After searching for sealife, ask the children to think about the skeleton types of the creatures they have seen. Have they seen examples of endoskeletons, exoskeletons and hydrostatic skeletons? For each creature consider how its skeleton provides support, protection and movement.

It's quite likely someone will find a shed crab exoskeleton - they look like a dead crab, but there are holes where the eyes should be.

Having an exoskeleton means they have to shed their skeleton in order to grow. This is called moulting. Moulting takes place at night, a few hours after an initial crack appears at the back of the crab shell. The crab then has to drink copiously to swell up and force the shell apart along the crack.

The crab that emerges is soft and slimy, and it is vulnerable to being eaten by fish for the first few days. The shell's texture changes from slimy, when the crab first emerges, to feeling like paper, thin card and then cardboard, before finally hardening within 3-4 weeks.

## Activity 2 Grouping and classifying

A good place to start this topic is our Grouping Animals lesson.

Follow up by using the images of creatures found in the MCZ in the slides below. In groups, pupils should sort them into groups using their own criteria, and then share and discuss the criteria each group chose. Can they explain why they grouped them that way?

Groupings could include:

Number of legs
Shell/no shell
Movement types: swim/don't swim/crawl/slither/static
Vertebrates/invertebrates

Vertebrates could be further split into bird/fish/mammal, and skeleton type could be revisited and split into endoskeleton/exoskeleton and hydrostatic skeleton.

## Activity 3 Food chains

Give the children copies of the food chain pictures. They should use the information to create a food chain and cut out the images, order them and draw arrows. The arrows must show the direction of the transfer of energy from the food.

Discuss the terms producer, predator, prey, herbivore, carnivore, omnivore. Children should then label the producers, predators and prey on their food chains. Afterwards, use the slides to check their food chains.

Food chains provided:

Seaweed - prawn - sea bass – seal
Plankton - mussels - starfish - herring gull
Algae - periwinkle - lobster – human
Algae - periwinkle - shore crab - sea bass – seal
Seaweed - limpet - dog whelk - edible crab - human

These food chains have been chosen to show the range of plants that support life in the sea. The reality is that these food chains are part of a very complex food web with many creatures eating a wide range of things.

## Activity 4 Rockpooling

**Year 4 – Using a key**

Explore the rockpool habitat at Sheringham or West Runton beach at low tide to find a variety of life. Children could use a key to identify the creatures and plants they find. Encourage the children to carefully lift up rocks and seaweed to find creatures that are hidden, then return rocks to the position they were found.

Get started in the classroom with our Outdoor Rockpool Explorers lesson.

Guidance about rockpooling can be found here: NMMC How to rockpool.

The Field Studies Council have a great Rocky Shore Name Trail available to purchase.

It's a good idea to have a field guidebook with you too to find out more about the sealife you come across. Our Rockpool Fact File has some useful information to get you started.

Take a look at Essex Wildlife Trust's Shoreline Identification Guide.

Whiteboard and printable resources about rockpool species available here: Benny the Blenny rockpool poster

Norfolk Wildlife Trust and the National Trust at Sheringham Park also offer rockpooling sessions.

**Year 6 – Adaptations**

A good place to start this topic is the How do creatures adapt? lesson.

If you can get to a beach, you could also use the Outdoor Rockpool Explorers lesson and explore the rockpools at Sheringham or West Runton at low tide. If you can't get to the coast, use the Indoor Rockpool Explorers lesson.

Encourage the children to consider how each creature they find manages to survive in this habitat - a place that isn't always covered by the sea, sometimes has waves crashing onto it and temperatures can fluctuate. How are they adapted to this environment?

This could be a good opportunity to recap different types of skeleton (see Year 3 Skeleton session).

Examples below:

- Crabs: hard shell to protect from rocks and predators. Place one on wet sand and watch it bury itself!
- Mussels: anchored to the rock, they close up when not covered by the sea.
- Beadlet anemones: can curl up into a ball, attached to rock.
- Periwinkles, whelks and limpets: foot secures them to rock, tough shell protects them.
- Prawns: well camouflaged from predators. Live in rockpools.
- Shrimps: well camouflaged from predators. Live in sandy areas. Place one on wet sand and watch it bury itself!

If your group is lucky enough to find two or more different species of crab encourage the children to look closely and compare them. What is the same about them? What is different? Why might that be?

## Activity 5 Reports

**Non-chronological reports**

Use English lessons to expand your pupils' understanding further by writing non-chronological reports about the creatures.

An example of a non-chronological report is provided for Parpal Dumplin (purple sponge). Blank non-chronological report formats are included for the following species:

1. Shore crab
2. Edible (brown) crab
3. Common Lobster
4. Beadlet anemone
5. Common starfish
6. (Dotted) Sea hare (Aplysia punctata)
7. Tompot blenny (Parablennius gattorugine)
8. Common whelk (Buccinum undatum)

Children can research their chosen species using the websites below to find facts about appearance, diet, survival and other 'did you know?' facts:

wildlifetrusts.org/wildlife-explorer/marine

marlin.ac.uk/species

britishseafishing.co.uk/fish-species/other-sea-creature-species/

# Wildlife in the MCZ

Much of the wildlife in the Cromer Shoal Chalk Beds Marine Conservation Zone is hidden beneath the surface but it is pretty amazing! Over 350 species of marine animals and plants have been recorded in the MCZ.

Watch the videos on the next slides to see some of the amazing creatures that live there.

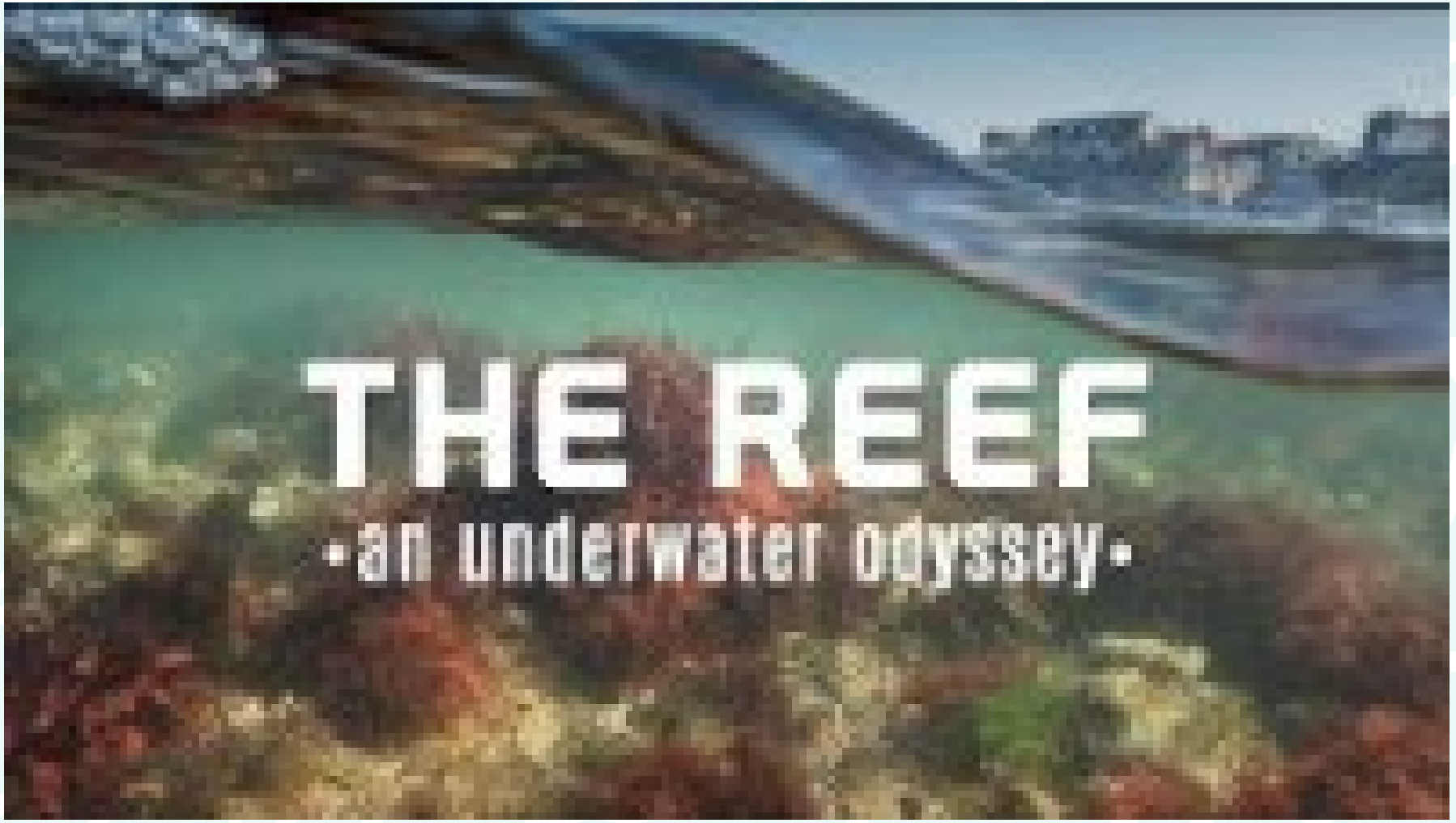
Photo: christaylorphoto.co.uk

# Wildlife in the MCZ

3-minute video:

# Wildlife in the MCZ

10-minute video:



# Chalk seabed

The chalk beds have holes, arches and ridges up to 3m high. These provide great places for wildlife to live and hide from predators.

The chalk provides a surface for seaweed and creatures to attach to. It is a different habitat to much of the seabed in the North Sea.

Photo: christaylorphoto.co.uk

# Parpal Dumplin

In 2011 some Seasearch divers noticed a purple sponge and with the help of scientists they realised it was new to science! It is the only place in the world where it is known to live.

In 2021 a competition was organised that a local school girl won.  She named it **Parpal Dumplin** because it's purple and looks a bit like a dumpling!

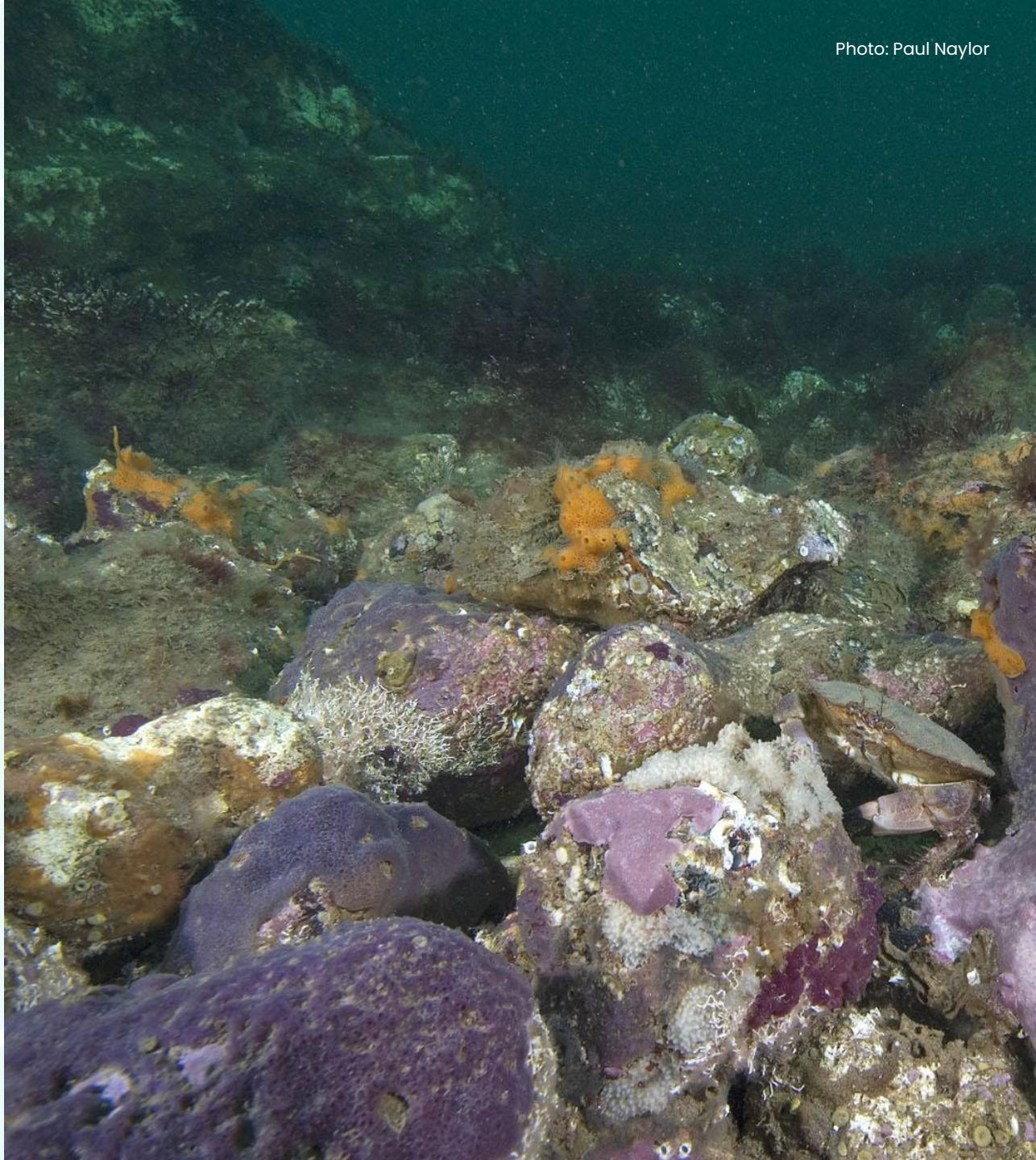


Photo: Paul Naylor

# Can you spot the crab?

These amazing spider crabs cut off and attach pieces of sponge to their shell to help them camouflage!

# Threats to wildlife in the MCZ

Despite being hidden from view, the wildlife faces some threats.

The Marine Conservation Zone designation means that work is happening to protect the wildlife from these threats.

Potential threats include:

- Litter
- Wind farm development
- Coastal defence works
- Fishing

# Litter

Beach clean organisers collect data about the litter collected.  They can then identify where the litter is coming from and campaign to prevent it. Plastics are the main problem.

Plastic cotton buds were regularly found during beach cleans. Following campaign work, the government banned them from sale from 1st October 2020, along with plastic straws and stirrers. Now they are rarely found.

The sticks are now made from card, wood or bamboo which biodegrades naturally.


PhotoPisauikan

# Plastics

Beach cleaners regularly collect litter from the beaches.

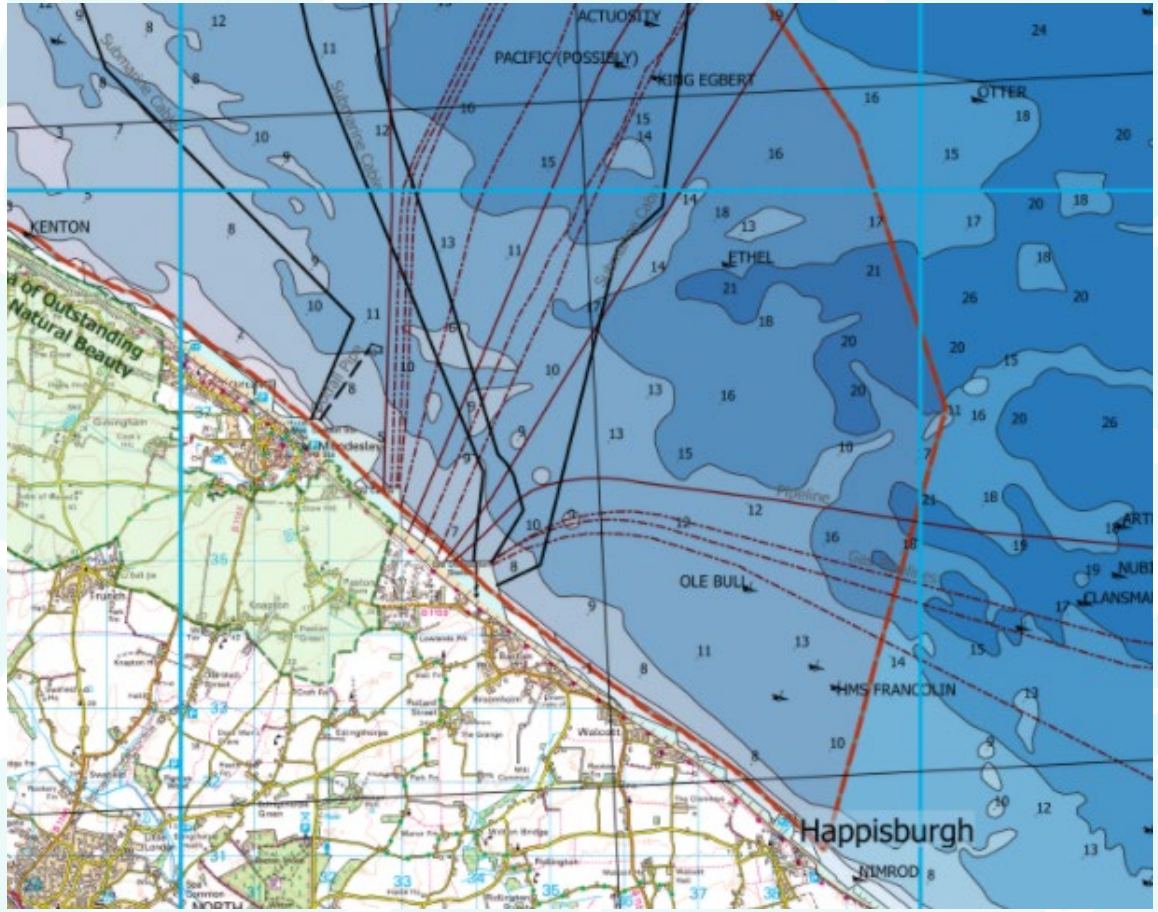
They have noticed lots of pieces of plastic edging from crab pots getting washed up on beaches. Use of plastic free, stainless-steel pots has the potential to remove this problem, but they are more expensive.

Photo: Rob Coleman

# Oil, gas and windfarm development

The MCZ designation means extra considerations need to be made before permission is granted for development within the area.

A new wind farm altered its planned cable route to avoid the MCZ.



# Coastal defence works

The North Norfolk coast is vulnerable to erosion as the cliffs wear away and fall into the sea causing the loss of farmland, housing and industry.

You can see various methods of coastal defence along the coast including:

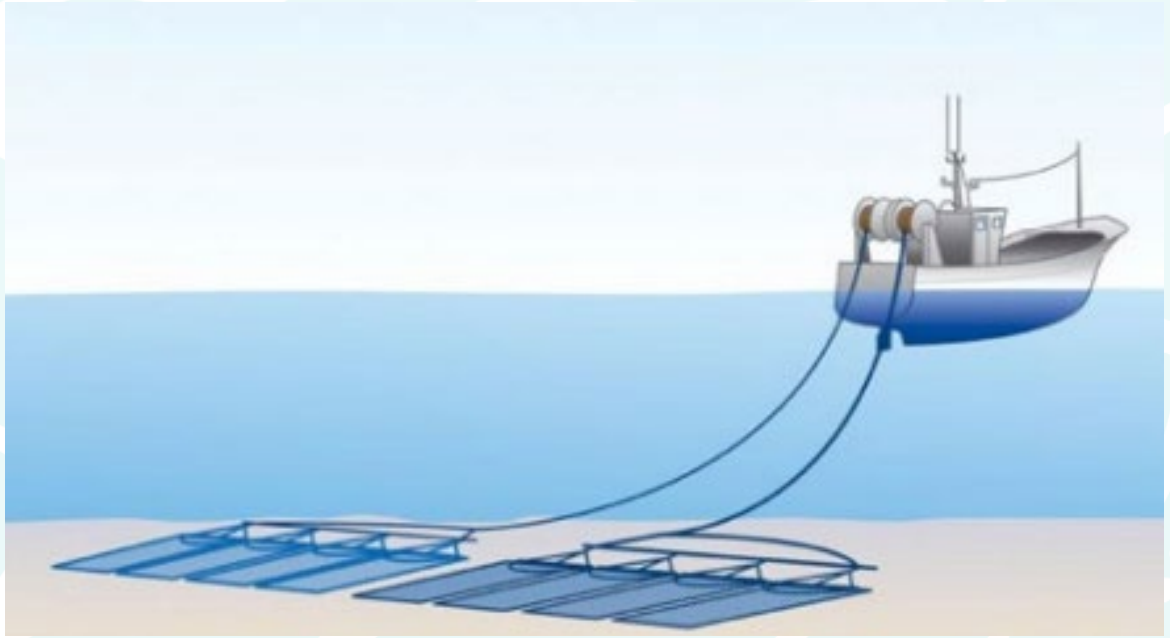
- Groynes
- Revetments
- Boulder barriers
- Sea walls
- Sandscaping

There was a big sandscaping project at Bacton in 2019 where 1.8 million cubic metres of sand were added to the beach.

These methods can all affect the seabed and the wildlife in the MCZ.

# Damage from trawling and dredging

45% of the area was already a no-trawl and no-dredge area. A byelaw has extended this to 93% of the MCZ.



# Overfishing

Overfishing is the catching of fish (or crabs!) faster than they can reproduce which causes numbers to decline.

Data about crab numbers and fishing effort is collected to monitor crab populations.

Some laws are in place to help prevent overfishing:

Fishers are not allowed to land crabs that are smaller than 115mm across their shell. This means they have at least one year to reproduce before being caught.

Berried crabs and lobsters (with eggs) are thrown back.

Photo: christaylorphoto.co.uk

# Environmental impact of potting in the MCZ

In 2019, a study found that potting fisheries were linked to physical damage to chalk outcrops.

Pots and ropes can scour the chalk as they move in the currents. This can damage the chalk and the life that is attached to it.

A code of practise has been written so fishermen minimise the impact of lost and stored pots.

Research to map the seabed and fishing activity is ongoing. This will improve understanding of the area and the impact of fishing on the chalk. Depending on findings, laws may be brought in to minimise impact.

Photo: Rob Coleman

# Amazing wildlife

There are lots of amazing creatures living in the Marine Conservation Zone.

Threats to the wildlife that lives there are being monitored and new laws may be brought in to help the wildlife.

# **Activity 1: Skeletons** (Year 3)

A field trip to some rockpools provides an ideal opportunity to embed children's learning about skeletons. Explore the rockpools at Sheringham or West Runton beach at low tide to find a variety of life.

After searching for sealife, ask the children to think about the skeleton types of the creatures they have seen. Have they seen examples of endoskeletons, exoskeletons and hydrostatic skeletons? For each creature consider how its skeleton provides support, protection and movement.

It is quite likely someone will find a shed crab exoskeleton - they look like a dead crab, but there are holes where the eyes should be.

Having an exoskeleton means they have to shed their skeleton in order to grow.

Moulting takes place at night, a few hours after an initial crack appears at the back of the crab shell. The crab then has to drink copiously to swell up and force the shell apart along the crack. The crab that emerges is soft and slimy, and it is vulnerable to being eaten by fish for the first few days. The shell's texture changes from slimy, when the crab first emerges, to feeling like paper, thin card and then cardboard, before finally hardening within 3-4 weeks.

| **Endoskeleton** | **Exoskeleton** | **Hydrostatic skeleton** |
|---|---|---|
| Fish<br><br>Seals (common, grey)<br><br>Humans | *Exoskeletons that are shed in order to grow:*<br>Crabs (shore/green, edible/brown, velvet swimming)<br>Lobster (common, squat)<br><br>*Exoskeletons that grow with the creature:*<br>Sea snails: whelks, winkles, mussels | Anemones<br><br>Starfish (though the tiny bony plates underneath a tough outer skin act like an exoskeleton) |

# **Activity 2: Grouping and classifying** (Years 4 and 6)

A good place to start this topic is Lesson 7: Grouping animals in the Amazing Ocean series.

Follow up by using local selection of images of creatures found in the MCZ in the slides below.

In groups, pupils should sort them into groups using their own criteria and then share and discuss the criteria the different groups chose. Can they explain why they grouped them that way?

Give them time to group them using a different set of criteria.

Groupings could include:

- Number of legs
- Shell/no shell
- Movement types: Swim/don't swim/crawl/slither/static
- Vertebrates/invertebrates
- Vertebrates could be further split into birds/fish/mammals
- Skeleton type could be revisited - endoskeleton/exoskeleton and hydrostatic skeleton

# Grouping creatures from the MCZ


Photo: Rob Coleman


Photo: Rob Coleman


Photo: Rob Coleman


Photo: Rob Coleman

# Grouping creatures from the MCZ


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Photo: christaylorphoto.co.uk


Photo: Rob Coleman

# Grouping creatures from the MCZ


Photo: christaylorphoto.co.uk


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Photo: christaylorphoto.co.uk


Photo: Paul Naylor

# Grouping creatures from the MCZ


# The phylums molluscs, crustaceans and echinoderms

Scientists group organisms to help classify and identify them. Sea creatures are particularly difficult to classify. DNA has helped scientists understand how different organisms are related and, in some cases, has meant they have changed the groups around!

Can you use the information below to sort the creatures into the three groups: molluscs, crustaceans and echinoderms?

| Molluscs | Crustaceans | Echinoderms |
| --- | --- | --- |
| A large, varied group!<br>Soft bodied<br>Some have shells<br>Many have head, foot, main body<br>Many have a rasping tongue (radula) | Hard exoskeleton<br>Jointed legs<br>Two pairs of antennae (feelers)<br>Segmented body (though some are fused) | Tiny ‘plates’ covered with skin<br>Five-rayed symmetry<br>Many small tube feet |

# Answers: The phylums molluscs, crustaceans and echinoderms

Explain that scientists group organisms to help classify and identify them. DNA has helped scientists understand how different organisms are related and, in some cases, has meant they have changed the groups around!

Explain the criteria of the phylums mollusca, crustaceans and echinoderms. Then ask the children to sort the creatures into the three groups:

| Molluscs | Crustaceans | Echinoderms |
|---|---|---|
| A large, varied group!<br>Soft bodied<br>Some have shells<br>Many have head, foot, main body<br>Many have a rasping tongue (radula)<br><br>*Sea slugs*<br>*Whelks*<br>*Mussels*<br>*Winkles*<br>*Limpet*<br>*Little cuttlefish* | Hard exoskeleton<br>Jointed legs<br>Two pairs of antennae (feelers)<br>Segmented body (though some are fused)<br><br>*Crabs*<br>*Lobsters*<br>*Shrimp*<br>*Barnacles* | Tiny 'plates' covered with skin<br>Five-rayed symmetry<br>Many small tube feet<br><br>*Starfish*<br>*Urchins*<br>*Sea cucumber* |

# The phylums molluscs, crustaceans and echinoderms











## Molluscs





## Crustaceans






## Echinoderms


# **Food chains** (Year 4)

Give the children copies of the food chain pictures. They should use the information to create a food chain - cut out the images, order them and draw arrows. The arrows must show the direction of the transfer of energy from the food.

Discuss the terms producer, predator, prey, herbivore, carnivore, omnivore. Children should then label the producers, predators and prey on their food chains. Afterwards, use the slides to check their food chains.

Food chains provided:

- Seaweed - prawn - sea bass - seal
- Plankton - mussels - starfish - herring gull
- Algae - periwinkle - lobster - human
- Algae - periwinkle - shore crab - sea bass - seal
- Seaweed - limpet - dog whelk - edible crab - human

These food chains have been chosen to show the range of plants that support life in the sea. The reality is that these food chains are part of a very complex food web with many creatures eating a wide range of things.

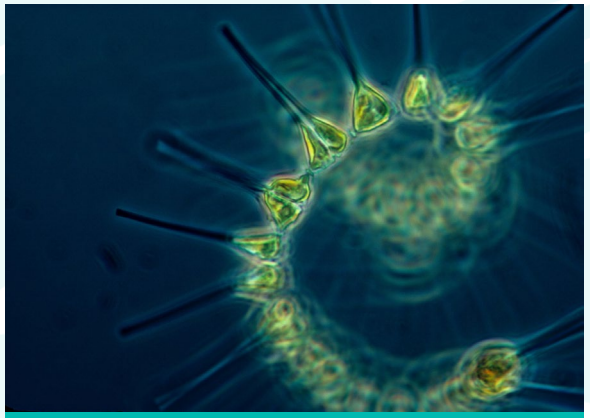

**Sea bass**
I get my energy from shrimps, periwinkles, prawns, crabs and smaller fish. I am eaten by seals and humans.

**Seaweed**
I get my energy from the sun. I am eaten by crabs, periwinkles, worms, prawns and shrimps.


**Prawn**
I get my energy from seaweed, carrion and small shrimp-like creatures. I am eaten by crabs, fish and sea anemones.


**Seal**
I get my energy from fish, crabs, squid and octopus. I don't have any predators.


**Herring gull**
I get my energy from eggs, starfish, crabs, fruit, grains and worms. I do not have any predators.



**Phytoplankton**
I get my energy from the sun. I am eaten by barnacles and mussels.

**Common starfish**
I get my energy from periwinkle, mussels, barnacles and limpets. I am eaten by crabs, seabirds and fish.

**Mussels**
I get my energy from plankton. I am eaten by humans, dog whelks, seabirds and starfish.

**Human**

**Lobster**
I get my energy from crabs, sea snails, sea urchins and starfish.
I am eaten by humans.

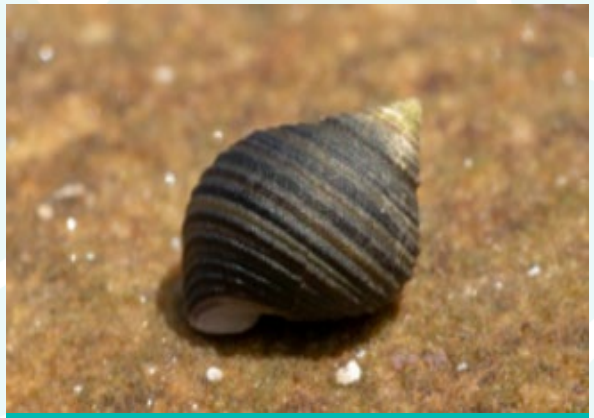
**Algae**
I get my energy from the sun.
I am eaten by limpets and periwinkles

**Periwinkle**
I get my energy from algae on rocks and young seaweed.
I am eaten by crabs, lobsters, seabirds and fish.


**Sea bass**
I get my energy from shrimps, periwinkles, prawns, crabs and smaller fish. I am eaten by seals and humans.

**Shore crab**
I get my energy from seaweed, carrion, sea snails, shrimps and small fish. I am eaten by other crabs, fish, lobsters and sea anemones

**Algae**
I get my energy from the sun. I am eaten by limpets and periwinkles



**Periwinkle**
I get my energy from algae on rocks and young seaweed. I am eaten by crabs, lobsters, seabirds and fish.


**Seal**
I get my energy from fish, crabs, squid and octopus. I don't have any predators.

**Human**

**Limpet**

I get my energy from algae on rocks and young seaweed.
I am eaten by crabs, seabirds, starfish, dog whelks and fish.

**Edible crab**

I get my energy from crabs, sea snails, sea urchins and starfish.
I am eaten by humans and lobsters.

**Seaweed**

I get my energy from the sun.
I am eaten by limpets, periwinkles, worms, prawns and shrimps.

**Dog whelk**

I get my energy from periwinkle, mussels, barnacles and limpets.
I am eaten by crabs, seabirds and fish..

**Seaweed**
I get my energy from the sun. I am eaten by crabs, periwinkles, worms, prawns and shrimps.

## Producer


**Prawn**
I get my energy from seaweed, carrion and small shrimp-like creatures. I am eaten by crabs, fish and sea anemones.

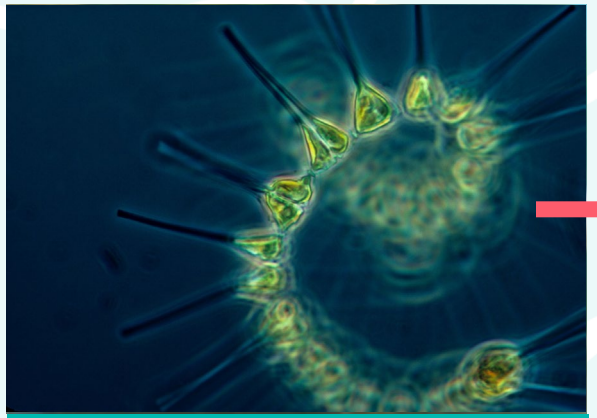
## Prey


**Sea Bass**
I get my energy from shrimps, periwinkles, prawns, crabs and smaller fish. I am eaten by seals and humans.

## Predator Prey


**Seal**
I get my energy from fish, crabs, squid and octopus. I don't have any predators.

## Predator



**Phytoplankton**
I get my energy from the sun. I am eaten by barnacles and mussels.

## Producer

**Mussels**
I get my energy from plankton. I am eaten by humans, dog whelks, seabirds and starfish.

## Prey

**Common Starfish**
I get my energy from periwinkle, mussels, barnacles and limpets. I am eaten by crabs, seabirds and fish.

## Predator Prey


**Herring Gull**
I get my energy from eggs, starfish, crabs, fruit, grains and worms. I do not have any predators.

## Predator

**Algae**
I get my energy from the sun.
I am eaten by limpets and periwinkles

## Producer

**Periwinkle**
I get my energy from algae on rocks and young seaweed.
I am eaten by crabs, lobsters, seabirds and fish.

## Prey

**Lobster**
I get my energy from crabs, sea snails, sea urchins and starfish.
I am eaten by humans.

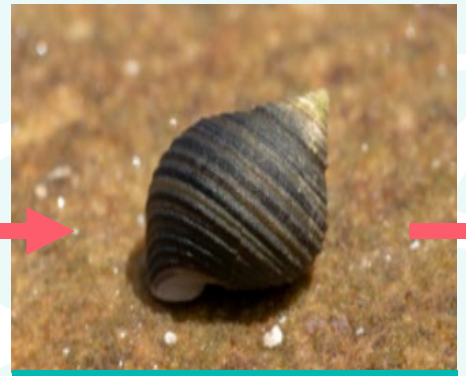
## Predator Prey

**Human**

## Predator

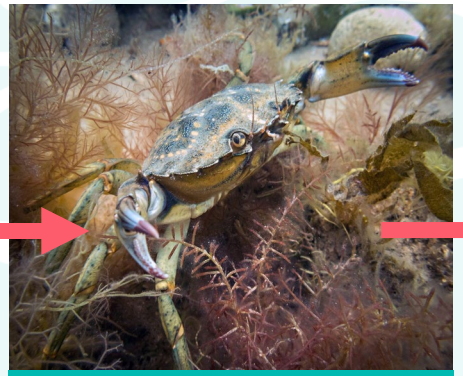
**Algae**
I get my energy from the sun.
I am eaten by limpets and periwinkles

Producer



**Periwinkle**
I get my energy from algae on rocks and young seaweed.
I am eaten by crabs, lobsters, seabirds and fish.

Prey



**Shore Crab**
I get my energy from seaweed, carrion, sea snails, shrimps and small fish. I am eaten by other crabs, fish, lobsters and sea anemones

Predator
Prey


**Sea Bass**
I get my energy from shrimps, periwinkles, prawns, crabs and smaller fish. I am eaten by seals and humans.

Predator
Prey


**Seal**
I get my energy from fish, crabs, squid and octopus. I don't have any predators.

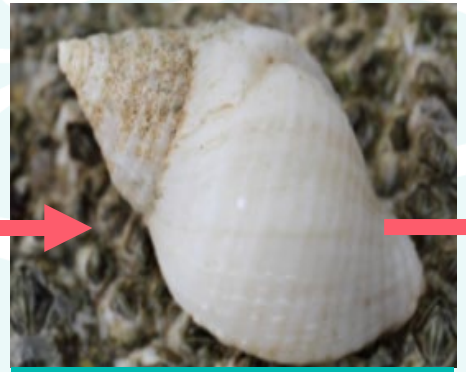
Predator

**Seaweed**
I get my energy from the sun.
I am eaten by limpets, periwinkles, worms, prawns and shrimps.

**Producer**

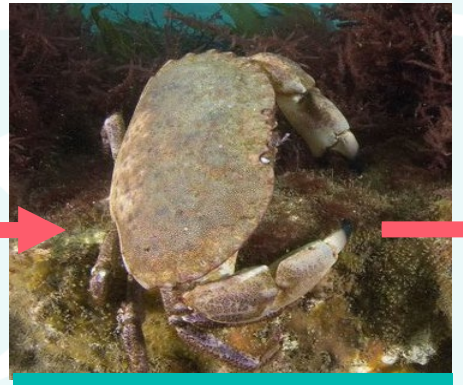
**Limpet**
I get my energy from algae on rocks and young seaweed.
I am eaten by crabs, seabirds, starfish, dog whelks and fish.

**Prey**



**Dog Whelk**
I get my energy from periwinkle, mussels, barnacles and limpets.
I am eaten by crabs, seabirds and fish..

**Predator**
**Prey**



**Edible Crab**
I get my energy from crabs, sea snails, sea urchins and starfish.
I am eaten by humans and lobsters.

**Predator**
**Prey**

**Human**

**Predator**

# **Rockpooling – Using a key** (Year 4)

Explore the rockpool habitat at Sheringham or West Runton beach at low tide to find a variety of life. Children could use a key to identify the creatures and plants they find. Encourage the children to carefully lift up rocks and seaweed to find creatures that are hidden, then return rocks to the position they were found.

Get started in the classroom with Lesson 5: Outdoor Rockpool Explorers.

Guidance about rockpooling can be found here: NMMC How to rockpool.

The Field Studies Council have a great Rocky Shore Name Trail available to purchase.

It's a good idea to have a field guidebook with you too to find out more information about the sealife you come across. Our Rockpool Fact File has some useful information to get you started.

Take a look at Essex Wildlife Trust's Shoreline Identification Guide.

Whiteboard and printable resources about rockpool species available here: Benny the Blenny rockpool poster

Norfolk Wildlife Trust and the National Trust at Sheringham Park also offer rockpooling sessions.

# **Rockpooling – Adaptations** (Year 6)

A good place to start this topic is Lesson 3: How do creatures adapt? in the Amazing Ocean series.

If you can get to a beach, you could also use Lesson 5: Outdoor Rockpool Explorers and explore the rockpools at Sheringham or West Runton at low tide. If you can't get to the coast, use Lesson 6: Indoor Rockpool Explorers.

Encourage the children to consider how each creature they find manages to survive in this habitat - a place that isn't always covered by the sea, sometimes has waves crashing onto it and temperatures can fluctuate. How are they adapted to this environment?

This could be a good opportunity to recap different types of skeleton (see Year 3 Skeleton session). Examples below:

- Crabs: hard shell to protect from rocks and predators. Place one on wet sand and watch it bury itself!
- Mussels: anchored to the rock, they close up when not covered by the sea.
- Beadlet anemones: can curl up into a ball, attached to rock.
- Periwinkles, whelks and limpets: foot secures them to rock, tough shell protects them.
- Prawns: well camouflaged from predators. Live in rockpools.
- Shrimps: well camouflaged from predators. Live in sandy areas. Place one on wet sand and watch it bury itself!

If your group is lucky enough to find two or more different species of crab encourage the children to look closely and compare them. What is the same about them? What is different? Why might that be?

# **Rockpooling –** Adaptations

## Plants

Don’t forget about the plants!

Seaweed lives on the rocks but doesn’t have roots to hold it in place. Seaweeds anchor to the rocks with ‘holdfasts.’ Ask the children to look closely at some.

Notice how some seaweeds have bubbles in them (e.g. bladderwrack). Why do they have this? The bubbles are full of air to help them float up towards the light.

# Non-chronological reports

Use English lessons to expand your pupils' understanding further by writing non-chronological reports about the creatures. An example of a non-chronological report is provided for Parpal Dumplin (purple sponge). Blank non-chronological report formats are included for the following species:

1. Shore crab
2. Edible (brown) crab
3. Common Lobster
4. Beadlet anemone
5. Common starfish
6. (Dotted) Sea hare (Aplysia punctata)
7. Tompot blenny (Parablennius gattorugine)
8. Common whelk (Buccinum undatum)

Children can research their chosen species using the websites below to find facts about appearance, diet, survival and other 'did you know?' facts:

wildlifetrusts.org/wildlife-explorer/marine

marlin.ac.uk/species

britishseafishing.co.uk/fish-species/other-sea-creature-species/

# Parpal Dumplin (purple sponge)

## Appearance

Parpal Dumplin was given its name because it is purple and looks a bit like a dumpling!
It is a type of encrusting sponge which means it forms a crust or layer over the rock on which it lives. Its shape depends on the shape of the rock. The distinctive purple colour of this sponge is quite unusual.

## Survival

Sponges are animals that do not move! They are simple animals that form colonies.
They have toxins that make them unpalatable, so few animals eat them. Some sea slugs are able to eat them and incorporate the toxins into their own bodies for defence!
Some spider crabs tear off small pieces and use them to camouflage their backs where the sponge then grows!

## Diet

Sponges are filter feeders. Tiny holes or pores cover the sponge and draw the sea water in. They take tiny pieces of food (mainly phytoplankton) out of the water that drifts by so help to keep sea water clear.

## Did you know?

This sponge was only discovered in 2011 by some divers. It was new to science!

# Edible crab

## Appearance

## Survival

## Diet

## Did you know?

# Shore crab

## Appearance

## Survival

## Diet

## Did you know?

# Common lobster

## Appearance

## Survival

## Diet

## Did you know?

# Beadlet Anemone

## Appearance

## Survival

## Diet

## Did you know?

# Common Starfish

## Appearance

## Survival

## Diet

## Did you know?

# **Sea hare** (Aplysia punctata)

## Appearance

## Survival

## Diet

## Did you know?

# **Dog whelk** (Nucella lapillus)

## Appearance

## Survival

## Diet

## Did you know?

# Fishing in the Cromer Shoal Chalk Beds Marine Conservation Zone

Ages 7-11

MARINE CONSERVATION SOCIETY

NORFOLK COAST
AREA OF OUTSTANDING NATURAL BEAUTY

seafarers UK
Supporting the maritime community

The Wash and North Norfolk Marine Partnership
Protecting Nature and Culture

Life

# National Curriculum links

Ages 7-11

## Sea to sandwich

**Design and Technology**

Understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed**.**

**Geography**

Describe and understand key aspects of human geography, including: types of settlement and land use, economic activity including trade links, and the distribution of natural resources including energy, food, minerals and water.

## Sustainable fishing in the MCZ

**Citizenship**

To research, discuss and debate topical issues, problems and events.

Why and how rules and laws are made and enforced, why different rules are needed in different situations and how to take part in making and changing rules.

To recognise the role of voluntary, community and pressure groups.

## Crab recipes

**Design and Technology**

Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques.

# Suggested order of learning

## Activity 1 — Sustainable Seafood Lesson 1

The lesson What do we eat and where does it come from? isn't directly linked to the Cromer MCZ fishery, but the seafood shopping list activity is great for linking Maths (data handling) to the topic. The Fisheries Fact File could be used in guided reading.

## Activity 2 — Sea to sandwich

Start by asking students how they think crabs get from the sea into a sandwich. Go through the slides that explain how crab pots work and life as a fisher.

In pairs or groups, give them the Sea to Sandwich image cards but not in order. There are two sets of images to choose from, A: with captions or B: without captions.

Give them a few minutes to see if they can sort them. This should lead to some interesting discussions. Get the children to share any main points that came up during their discussions and anything that surprised them.

Use the slides to go through the images in number order, explaining what's happening at each stage.

Ask the children to make any changes to the order of their images. Can they take it in turns to explain the process of sea to sandwich? Ask them how many people are involved and what their jobs are. There are additional videos to show a fisherman at work.

This session could be taken further in English through explanation writing.

## Activity 3 — Sustainable fishing in the MCZ

Use the Sustainable fishing in the MCZ slides in the presentation to develop pupils' understanding of possible threats from fishing to the MCZ and how these are being managed.

The learning feeds into the game in the next session.

## Activity 4 — Sustainable Seafood Lesson 2

The Let's go fishing lesson introduces different fishing methods with an interactive game. Check out the suggestions below to adapt the game to focus on crab fishing and the fishing methods outlined in Activity 3.

After the first round, ask pupils to suggest management ideas for the crab fishery and try them out. Here's a checklist of methods covered:

**Minimum Landing Size** - small crabs are released after being caught. Designate some children as small crabs (you could use stickers).

**Berried** crabs are released after being caught. Some children could be given balls to carry to represent the eggs.

**Limit number of licenses** - only allow a maximum of 3 fishers.

**Limit the potting effort** (number of pots and days they can fish) so children are limited to just 3 goes at being a fisher.

**Quotas** - fishers are limited to catching just 3 crabs each.

**No-fishing zones** - spaces where the crabs can be safe as they cross.

You can reset numbers of crabs as you play because new crabs hatch and grow each year.

## Activity 5 — Crap recipes

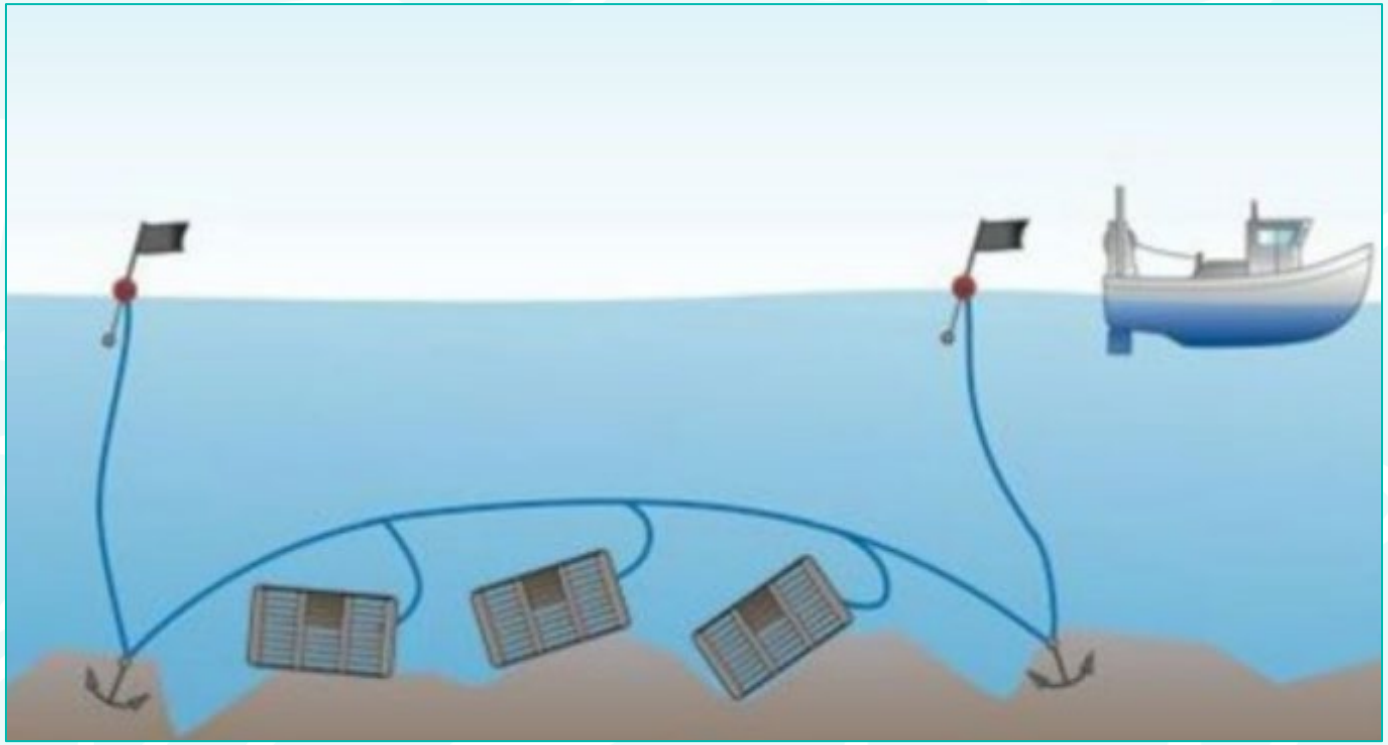
Use the recipe slides to prepare and cook your own crab dishes.

# Have you ever seen crab pots stacked up by the sea?

# How do crab pots work?

The crab pots are laid in lines called shanks.

There are usually 10 to 25 pots per shank depending on the size of the boat.



# How a parlour (crab) pot works:

**1.** Bait (dead fish) is secured inside the pot between two pieces of cord

**2.** Crabs and lobsters want to eat the bait so they move around the pot until they find a way in


**3.** The crabs and lobster find an entrance. It's easy for them to crawl into the wide opening and drop into the pot

**4.** When they finish eating, they look for a way out. They can't get out the way they came in because it's narrow and high up

**5.** They find a way to go, but this takes them up the net slope

**6.** The slope leads into the 'parlour' which they drop into and stay until the pot is emptied by a fisher

# Life as a fisher

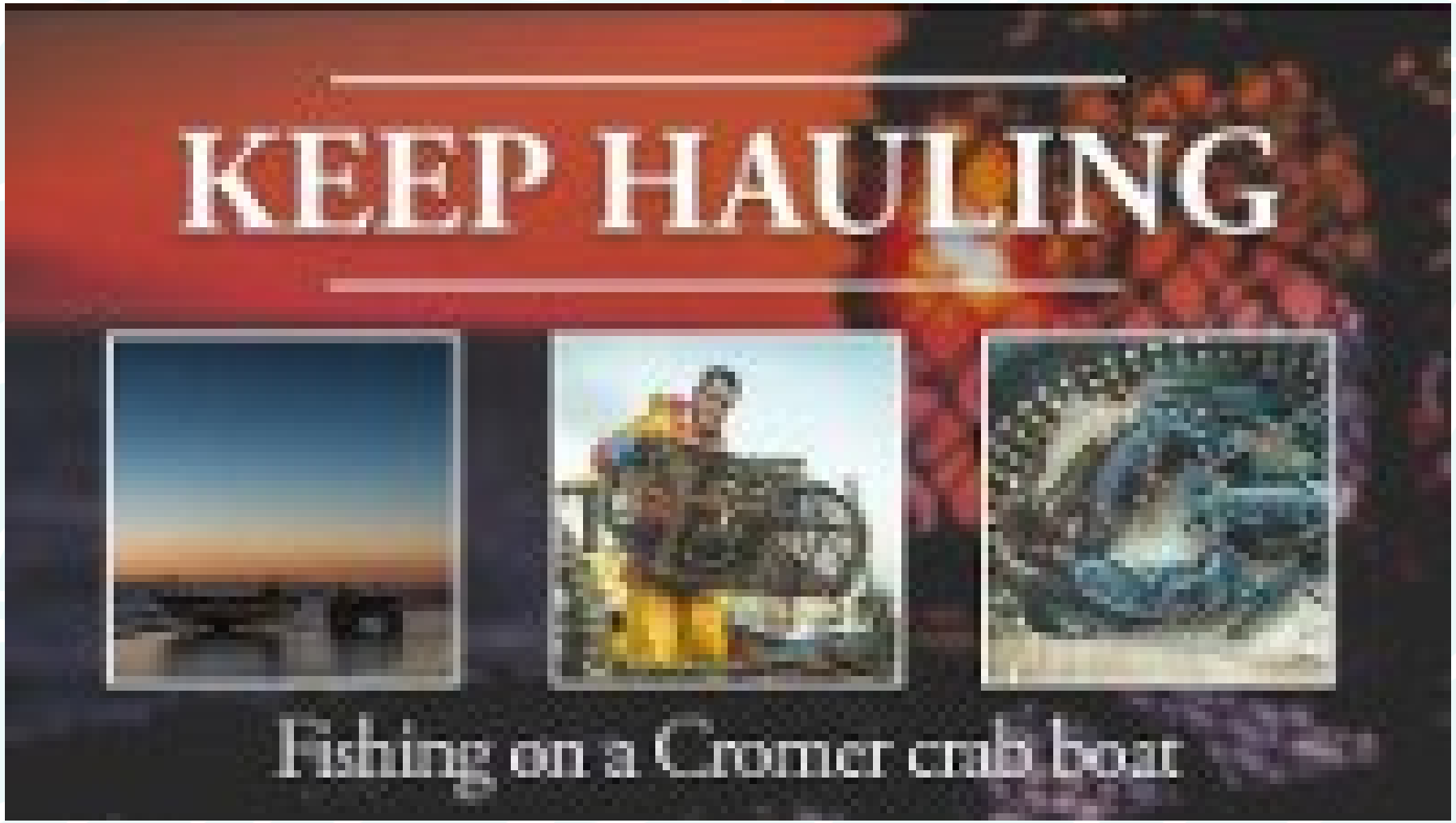
Crab fishers are out on the water most days, weather permitting, from March to October and less often during the winter.

Many have small boats that they operate single-handedly, though some have crew of up to four people. Depending on tides, they can have early morning starts in the dark. They go out in varying weather conditions so long as the wind and waves are not too strong.

In winter, the cold temperatures mean there are fewer crabs around so they use this time of year to fix damaged pots and carry out maintenance of their boats.

**The video on the next slide shows a Cromer fisherman's day at work out on his boat.**

# Life as a fisher



# Sea to Sandwich

Edible (brown) crabs live in the sea.

Photo: christaylorphoto.co.uk


Being a fisher can mean some early morning starts depending on the tides.

They go to their pots which are marked with flags.

They haul in their pots. The fishers use a winch to help raise the pots.

Photos: christaylorphoto.co.uk

The pots are emptied.

Photo: christaylorphoto.co.uk

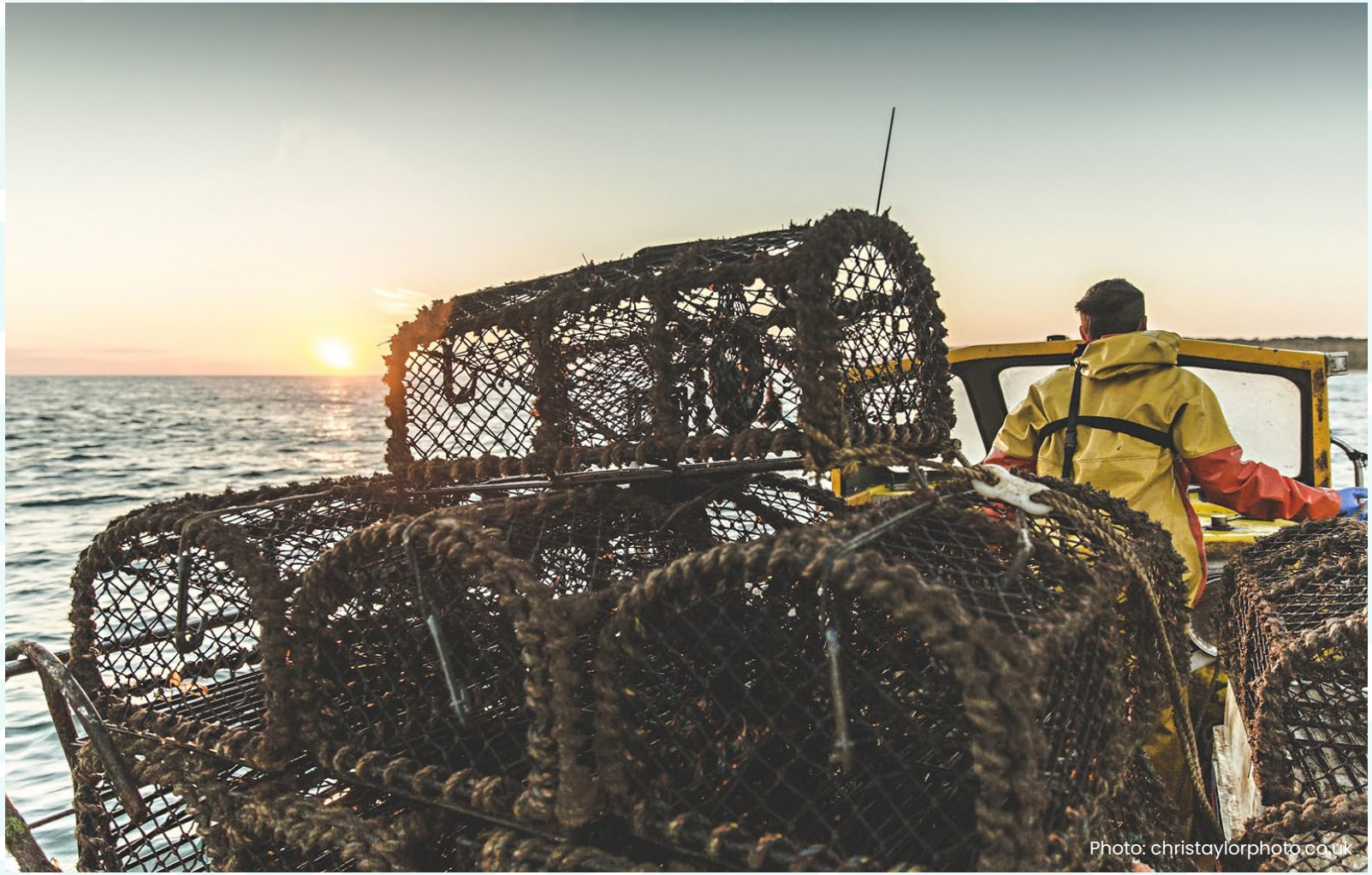
The crabs and lobsters are measured and checked.


If they are too small or are berried (have eggs) they are thrown back.

The crab pots are baited.

Fishers use a variety of bait - scad, flounder, gurnard and salmon heads are commonly used.

The pots are stacked in the boat then taken to another area.



# The pots are lowered back into the sea


The fishers empty other shanks of pots then head back to shore with their catch.

When back on shore, the crabs and lobsters are transported alive to the factory.

Photo: Rob Coleman


Photo: Rob Coleman

The crabs and lobsters are stored alive at the factory.


Lobsters are stored in tanks of circulating, filtered seawater.


Crabs are stored in large boxes.

The crabs and lobsters are stunned and then cooked.


Photo: Rob Coleman


Photo: Rob Coleman

This all happens on a conveyor belt through the stunner and into the boiling water.

They are then chilled and stored before being ‘dressed.’


Dressing a crab means the meat is removed from the shell.


The meat is put back in shells that have been cleaned and sterilised in boiling water.

# Dressing a crab!

See a crab being dressed at Davies Fish Shop in Cromer:

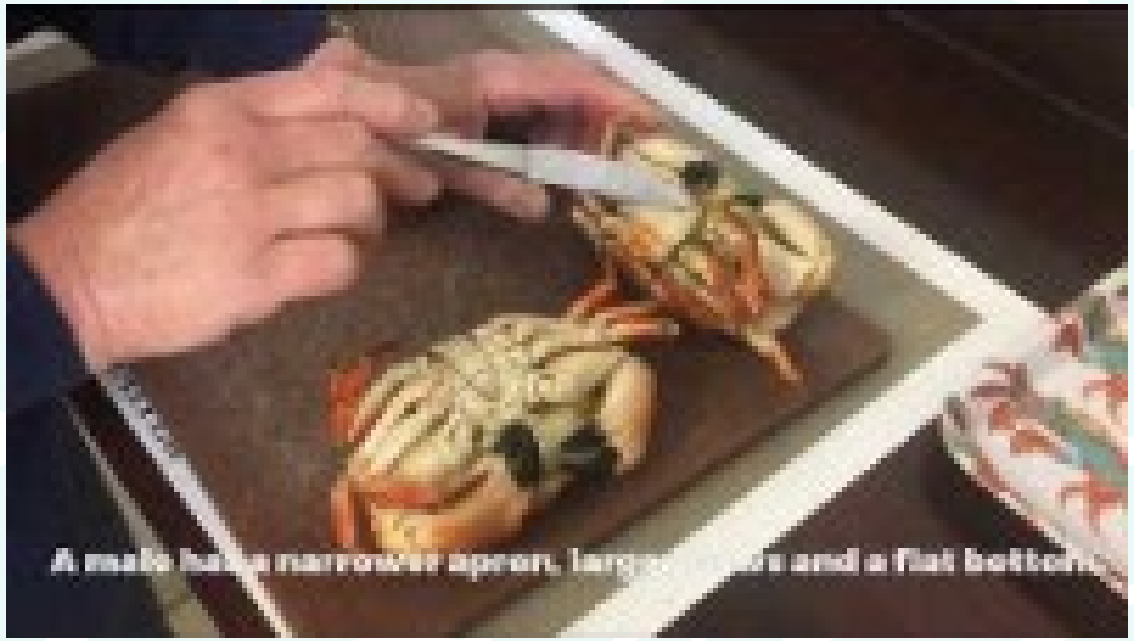


Photo: Rob Coleman

The dressed crabs are then labelled and boxed up ready to transport to the wholesaler, supermarket or restaurant.

Photo: Rob Coleman

Photo: Rob Coleman

The crabs are ready to be bought and eaten!

# Sea to Sandwich

Can you put the pictures in the correct order to show how a crab becomes a crab sandwich?

A crab sandwich ready to eat

The fisher collects the pots in

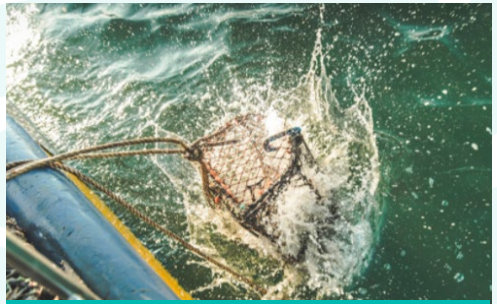
The crabs are cooked


Crabs are taken to the factory

Packed ready for sale

A crab is living in the sea

The crabs are dressed



Pots laid in shanks in the sea


Transported to supermarket or restaurant

The crabs are taken out of the pots and measured

# Sea to Sandwich

Can you put the pictures in the correct order to show how a crab becomes a crab sandwich?



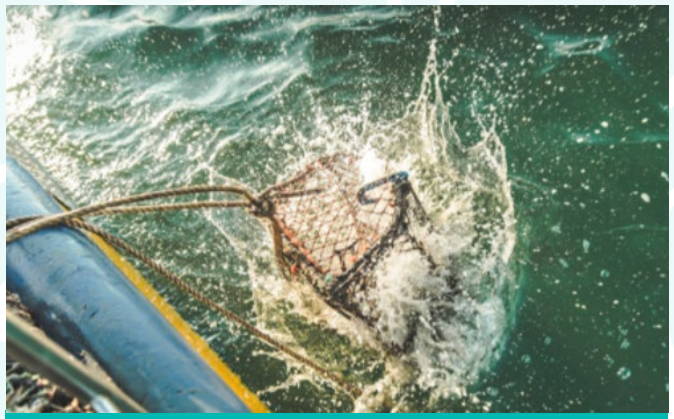
# Sea to Sandwich

Did you get them in the right order?

1.

A crab is living in the sea

2.

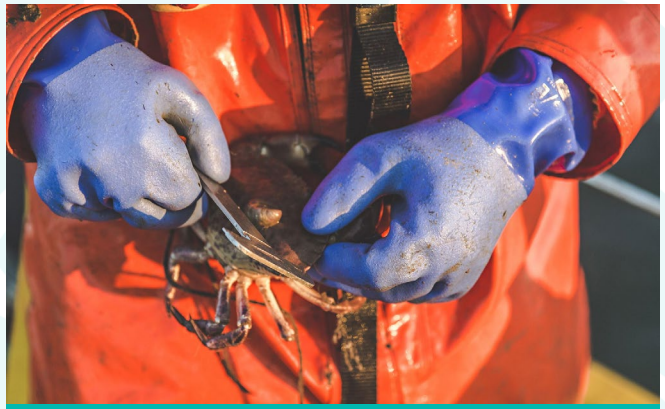


The pots are laid in shanks in the sea

3.

The fisher collects the pots in

4.



The crabs are taken out of the pots and measured

5.


The crabs are taken to the factory

6.

The crabs are cooked

# Sea to Sandwich

Did you get them in the right order?

7.

The crabs are dressed

8.

Packed ready for sale

9.


Transported to the supermarket or restaurant

10.

A crab sandwich ready to eat!

# The North Norfolk crab fishery

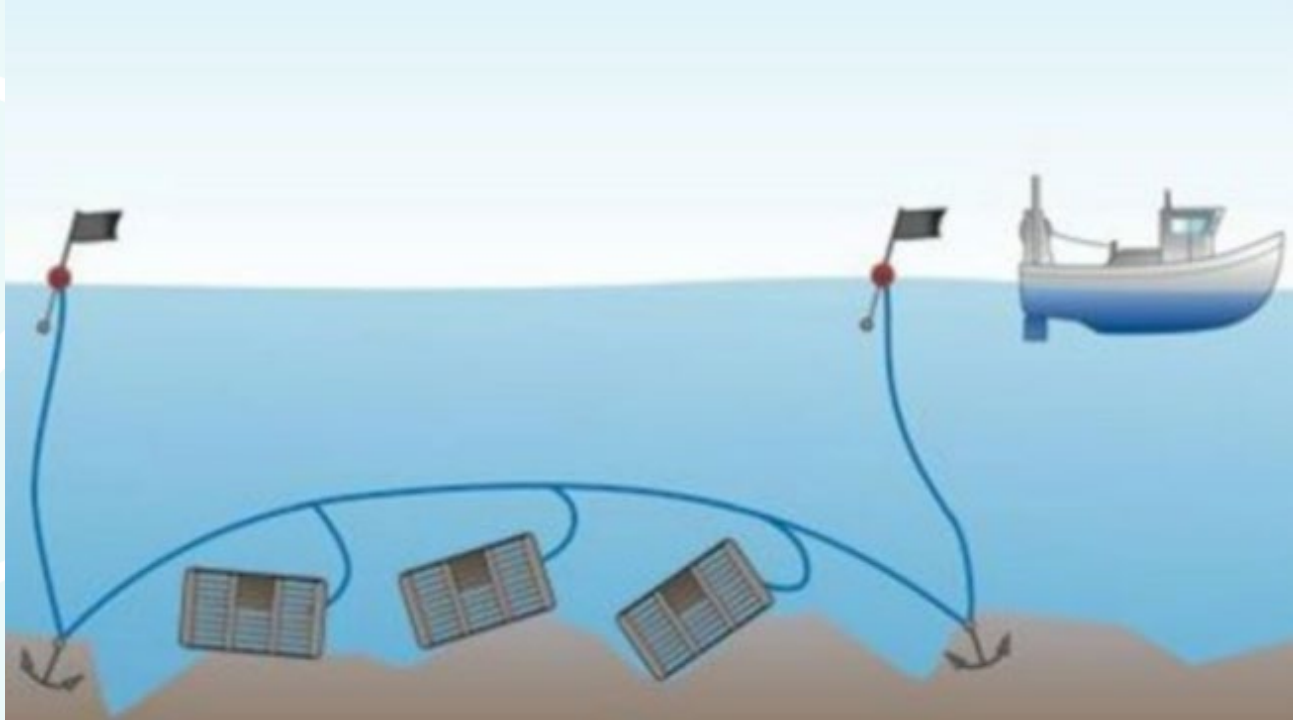
This video shows crabs being dressed and served at Rocky Bottoms café:

# Sustainable fishing in the Cromer Shoal Chalk Beds Marine Conservation Zone

# Fishing in the MCZ

Crab fishing is an important part of the economy in North Norfolk; it employs many people and brings money to the area.

People also feel that fishing for Cromer crabs is an important part of the local heritage. It has been happening here for centuries and crab pots have been used to catch crabs and lobsters since the 1860s.



## What does the Marine Conservation Zone do?

The role of the MCZ is to:

- Maintain it in favourable condition
- Provide social, environmental and economic benefits

It is a ‘sustainable use site.’ This means that fishing and other activities can continue in a Marine Conservation Zone if they are **sustainable**.

## What does sustainable mean?

## Sustainable = Able to carry on without harming the environment

If humans damage or harm the place and its wildlife, they won't be able to keep fishing, boating and diving here as there wouldn't be crabs and lobsters to catch or wildlife to see.

There are laws and guidance that protect the area, and these may change over time.

# Potting

Fishing for crabs using pots (potting) has been happening along the north Norfolk coast for over 150 years. To be sustainable it must be carried out in a way that means it can continue for many centuries to come.

In general, potting is considered 'low impact' as it is a selective form of fishing with very little bycatch . This is because other creatures are not caught, or if they are, they are released.

# How is the Cromer Shoal Chalk Beds MCZ protected?

**Eastern Inshore Fisheries and Conservation Authority (IFCA)** manages the inshore marine environment and fisheries (to 6 miles off the coast) for Norfolk.

Their work includes:

- **Monitoring** fishing and its impact on the environment.
- **Regulating fishing and enforcing fishing byelaws.**
- Working with many **stakeholders** with the aim of balancing conservation and fishery objectives.

Eastern IFCA has an **Adaptive Risk Management** approach to their management of the Cromer Shoal Chalk Beds Marine Conservation Zone. This means they will bring in new laws or amend existing laws if evidence suggests there is a need.

These slides state the regulations and laws in place in 2023.

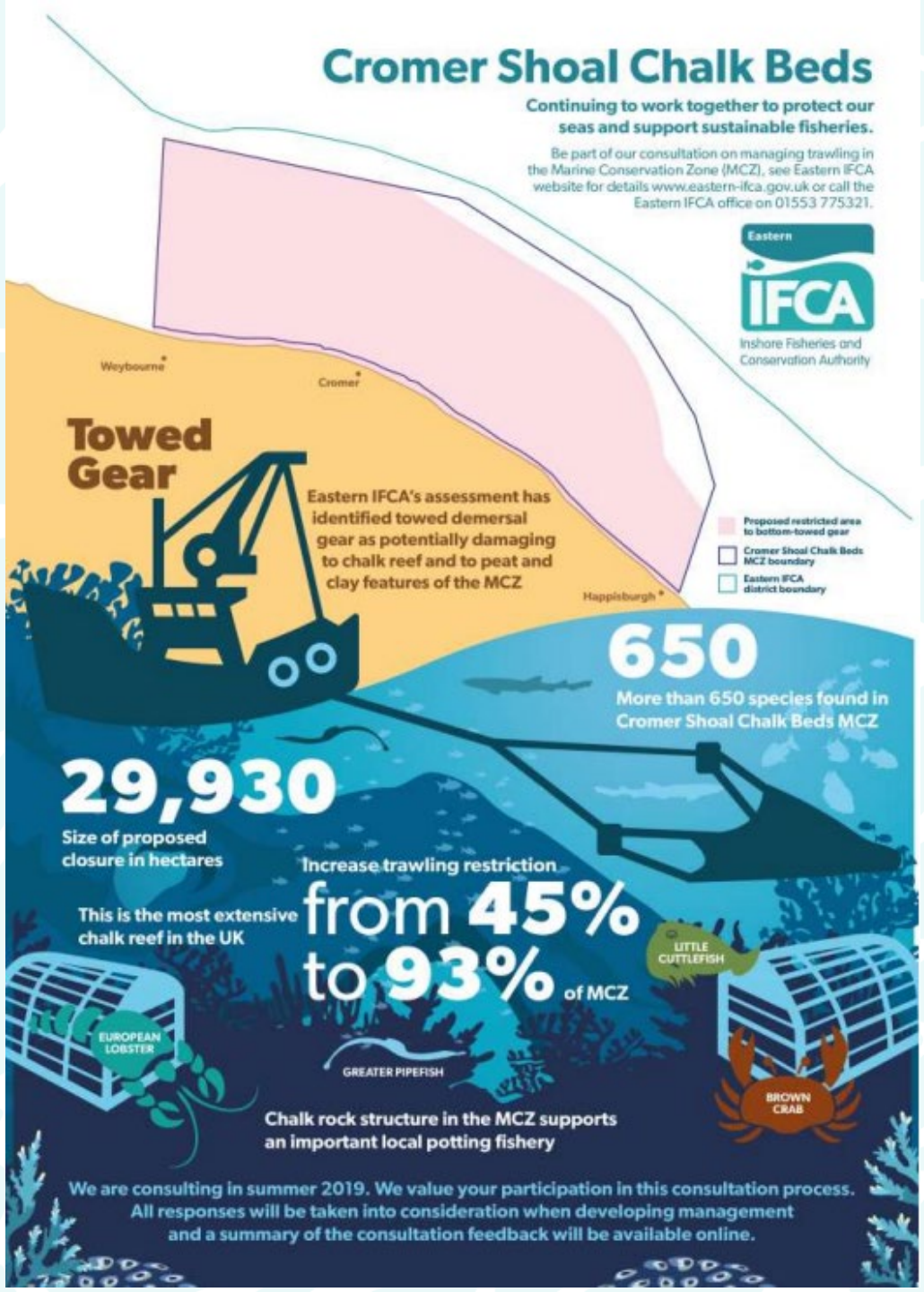
Eastern IFCA
Inshore Fisheries and Conservation Authority

# Damage from trawling and dredging in the MCZ

Trawling is a type of fishing where nets are dragged along the seabed, which can cause damage to the habitat.

Over 50 years ago, local fishermen recognised this and urged the fishing managers to introduce a trawler-free zone in the sea between Blakeney church and Mundesley church out 3 nautical miles.

This rule only covered 45% of the MCZ area so in 2021, the trawling byelaw was altered to increase this to 93% of the MCZ.



# Overfishing

Overfishing is catching fish (or crabs!) faster than they can reproduce causing numbers to decline.

This is not sustainable. There are fishing regulations and laws to help prevent this.

## Limits on sizes of crabs and lobsters taken

Fishers in this area are not allowed to land crabs that are smaller than 115mm across their shell. This is known as the Minimum Landing Size (MLS). Any that are smaller get thrown back.

This means the crabs have at least one chance to breed before they are caught.

A pot often catches up to 30-40 crabs, sometime more, but the fisher may only keep 3 or 4 of them!

In other parts of the sea, the MLS is bigger. It is 140mm for much of UK waters.

## Berried and soft crabs

Any female crabs and lobsters that have eggs on them are described as being ‘berried’ and must be thrown back.

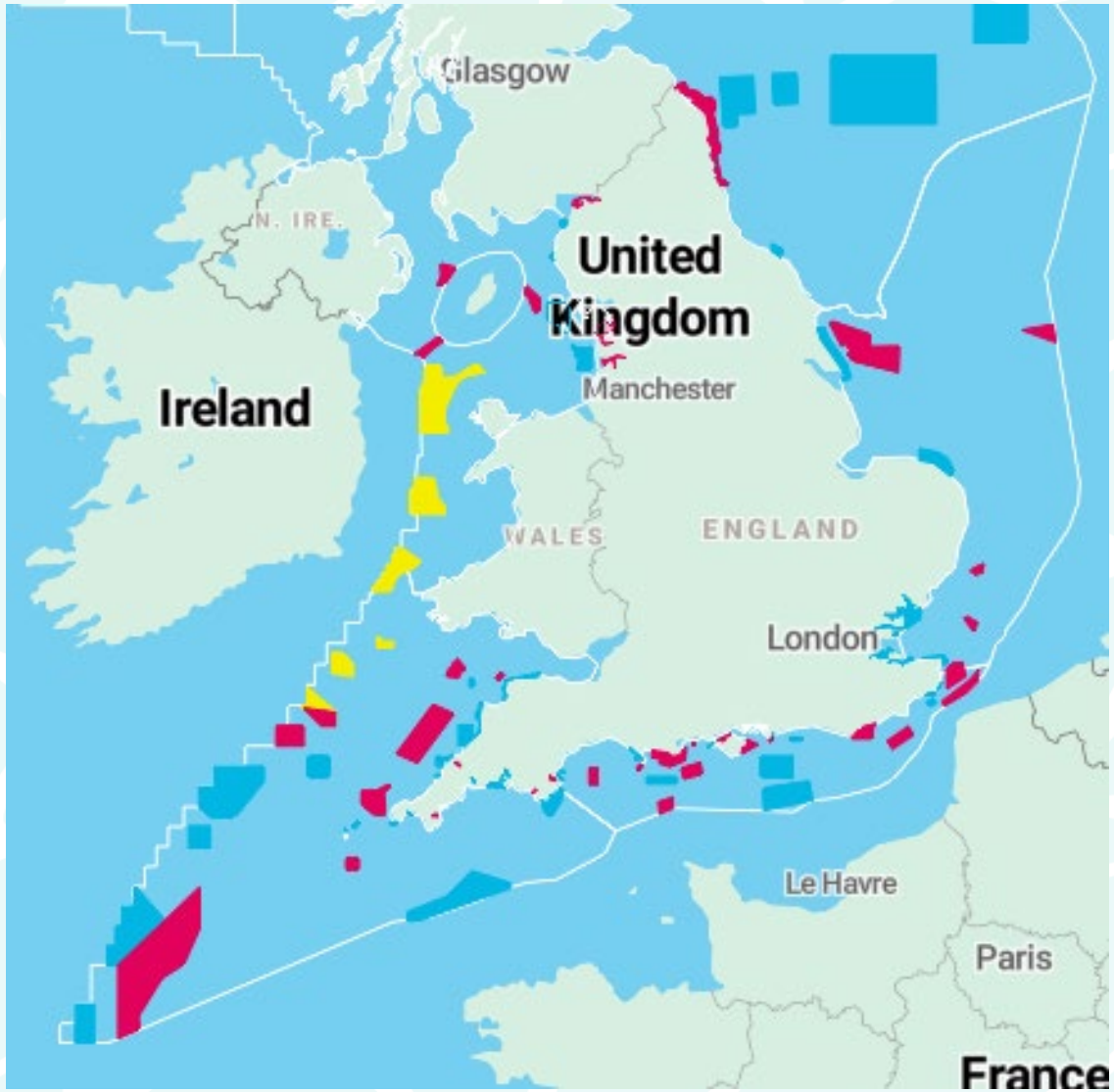
It is the same for soft-shelled crabs that have recently moulted. However, these are rarely caught because they tend to hide up until their shells harden.

## Understanding crab numbers

Fish and crabs can migrate large distances - there are no borders in the ocean!

This makes understanding crab populations tricky. International cooperation is needed to help understand populations more fully.

The crabs do not stay inside the MCZ!



# Maximum Sustainable Yield

Currently (in 2023) there are no limits on:

- the number of licences issued
- the catch effort (number of pots or days of catching allowed)
- quotas (the number of crabs and lobsters fishers are allowed to land).

In recent years, the number of fishers has decreased but the catch effort has increased.

# Environmental impact of potting in the MCZ

In 2019 a study found that potting fisheries were linked to physical damage to chalk outcrops.

Chalk is a soft rock and the pots and ropes can rub it, wearing it away. The pots and anchors can also break the rock when they strike it. Though this damage is considered small, collectively it affects the conservation objectives of the MCZ. There have been up to 8000 pots counted on the chalk reef on one day.

In 2020, Natural England stated that management of lost and stored pots is required as they are thought to pose the most risk to the chalk beds.

# Lost pots

Occasionally, pots may get separated from their shank or lose their markers during storms, by getting snagged on rocks or rope being cut by a boat propellor. Lost pots cause problems by:

- Continuing to catch crabs and lobsters when they are lost. This is known as **ghost fishing**.
- **Scraping and wearing away the chalk seabed** as the pots and ropes move in the currents. This can damage the life that is attached to the rocks.
- Costing the fishers **time and money** when they replace lost pots.

# Code of practice

A code of practice was drawn up in 2021 to help minimise the damage to chalk from pots. This is a voluntary agreement.

# Cromer Shoal Chalk Beds Byelaw 2023

A new byelaw means that fishers must:

1. Have permits to use crab pots inside the MCZ.
2. Mark all their pots so they can be identified.
3. Retrieve pots they lose.

It is a flexible byelaw. This means new measures may be introduced if research and monitoring suggests they are needed to keep the chalk reef in good condition.

# Research and monitoring

Research and monitoring is being carried out to better understand the issues:

- Mapping the seabed and fishing activity to better understand the area and its use.
- Remotely operated vehicles are being used to film pots on the chalk to help assess the extent of the damage.
- No-fishing areas are being set up to compare the impact with areas that are fished.

The findings will help make decisions on how to manage the fishing in the MCZ.

# The Good Fish Guide

The Marine Conservation Society's Good Fish Guide is updated each year.

It gives an idea of how sustainable the fishing is for different species in different parts of the sea.

The Cromer fishery is part of the Southern North Sea: Eastern IFCA district.

Find out more on the website: mcsuk.org/goodfishguide/

# Crab recipes

Have a go at making some savoury recipes using Cromer Crab!

Recipes include:

- **Crab sandwich**
- **Crab cakes (like fishcakes!)**
- **Crab and sweetcorn chowder**

# Crab sandwich

## Ingredients

- Bread
- Butter
- Crab meat
- Mayonnaise
- Salt
- Pepper
- Lemon juice
- Lettuce

## Method

1. Butter the bread.
2. Mix the crab meat with some mayonnaise, a squeeze of lemon juice and season with salt and pepper.
3. Spread the mixture onto the bread.
4. Add some lettuce and top with another slice of bread.
5. Serve!

# Crab cakes

## Makes 10 x 6cm crab cakes

### Ingredients

- 3 spring onions
- ½ a bunch of fresh flat-leaf parsley
- 1 large free-range egg*
- 750g cooked crabmeat
- 300g  potatoes
- 1 tsp ground pepper
- 1 tsp cayenne pepper
- Pinch of salt
- Plain flour*, for dusting
- Olive oil

*Recipe can be made gluten free by substituting gluten-free flour
*The egg can be substituted by egg-free mayonnaise

### Method

1. Peel, boil and mash the potatoes and leave to cool.
2. Trim and finely chop the spring onions.
3. Pick and finely chop the parsley.
4. Beat the egg.
5. Combine the crab meat, potatoes, spring onion, parsley, pepper, cayenne and egg in a bowl with a little salt.
6. Shape into 6cm cakes.
7. Dust with flour.
8. Shallow-fry in oil over a medium heat for about 5 minutes each side or until golden brown.

# Crab chowder

## Ingredients

- 1 tbsp olive oil
- 1 small/medium onion, chopped
- 2 celery ribs, chopped
- 2 medium carrots, peeled + chopped
- 2 leeks, sliced into half-moons
- 2 large potatoes, peeled and diced into small cubes
- 1 bay leaf
- 1 tsp paprika
- 1 tsp ground pepper
- 1½ tsp salt
- 1 litre vegetable stock
- 2 large tins sweet corn
- 500g fresh crab meat
- 100ml milk
- 100ml single cream
- ¼ cup finely chopped fresh parsley

## Method

1. In a large hob to oven dish, gently fry onions, celery, carrots, and leeks until soft.
2. Add potatoes, bay leaf, paprika, pepper, salt and vegetable stock. Cook for about 8-10 minutes until the potatoes are halfway done.
3. Puree 2 cups of the vegetable mixture in a food processor or blender until smooth. Stir the mixture back into the pot.
4. Add sweetcorn, crab meat, milk and cream. Cook uncovered for about 8 minutes.
5. Stir in parsley and serve!

# Viewpoints and values

Ages 7-11

MARINE CONSERVATION SOCIETY

NORFOLK COAST
AREA OF OUTSTANDING NATURAL BEAUTY

seafarers UK
Supporting the maritime community

The Wash and North Norfolk Marine Partnership
Protecting Nature and Culture

Life

# Viewpoints and values

This resource is to get children thinking about the role of the sea in their own lives. It works well as part of a unit of work about the sea or can be used as a stand-alone lesson.

The session includes:

- Exploring the many ways the ocean affects our lives
- Finding out about the viewpoints of some people local to the Cromer Shoal Chalk Beds MCZ
- Children explore their own feelings about the sea
- Ideas to use during a visit to the beach

## National Curriculum objectives:

**Citizenship**

- To reflect on spiritual, moral, social, and cultural issues, using imagination to understand other people's experiences.

**Health Education**

- That mental wellbeing is a normal part of daily life, in the same way as physical health.
- How to recognise and talk about their emotions, including having a varied vocabulary of words to use when talking about their own and others' feelings.
- The benefits of physical exercise, time outdoors, community participation, voluntary and service-based activity on mental wellbeing and happiness

MARINE CONSERVATION SOCIETY

NORFOLK COAST
AREA OF OUTSTANDING NATURAL BEAUTY

seafarers UK
Supporting the maritime community

The Wash and North Norfolk Marine Partnership
Protecting Nature and Culture

Life

## Activity 1 — How do we use the sea?

Start by getting the children to discuss their own use of the sea and create a class mind map titled 'the ocean and us.'

- What things do you do when you visit the sea?
- Do you use/eat anything that comes from the sea?
- Can you think of other things people get from the ocean?
- Is there anything else the oceans do for us?

You can find more information about what the ocean does for us in the Amazing Ocean Fact File. Use the fact file to add other ideas for your mind map that are suitable for your class.

The video What did the ocean ever do for us? provides a great overview of the topic.

## Activity 2 — People's viewpoints

Split the class into groups, giving each group one of the viewpoint sheets. There are two versions of each to enable differentiation. They need to read through and consider:

- What do they like about the sea?
- Why do you think that is?
- Do their feelings for the sea affect what they do?
- What would they say to you?

Use hot seating and get each group to imagine being that person and answer questions from the rest of the class.

Draw out differences and similarities between the different groups as you go.

## Activity 3 — What does the sea mean to me?

Now ask the children to consider their own responses to the sea – they should do this individually as it's a chance to consider their personal thoughts and feelings. They can use the sheet provided to write and draw their response.

How do I interact with the sea?
How do I feel about the sea? Why?
What does the sea do for me?
What can I do for the sea?

## Activity 4 — Reflection

When the class have had time to respond, ask them to consider if their feelings for the sea affect things they do.

Shelly spends lots of her spare time collecting litter. Philip, John and Chris spend time helping people to be safe at and by the sea. Spending their time helping the ocean and others helps them feel good too.

What do the children think they can do to help the ocean? Have any of them done some of those things before? How did it make them feel?

# Shelly - Beach Clean Organiser

**The sea and me**
I grew up in Bacton and spent many hours on the beach; it's like my second home. Since 2013, I have been a volunteer beach clean organiser covering the beaches from Trimingham to Sea Palling. I volunteer for the Marine Conservation Society and I have my own group called North Norfolk Beach Cleans. I also volunteer for Friends of Horsey Seals during the pupping season which includes doing early morning seal counts.

**How I feel about the sea**
I love the beach and sea. All my cleans are voluntary and I rely entirely on donations of beach clean equipment. Doing this benefits my wellbeing; I enjoy being on the beach with like-minded people and giving something back to nature. It's good physical exercise too; walking up dunes and along the sand carrying heavy bags is quite a work out!  I find it fun and relaxing too.

**The MCZ**
It is important to encourage sustainable use of surrounding areas, particularly fishing hot spots. People need to see and learn about the unusual and beneficial ecosystem of the MCZ with creatures like sea cucumbers, crabs, lobsters and fish. Marine plant life is vital for our carbon cycle and our food web; they all play an important part in balancing our marine ecosystem.

**My message**
- Go out and enjoy the beauty of a natural untouched environment.
- Learn about the marine ecosystem and how every creature and plant, from microscopic plankton to predators such as sharks and seals, play a vital part in the balance and health of our oceans. If we overfish and destroy habitats, it can have a knock on effect on the whole earth ecosystem. It could affect our food supplies, clean air and water supplies if unbalanced.
- Do little things like pick up litter, put litter in the bin, try to reuse wherever possible, avoid polystyrene and non-recyclable products and if you eat seafood make sure it is sustainably caught.

# Shelly - Beach Clean Organiser

**The sea and me**
I grew up in Bacton and have spent many days on the beach. I run beach cleans as a volunteer, covering the beaches from Trimingham to Sea Palling. My group is called North Norfolk Beach Cleans. I also volunteer for Friends of Horsey Seals during the pupping season.

**How I feel about the sea**
I love the beach and sea. It makes me feel good when I am with other people helping nature. Walking up sand dunes and along the beach carrying heavy bags keeps me fit! It is fun and relaxing too.

**The MCZ**
It is important to look after the area. People need to see and learn about the habitat and wildlife in the MCZ. The sea plays an important part in looking after our planet so we need to look after it.

**My message**
Go out and enjoy the beauty of the beaches and sea. Learn about the sea and how every creature and plant plays an important part in the balance and health of our oceans and planet. Do little things like pick up litter, put litter in the bin, try to reuse wherever possible and avoid single-use plastic.

# Chris – snorkeller, photographer and lifeboat crew member

**The sea and me**

I've lived in Sheringham all my life and enjoy walking along the tideline (usually with a bag for collecting any rubbish I find), swimming in the sea, surfing, kayaking or taking my boat out at Blakeney Point to see the seals and go fishing. I enjoy snorkelling when the sea is clear to see the amazing sea life and taking lots of photos and video.

In 2021, I found and filmed a 125 year old shipwreck (the SS Commodore) just off Sheringham which caused a lot of interest with local newspapers and I was even on an American TV show talking about the wreck. In 2000, I joined the lifeboat crew at Sheringham. I am currently the Deputy Senior Helmsman (meaning I drive the boat).

**How I feel about the sea**

I have always loved the way that the sea changes so much between the seasons. From snorkelling in inviting, clear, (fairly) warm water in summer to watching huge waves lash the shoreline in a winter storm. The drama and power of the sea is unrivalled for me. I really enjoy snorkelling and making the short films for other people to see what a special place the chalk reef is. I am on the lifeboat crew because I like to help people in trouble and it can also be fun to go out on the lifeboat.

**The MCZ**

It is important to find the balance between protecting the sea life of the MCZ and letting all of the users of the sea (crab fishermen, snorkellers, swimmers) do what they want to do. The wildlife and structure of the chalk reef are very hardy as they have to endure the winter storms. The fishermen are very good at protecting the reef to allow them to earn a living while the fishing regulations and laws ensure healthy populations are maintained. One of the biggest challenges is ensuring our Blue Flag beaches remain pollution-free and that our seas have as little plastic and rubbish thrown into them as possible as this harms the fish and other animals.

**My message**

If you get a chance to snorkel here in the summer you will be amazed by the wonderful animals that live in the shallow waters so close to the beach. The MCZ is a very special place and needs our help and protection so next time you go to the beach take a bag and pick up any rubbish you find, particularly any plastic. The fish will thank you!

# Chris – snorkeller, photographer and lifeboat crew member

**The sea and me**
I've lived in Sheringham all my life and enjoy walking along the beach (often with a bag for any rubbish I find), swimming in the sea, surfing and taking my boat out at Blakeney Point to see the seals. I enjoy snorkelling when the sea is clear to see the amazing sea life and take lots of photos and video.  I am also in the lifeboat crew at Sheringham.

**How I feel about the sea**
I love the way the sea changes so much between the seasons. From snorkelling in clear, warm water in summer to watching huge waves lash the beach in a winter storm. I really enjoy snorkelling and making the short films to show other people what a special place the chalk reef is.  I am on the lifeboat crew because I like to help people in trouble and it can be fun to go out on the lifeboat.

**The MCZ**
It is important to find the balance between looking after the sea life of the MCZ and letting all of the users of the sea (crab fishermen, snorkellers, swimmers) do what they want to do. We need to make sure our Blue Flag beaches stay pollution-free and that our seas have as little plastic and rubbish thrown into them as possible as this harms the wildlife.

**My message**
The MCZ is a special place and needs our help so next time you go to the beach take a bag and pick up any rubbish you find.  The fish will thank you!

# Philip - RNLI lifeboat volunteer

**The sea and me**
Quite a few years ago, I was a fisherman for a couple of years off Cromer, catching crabs, lobsters, whelk and herring. Through being a fisherman, I was encouraged to join the RNLI lifeboat where I crewed for thirty years. When I retired from the crew, I remained involved and am now chairman, press officer and community safety officer for RNLI Happisburgh Lifeboat Station.

I go to the lifeboat station at least once or twice a week to raise public awareness about water safety. I was also in the RAF on Air Sea Rescue Launches as a Coxswain in the seventies. I regularly walk my dog on the beach. My dog loves to swim in the sea!

**How I feel about the sea**
I love the beauty and power of the sea. I also love the way it is always changing; there is something different every time you visit whether it's the beach, the colour of the sea or the weather. I want to help others to have fun whilst keeping safe. I also enjoy being part of the lifeboat team; the RNLI is like a big family of like-minded people.

**The MCZ**
I feel it is important that we protect and maintain the chalk reef so it can carry on as it has for many years. It is also important that fishermen can carry on and earn a living.

**My message**
My main message is to respect the sea and keep safe. Always have an adult with you when you swim. Learn how to float (starfish float on your back) - it's the one thing that will save you if you unexpectedly end up in the water. Visit rnli.org to find out more about keeping safe during water based activities.

# Philip – RNLI lifeboat volunteer

**The sea and me**
I was a fisherman at Cromer catching crabs, lobsters, whelk and herring. I joined the RNLI lifeboat and was on the crew for thirty years. Since I retired from the crew, I have taken on other roles at the RNLI Lifeboat Station. I go to the lifeboat station every week to raise public awareness about water safety. I was also in the RAF on Air Sea Rescue Launches. I walk my dog on the beach. My dog loves to swim in the sea!

**How I feel about the sea**
I love the beauty and power of the sea. I also love the way the beach, the colour of the sea and the weather are always changing. I volunteer for the RNLI because I want to help others to have fun whilst keeping safe. I also enjoy being part of the lifeboat team.

**The MCZ**
I feel it is important that we protect and maintain the chalk reef so it can carry on as it has for many years. It is also important that fishermen can carry on and earn a living.

**My message**
My main message is to respect the sea and keep safe. Always have an adult with you when you swim. Learn how to float (starfish float on your back) - it is the one thing that will save you if you end up in the water. Visit rnli.org to find out more about keeping safe at the beach.

# Ben – Surf school manager

**The sea and me**
I have been running a surf school and surf shop in Cromer since 2007. I am the head instructor of surf and stand up paddle board (SUP) lessons but most of the time I'm managing the business. I love surfing and aim to get out whenever there are waves! My love for the sea began when I was about 10 years old and started going sea fishing from Falmouth in Cornwall. I saw lots of people surfing so gave it a go and ended up getting my first board when I was about seventeen.

**How I feel about the sea**
I am lucky that I get to combine my hobby with my work! I love the sense of freedom I get when I go surfing. The sea is so vast. I also really appreciate the health benefits, both physical and mental, that I get from surfing, stand up paddleboarding and generally being in and by the sea. It really gives me an opportunity to find a space to relax, be refreshed and continue positively with life.

**The MCZ**
It is important that there is a balance in the way the MCZ is managed. Tourism is a really important part of the local economy that needs to be considered. People come here to surf, enjoy the view, see the wildlife and eat Cromer crabs.

**My message**
The North Norfolk coast is like a giant, free playground! Visit it and most importantly experience it. Take your shoes off and feel the water on your feet, go for a swim, try surfing lessons and make sure you keep safe. By experiencing it you will develop a natural love for it. The coast needs to be looked after and preserved for generations to come.

# Ben – Surf school manager

**The sea and me**
I run a surf school and surf shop in Cromer. I teach surf and stand up paddle board lessons but most of the time I'm managing the business. I love surfing and aim to get out whenever there are waves! My love for the sea began when I was about 10 years old and started going sea fishing.

**How I feel about the sea**
I am lucky that I get to combine my hobby with my work! I love the sense of freedom I get when I go surfing. The sea is so vast. Surfing, stand up paddleboarding and generally being in and by the sea are good for my fitness and mental well-being. It really helps me relax, be refreshed and continue positively with life.

**The MCZ**
It is important that there is a balance in the way the MCZ is looked after. Tourism is a really important. People come here to surf, enjoy the view, see the wildlife and eat Cromer crabs.

**My message**
The North Norfolk coast is like a giant, free playground! Visit it and experience it. Take your shoes off and feel the water on your feet, go for a swim, try surfing lessons and make sure you keep safe. You will love it. The coast needs to be looked after for the future and the young people to come.


# Kevin – Crab and lobster business manager

**The sea and me**

I grew up part of a fishing family, helping to dress crabs in our kitchen from a young age. I followed two of my brothers into trawler fishing when I left school and spent 9 years trawler fishing before wanting a change. I set up my crab and lobster business in 1995 as well as buying a boat and going out fishing for crabs and lobsters. In 2013, we moved into our current factory which meant I didn't have time to go out on the boats anymore.  The factory now processes up to one million crabs a year.

**How I feel about the sea**

Having grown up in a fishing family, the sea and crabs have always been part of my life. Trawler fishing was a job to earn money but now I enjoy the independence of running my own business. Although I no longer go out to sea, I enjoy keeping up with the fishermen when I go to collect the crabs.

**The MCZ**

It is important for everyone to take a balanced view and look at others' points of view. We need to find a way for the fisheries to keep going. Without the Cromer Crab, we would lose a way of life for many, a tradition, jobs and the flavour of North Norfolk would change. Fishing practices may have to change a little to make sure they are sustainable.

**My message**

It is important to keep a perspective on the crabbing industry. The fishermen only take some of the crabs: lots of small ones are put back. Potting has a much lower impact on the marine environment than trawling. Try some crab and lobster!


# Kevin – Crab and lobster business manager

**The sea and me**
I grew up part of a fishing family, helping to dress crabs in our kitchen when I was young. I was a trawler fisherman when I left school. In 1995, I set up my company and fished for crabs and lobsters. In 2013, we moved into our current factory which meant I didn't have time to go out on the boat anymore. The factory now processes up to one million crabs a year.

**How I feel about the sea**
Having grown up in a fishing family, the sea and crabs have always been part of my life. Trawler fishing was a job to earn money but now I enjoy running my own business. I no longer go out to sea but I enjoy keeping up with the fishermen when I go to collect the crabs.

**The MCZ**
It is important for everyone to take a balanced view and look at others' points of view. We need to find a way for the fishering to keep going. Without the Cromer Crab, we would lose a way of life for many, jobs and the flavour of North Norfolk would change. Fishing practices may have to change a little to make sure they can keep going.

**My message**
The fishermen only take some of the crabs: lots of small ones are put back. Potting has a much lower impact on the sea habitat than trawling. Try some crab and lobster!

# John – Fisherman with a fish shop

**The sea and me**
The sea has always been part of my life. I come from a family of eight generations of fishermen and I watched my father go out on his boat. I go out on my boat fishing several times a week, weather permitting. On the days I don't go out, I go and look at the sea instead. The crabs, lobsters and fish I catch are sold in our fish shop in Cromer. I was in the crew on the RNLI Cromer lifeboat for 36 years.

**How I feel about the sea**
I am lucky that I enjoy my job. It is a rewarding but hard way to earn a living. There are days when being out on my boat is the best place in the world! The early mornings watching the sun come up are beautiful. There's a real sense of freedom when you're out on the sea but you have got to respect it.

**The MCZ**
It is important to protect the balance between nature and man. The MCZ needs protecting; I'd like it to stay as it is. There are not many youngsters getting into fishing these days and it would be a huge loss if the local crab industry ended. It is part of our local community and history, and is important for Cromer and Norfolk.

**My message**
Appreciate how lucky we are to have the chalk shoal here and be thankful. The MCZ is a place where people earn a living. The crabs and lobsters that live there are important for our local community and industry. There are very few food miles when you eat a Cromer crab; most are caught just a mile or two off the beach!

# John - Fisherman with a fish shop

**The sea and me**
The sea has always been part of my life. My father was a fisherman and his father too. I go out on my boat fishing several times a week, weather permitting. On the days I don't go out, I go and look at the sea instead. The crabs, lobsters and fish I catch are sold in our fish shop in Cromer. I was in the crew on the RNLI Cromer lifeboat crew for 36 years.

**How I feel about the sea**
I am lucky that I enjoy my job. There are days when being out on my boat is the best place in the world! The early mornings watching the sun come up are beautiful. There's a real sense of freedom when you're out on the sea but you have got to respect it.

**The MCZ**
It is important to protect the balance between nature and man. The MCZ needs looking after. It is also a place where people earn a living. There are not many young people getting into fishing these days and it would be a huge loss if the local crab industry ended. It is important for Cromer and Norfolk.

**My message**
We are lucky to have the chalk shoal here. There are very few food miles when you eat a Cromer crab because most are caught just a mile or two off the beach!

# The Sea and Me by:

How do I feel about the sea? Why?

What do I like to do at the seaside?

What else is good about the sea?

Use this space to write and draw your thoughts about the sea:

# Visiting the beach

A visit to the beach can be a great opportunity to get the children to consider their personal feeling about being there and the physical and mental well-being benefits of being by the sea. Point out the effort needed to walk on sand. Share your own feelings about being on the beach. Here are some other ideas:

## Sit spots

Invite the children to spread out and sit in silence in their own space watching the sea. Encourage them to look, listen and feel - to experience it.

## Explore their senses

Gather ideas, thoughts and words to describe each sense.

They could use this to write poetry about the sea.

## Pebble pledge

A great activity if you have been learning about environmental issues relating to the sea.

Invite the children to hunt for a special pebble that they really like. Whilst hunting, encourage them to consider what they could do to help the oceans. Gather together and the children place the pebbles into a pile or circle whilst making a pledge. Invite them to share their pledge if they want to.