

# COCKLES

Co-Operation for Restoring Cockle Shellfisheries  
and its Ecosystem-Services in the Atlantic Area

Understanding the value of some  
ecosystem services from cockles

UKCEH and COCKLES partners

**FINAL VIRTUAL CONFERENCE**

**March 2021**



The common cockle provides a wealth of services to coastal communities in the Atlantic Area.



## Food



- Human have consumed cockles since Neolithic times.
- Part of an international industry, which supports long-established livelihoods in coastal communities.
- A tonne of fresh living cockle: 1,000 € to 5,700 €

## Shell by-products

- Cockle shells can be used for: chicken grit, aggregate and ornamental uses.



# Cockles affect marine processes (Regulating services)

## From cockles underwater:

### Water filtration

- Healthy and productive cockle beds can filter large volumes of water and improve water quality.

### Erosion control

- The burrowing action of cockles can make the bottom sediment more or less prone to erosion.



## From harvesting cockles:

- Cockles lock up **carbon** in their shell.
- Both **nitrogen** and **phosphorus** are assimilated by cockles for tissue and shell growth.



**These processes can remove nutrients and reduce eutrophication and harmful algal blooms in coastal waters.**

# Supporting services

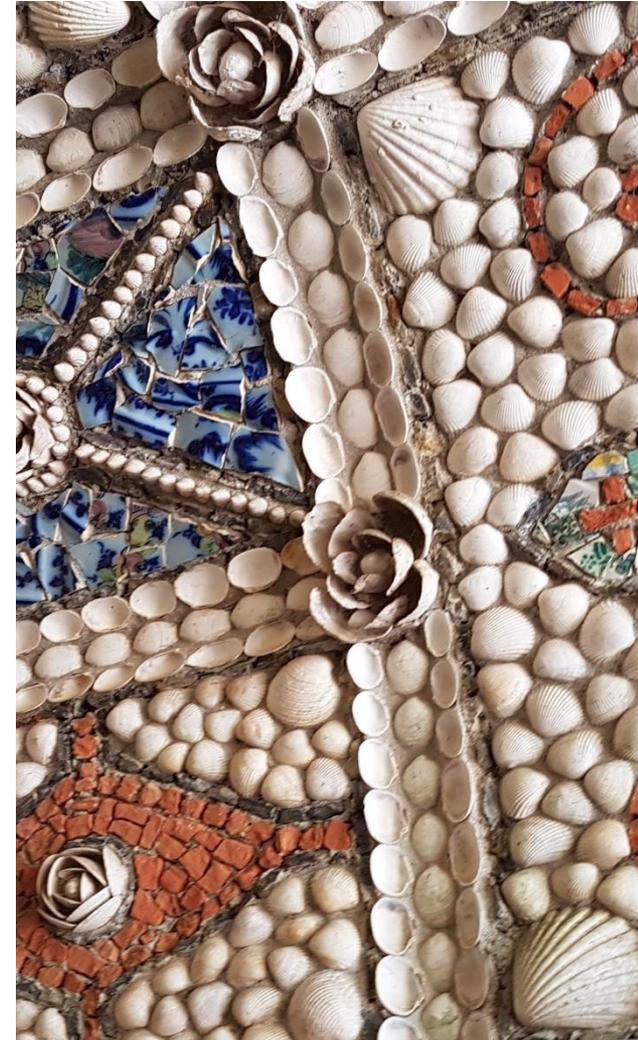
## Food source for wildlife

- Cockles are also an important food source for many wading birds, especially in winter.
- As well as for finfishes and other marine animals, both during the planktonic (larvae) and benthic (juveniles and adults) cockle life stages.



A strong place-based identity, around the history, heritage and cultural associations of people with this important shellfish.

- Rich and diverse examples among the 5 countries.
- cultural associations with cockles differed among countries.
  - Northern countries more historical
  - Southern countries deeper in present culture



# Cockle cultural services can be grouped under 7 categories.

We found over 230 examples

## Inspirational



## Aesthetic



## Spiritual & religious



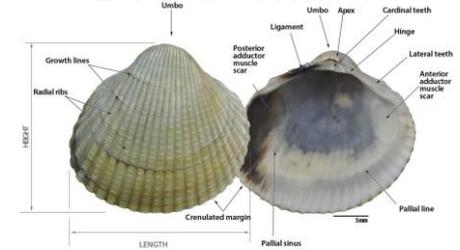
## Recreation & ecotourism



## Sense of place



## Educational



## Cultural heritage



## Harvest-based services

Currency	€	(drop-down menu)
Year	2019	

Input your data here			
Site	Country (drop-down menu)	Year	Fresh weight (t) (TWW)
	UK	2018	8,100.00
	Spain	2009	3255.329
	Portugal	2005	2391
	Ireland	2007	643
	France	2013	2,749.69

- The user enters data in spreadsheets Harvest-based services:

- Location
- Year
- Fresh weight of cockles

The user choose the currency and the preferred year for economic valuation.

## Harvest-based services

Outputs									
Landing (Live animals)		Shell		N remediated		P remediated		Carbon removed	
Amount (t)	Economic value	Amount (t)	Economic value for aggregate (central estimate)	Amount (t)	Economic value	Amount (t)	Economic value	Amount (t)	Economic value (central estimate)
	€		€		€		€		€
8,100	6,437,133	3,260	4,589,257	25	321,114	3	25,950	449	112,627
3,255	14,053,514	1,310	1,844,388	10	118,054	1	10,429	180	40,535
2,391	3,027,380	962	1,354,681	7	92,135	1	7,660	132	29,772
643	1,472,968	259	364,308	2	25,529	0	2,060	36	8,007
2,750	9,891,250	1,107	1,557,905	8	101,625	1	8,809	152	34,239

- The outputs on several services will be automatically calculated:
  - Market values = the economic values of live animals
  - Non-market values = Potential ecosystem services values: price of shell as aggregate, the price of nitrogen and phosphorous removal as well as carbon sequestration in the cockle shell and flesh.



## In-situ services

The user enter information specific to their site into the in-situ sheet:

Input your data here								
Location	year	Site	m <sup>2</sup>	%	mm	n cockles m <sup>-2</sup>	g.m <sup>-2</sup>	log of mg.m <sup>-3</sup>
Location	year	Site	Site area	Percentage of site area at this density	Size class of cockle	Density: Number of cockle per size class per m <sup>2</sup> (if no such information, leave it blank (not zero))	Biomass per size class per m <sup>2</sup> (if no biomass given leave it blank (not zero))	Chlorophyll-a concentration (to retrieve concentration click on the link below and find the site on the map) <a href="#">map of Chl-a</a>
Arcachon	2018	Banc_dArg	10000	100	smaller than 10 mm	0		0.443
Arcachon	2018	Banc_dArg	10000	100	10 - 15 mm	0		0.443
Arcachon	2018	Banc_dArg	10000	100	16 - 20 mm	0		0.443
Arcachon	2018	Banc_dArg	10000	100	21 - 25 mm	150		0.443
Arcachon	2018	Banc_dArg	10000	100	26 - 30 mm	0		0.443
Arcachon	2018	Banc_dArg	10000	100	31 - 35 mm	0		0.443
Arcachon	2018	Banc_dArg	10000	100	36 - 40 mm	0		0.443
Arcachon	2018	Banc_dArg	10000	100	greater than 41 mm	0		0.443
Aveiro	2011	Barra	20000	100	smaller than 10 mm		1	0.672
Aveiro	2011	Barra	20000	100	10 - 15 mm		1	0.672
Aveiro	2011	Barra	20000	100	16 - 20 mm		1200	0.672
Aveiro	2011	Barra	20000	100	21 - 25 mm		3400	0.672
Aveiro	2011	Barra	20000	100	26 - 30 mm		0	0.672
Aveiro	2011	Barra	20000	100	31 - 35 mm		0	0.672
Aveiro	2011	Barra	20000	100	36 - 40 mm		0	0.672
Aveiro	2011	Barra	20000	100	greater than 41 mm		0	0.672



## In-situ services

The outputs specific to the site will be automatically calculated:

Outputs				
l.d <sup>-1</sup>	t.d <sup>-1</sup>	t.y <sup>-1</sup>	t.y <sup>-1</sup>	n
Volume of water (liter) cleared per day at a site	Amount of phytoplankton (tonne) cleared per site in a day	Amount of phytoplankton (tonne) cleared per site in a year	Potential Nitrogen (tonnes) removed in a year	Estimated number of oystercatcher feeding at this site over a winter period
12,729,679	35	12,886	180,401	10
169,676,660	797	291,015	4,074,206	70

- Volume of water cleared
- Amount of phytoplankton cleared
- Potential Nitrogen removed
- Potential number of oystercatcher feeding at this site.



# Ecosystem services leaflets



The common cockle provides a wealth of services to coastal communities in the Atlantic Area.

**COCKLES**  
COCKLES project has been collating evidence and data from the 5 partner countries: Ireland, Portugal, Spain, France, and the UK, to demonstrate the substantial role of the common cockle in providing ecosystem services.

## Ecosystem services

Provided by the common cockle

**Cross-country differences**  
Cockles support a strong place-based identity which is built up around the history, heritage and cultural associations of people with this important shellfish.

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## Cultural services

**Cockles**  
The common cockle provides important regulating services from water.

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## Regulating services

Provided by the common cockle

**Cockles**  
The common cockle provides important provisioning services from food production to shell by-products.

**COCKLES**  
COCKLES project has been collating evidence and data from the 5 partner countries: Portugal, Spain, France, Ireland and the UK, to demonstrate the substantial role played by the common cockle in provisioning, regulating as well as providing cultural and supporting services.

## Provisioning services

Provided by the common cockle

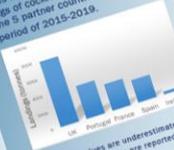
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## Economic values

A tonne of fresh living cockle can vary from 1,000 € to 5,700 € depending on the market region.

The average market price of shell mussels is approximately 1,400 € per tonne of shell (range: 400-2400 €).

This figure shows the average landings of cockles per tonne across the 5 partner countries during the period of 2015-2019.



NB: Spain values are underestimated since only Galicia landings are reported here.

**Inspirational**  
There has been a rich source of inspiration through time and continues to inspire artists today.

**Educational**  
Numerous educational materials as well as outreach activities are based on cockle.

**Services under threat**  
Nitrogen in the cockle biodeposits can be transformed into less harmful forms through denitrification processes by bacteria (released as unreactive nitrogen gases N<sub>2</sub> or N<sub>2</sub>O).

**Shells as cultural heritage**  
Shells as cultural heritage as all 5 nations sense of

**Control**  
Activity by cockles biologically and chemically in sediment can help decrease sediment on the seabed. In sandy sediment it is more stable, in silty it is less stable.

**Shells as cultural heritage**  
Shells as cultural heritage as all 5 nations sense of



Thank you for listening