

# Marine aggregates

## Capability & Portfolio 2019



# National overview

## Why are marine aggregates important to Britain?

Britain has one of the world's most developed marine aggregate industries, extracting 15 to 20 million tonnes from the seabed annually. Much of this is used for building houses, transport infrastructure, replenishing beaches and improving coastal defences.

Onshore resources are becoming increasingly constrained, particularly in the South East of England and London. The marine aggregate industry meets around 20% of the sand and gravel demand for England and Wales.

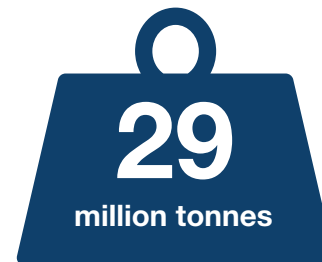
The Crown Estate owns almost all of the sand and gravel resources lying off of the coast of England, Wales and Northern Ireland and we award and manage commercial agreements for companies to extract it.

This document is designed to help planning officers in local authorities understand the contribution that marine aggregates can make, by identifying offshore sources and providing information on supply routes. In turn, this is intended to support local authorities in complying with the National Planning Policy Framework, which requires mineral planning authorities to demonstrate they have a steady and adequate supply of aggregates for their requirements through Local Aggregates Assessments.

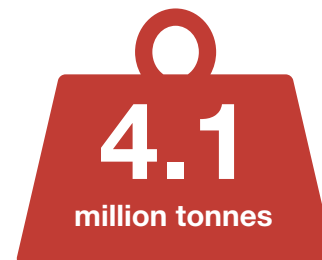
Unless otherwise stated, all figures in this document are correct as of July 2019.



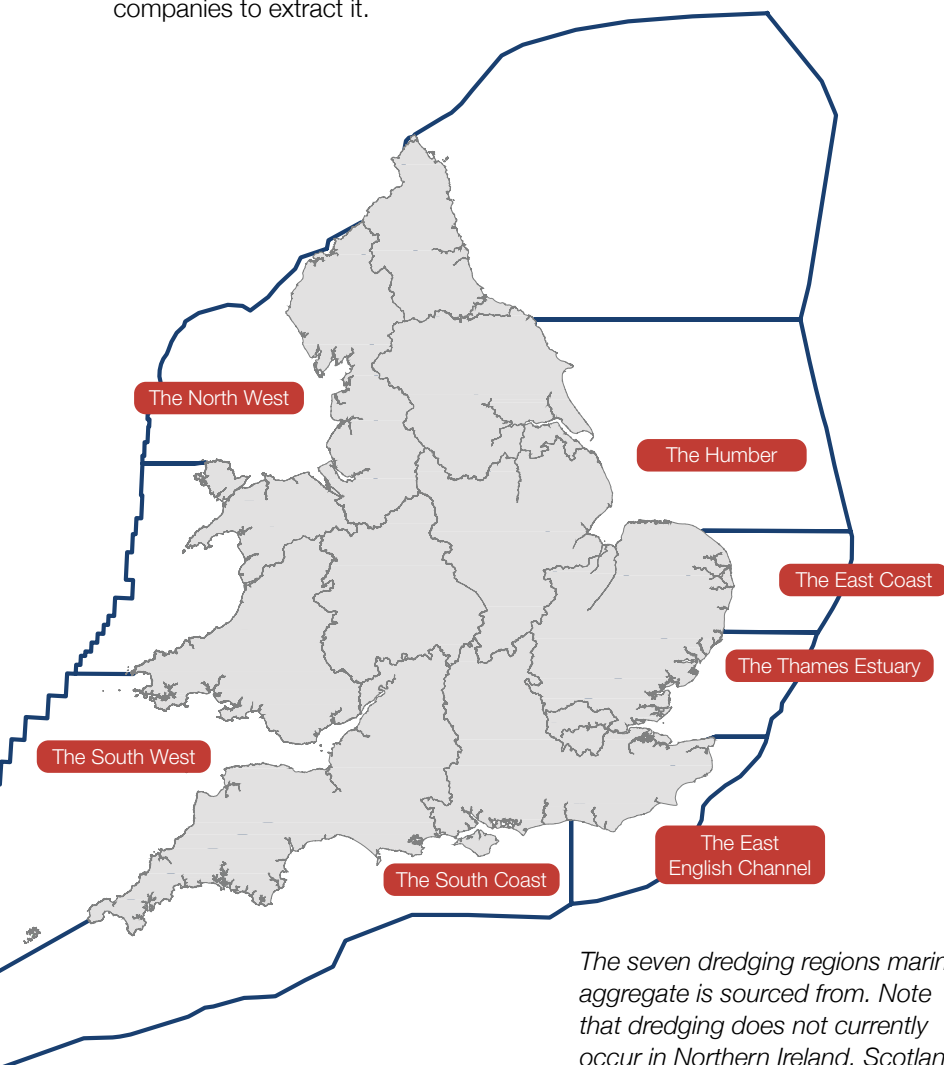
**50%** of all ready mix concrete in London contains **marine aggregate**



There is potential for demand to increase to **29 million tonnes** per year by **2030**



**4.1 million tonnes** of marine aggregate were exported to **Europe** in 2018 (**23%** of all marine aggregate landed)



*The seven dredging regions marine aggregate is sourced from. Note that dredging does not currently occur in Northern Ireland. Scotland is the responsibility of Crown Estate Scotland.*



# Reserves and resources

## Reserves and resources

The PERC code defines “**reserves**” as the proportion of a mineral “**resource**” that can be mined for economic purposes

# 22

Current national estimates suggest there are **22 years** of primary marine aggregate production permitted

# 347

million tonnes

Current national estimates suggest there are **347 million tonnes** of total current primary reserves

Region	Total current primary reserves	10 Year average annual offtake*	3 Year average annual offtake*	Peak annual offtake during 10 year period*	Annual permitted offtake (as at July 2019)	Regional reserve life @ 10 year average annual offtake
		Primary (construction aggregate)				
Humber	55.23	1.92	2.01	2.78	6.50	28.77
East Coast	70.03	4.56	4.27	5.64	7.93	15.36
Thames Estuary	32.71	1.11	1.85	1.94	3.80	29.47
East English Channel	52.61	3.59	4.23	4.65	9.63	14.65
South Coast	86.11	3.42	3.44	3.92	8.33	25.18
South West	37.65	1.11	1.28	1.38	3.70	33.92
North West	12.87	0.31	0.31	0.38	1.30	41.52
TOTAL	347.21	16.01	17.38	17.85	41.19	21.69

All figures are in millions of tonnes

\*Totals are national averages and peaks, not the sum of the regional figures

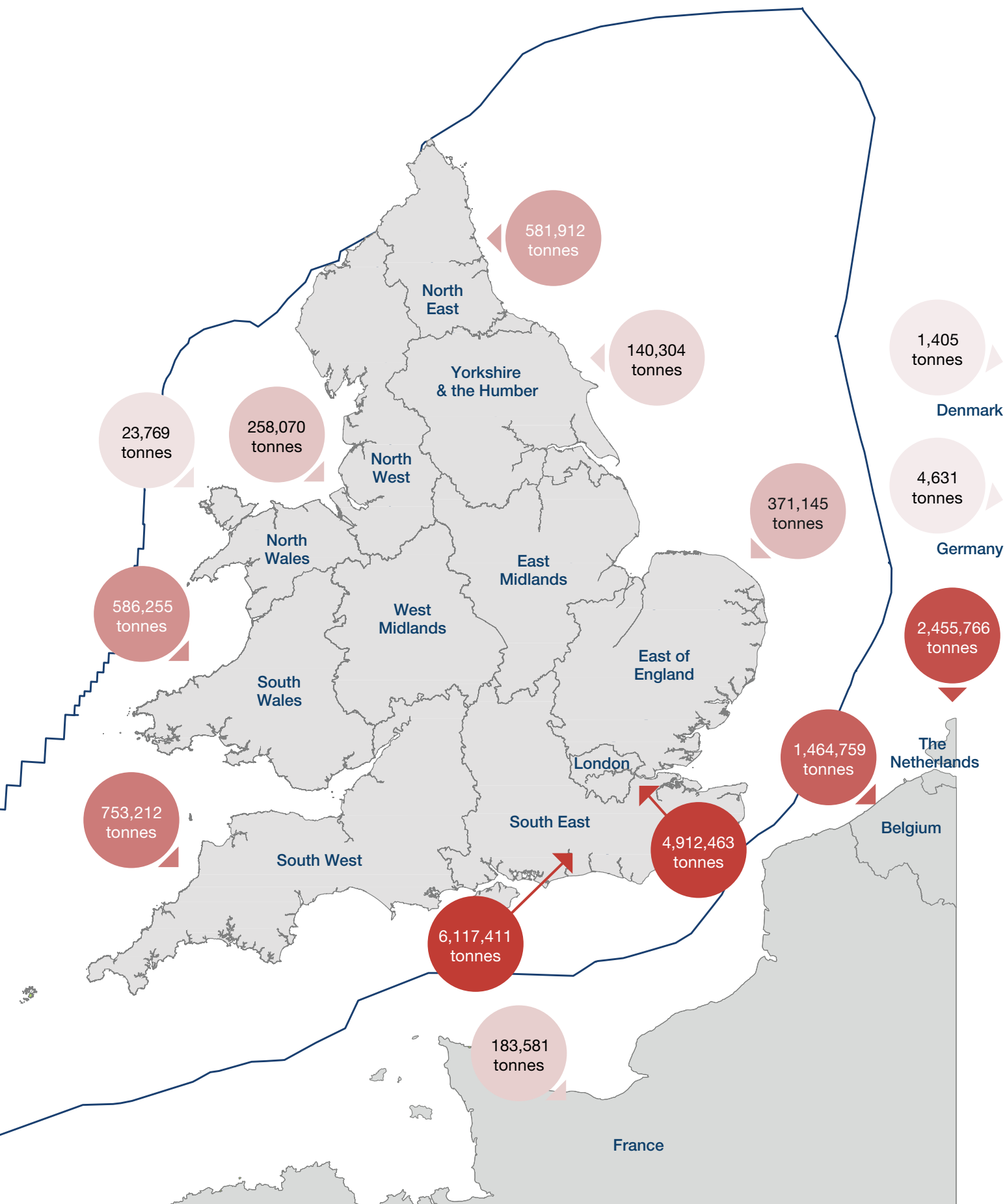


# 155

million tonnes

London and the Thames Estuary are supplied by the East Coast, Thames Estuary & East English Channel. These hold reserves of 155m tonnes, giving **London** and the **Thames Estuary** 17 years of production

# Delivery by region/country





# Extraction and delivery by dredge region

Regions delivered to:

- Belgium

Denmark

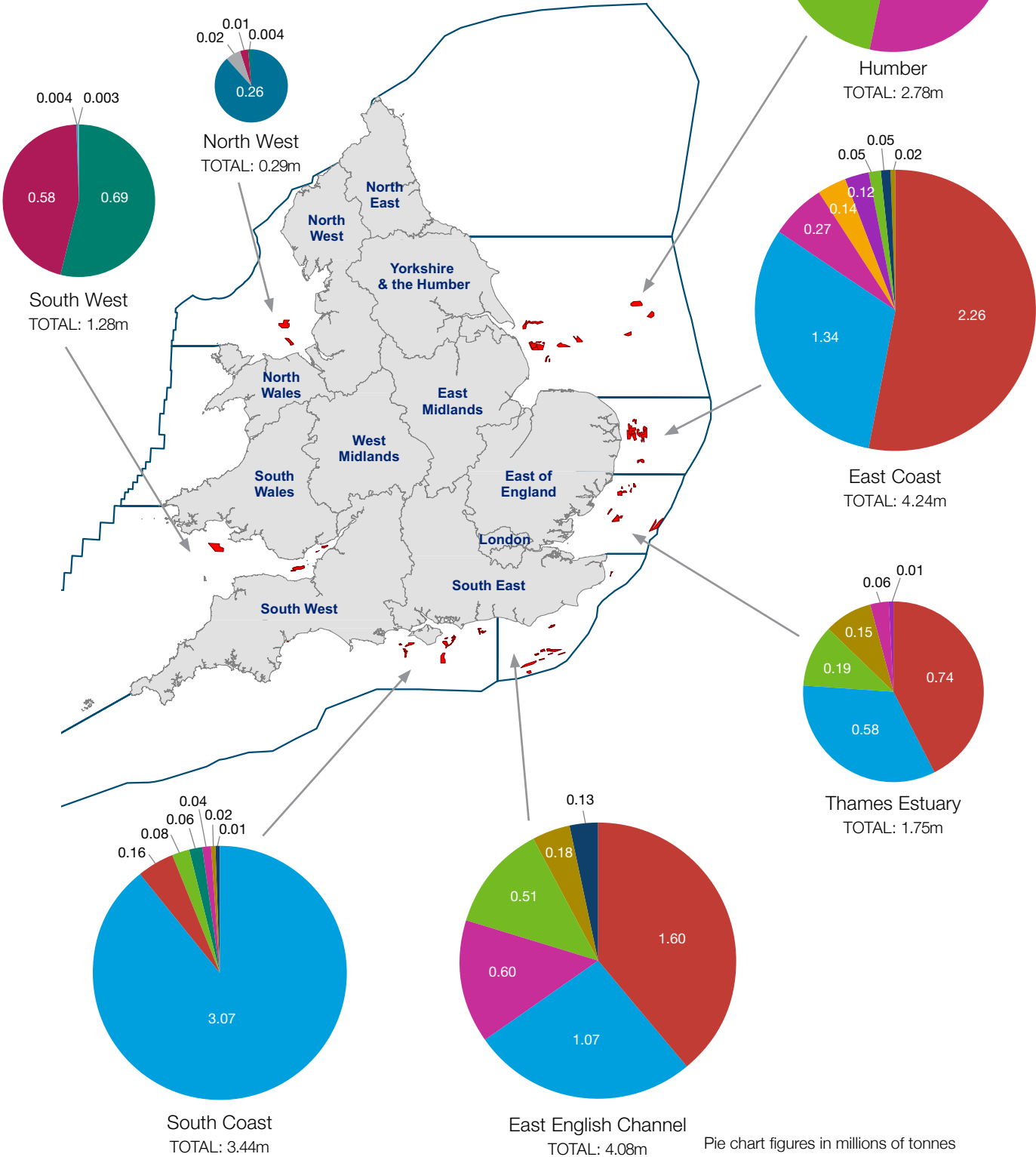
East of England

France

London

Germany

The Netherlands
- North East
- North Wales
- North West
- South East
- South West
- South Wales
- Yorkshire and the Humber



Pie chart figures in millions of tonnes  
These figures refer to calendar year 2018

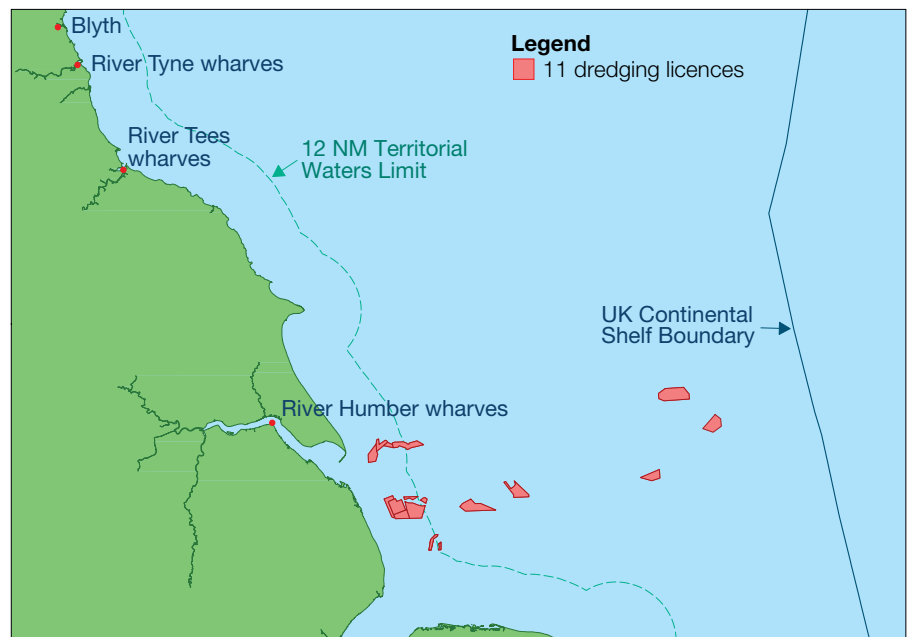
# The Humber region

6.5

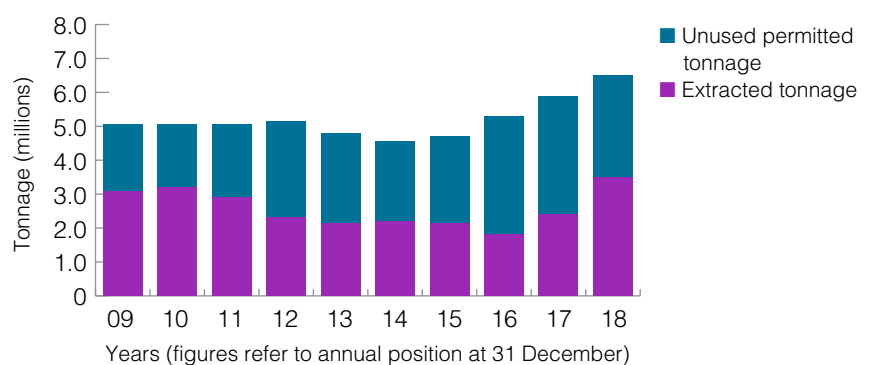
million tonnes can be  
extracted from  
11 licences annually

29

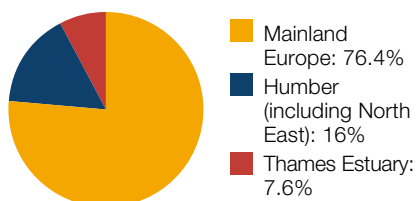
Current estimates suggest  
there are **29 years** of  
primary marine aggregate  
production permitted



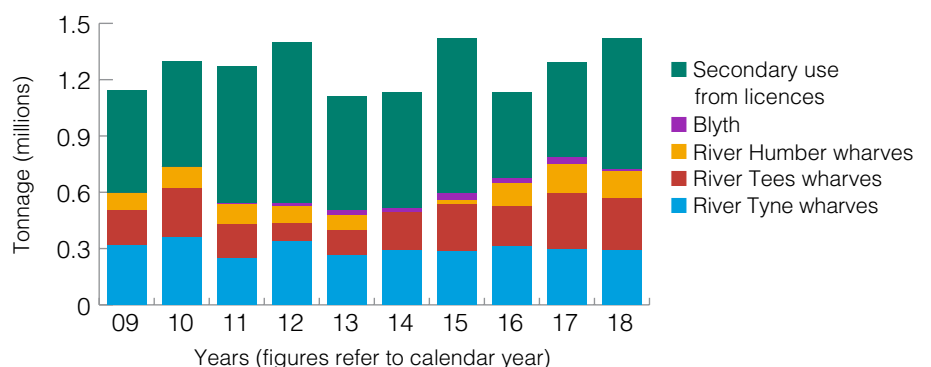
Permitted & extracted tonnage



During 2018 material extraction from the region was mainly delivered to:



Delivery of marine aggregate to the region



Sediments and indicative grain sizes



# The East Coast region

7.93

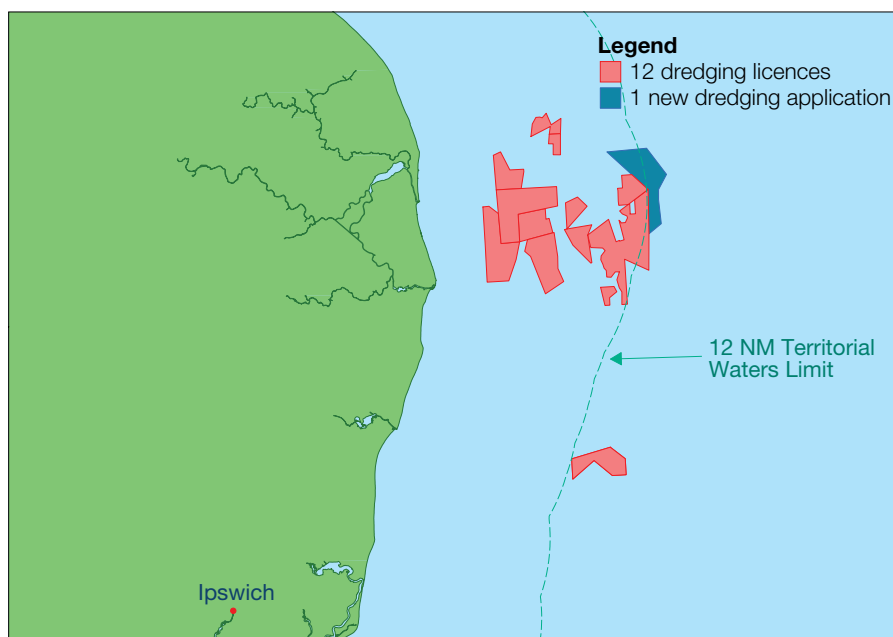
million tonnes can be  
extracted from  
12 licences annually

15

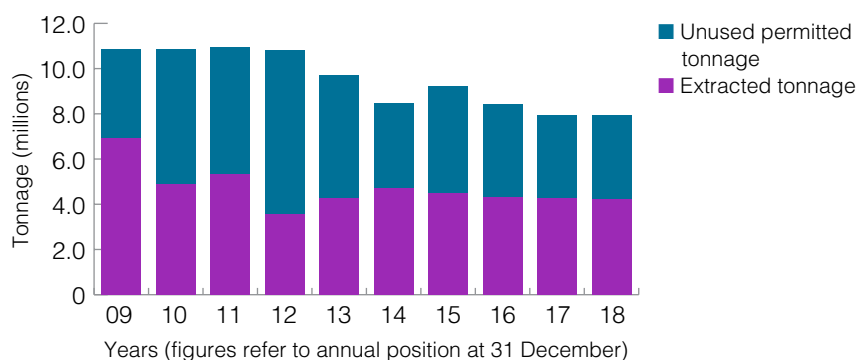
Current estimates suggest  
there are **15 years** of  
primary marine aggregate  
production permitted

1

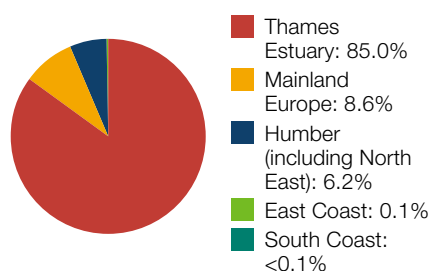
application for a  
licence could, if approved,  
increase the permitted tonnage  
by **0.5 million tonnes**



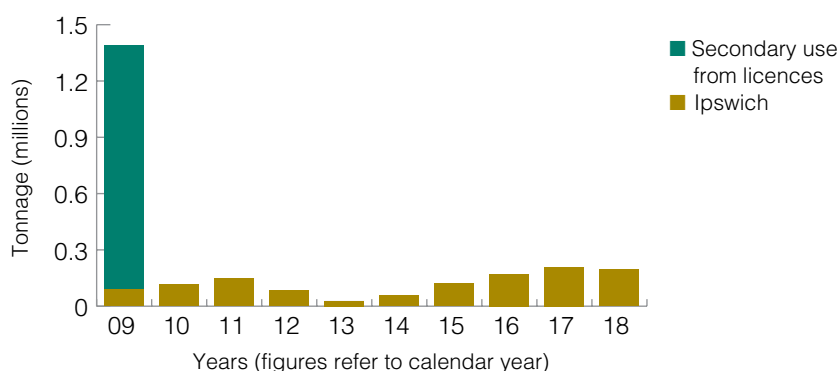
Permitted & extracted tonnage



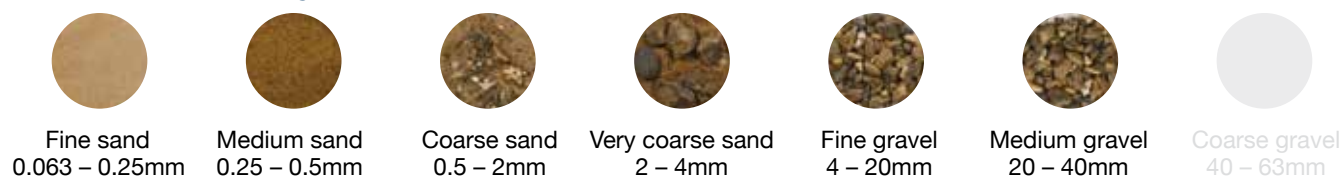
During 2018 material extraction from  
the region was mainly delivered to:



Delivery of marine aggregate to the region



Sediments and indicative grain sizes





# The Thames Estuary region

## 3.8

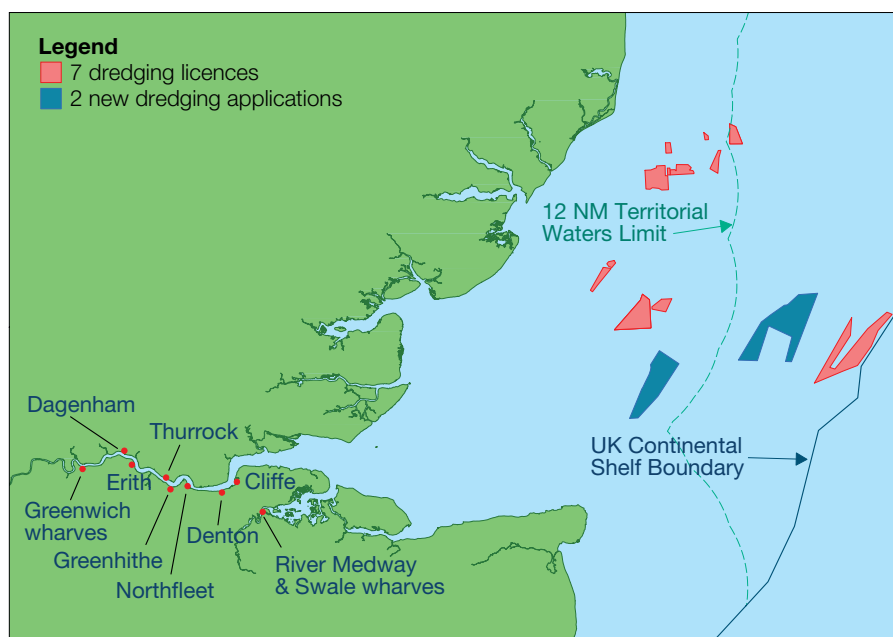
million tonnes can be extracted from 7 licences annually

## 29

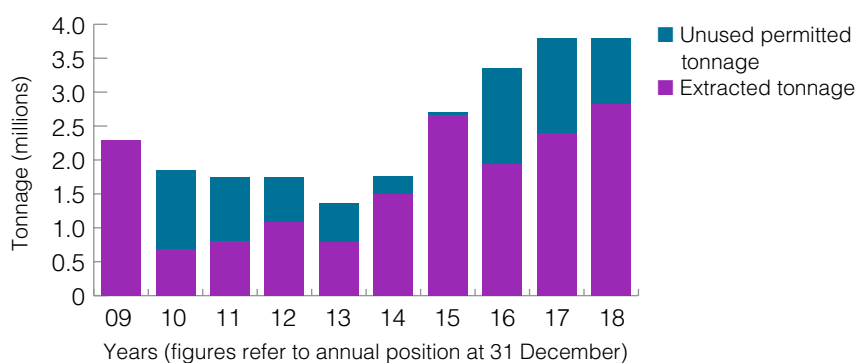
Current estimates suggest there are **29 years** of primary marine aggregate production permitted

## 2

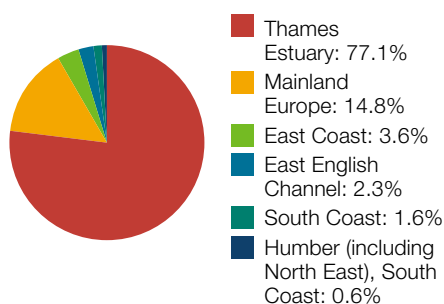
applications for licences could, if approved, increase the permitted tonnage by **1.05 million tonnes**



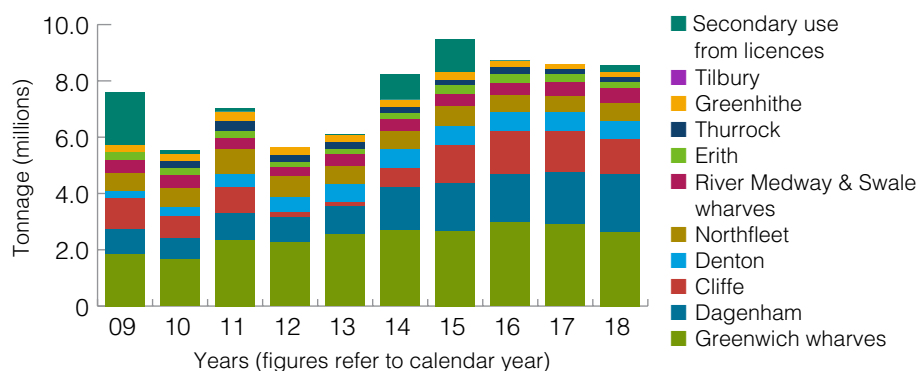
Permitted & extracted tonnage



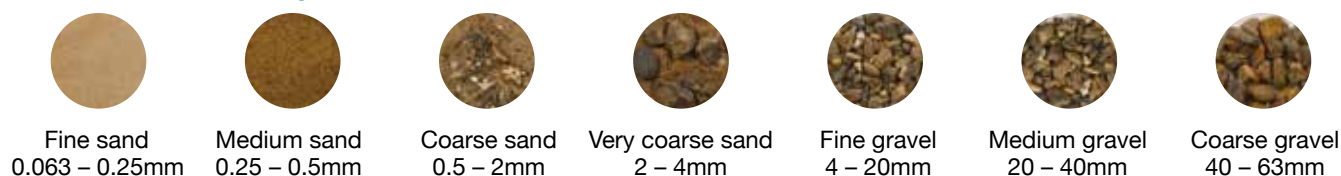
During 2018 material extraction from the region was mainly delivered to:



Delivery of marine aggregate to the region



Sediments and indicative grain sizes



# The East English Channel region

9.63

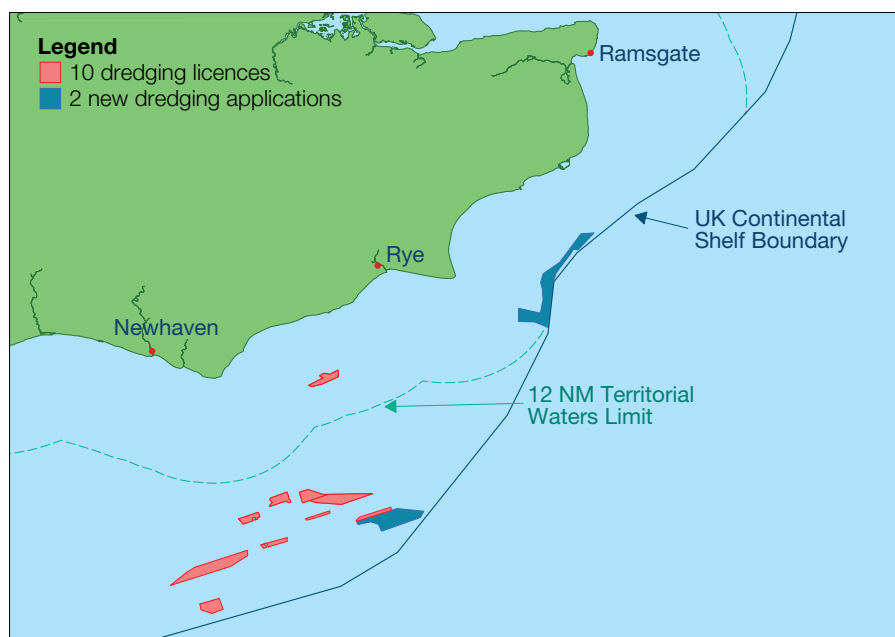
million tonnes can be  
extracted from  
10 licences annually

15

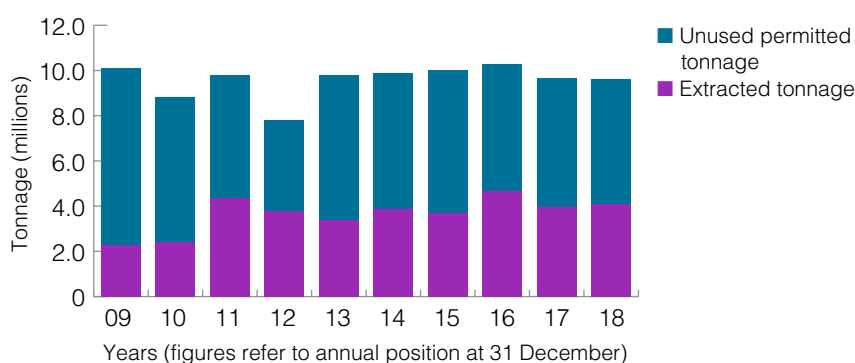
Current estimates suggest  
there are **15 years** of  
primary marine aggregate  
production permitted

2

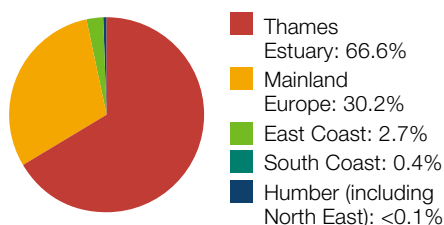
applications for  
licences could, if approved,  
increase the permitted tonnage  
by **1.3 million tonnes**



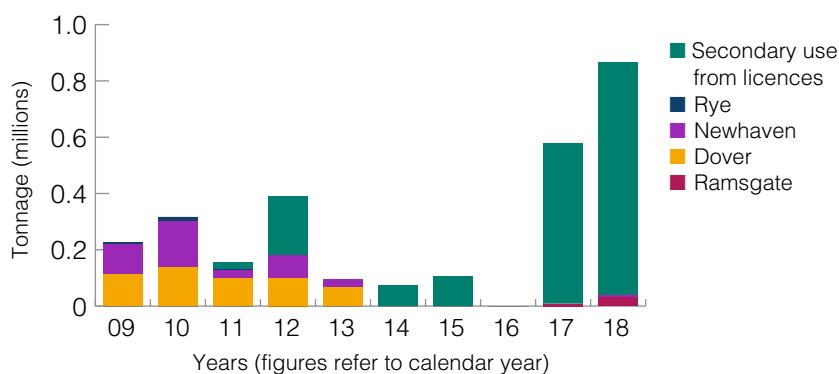
Permitted & extracted tonnage



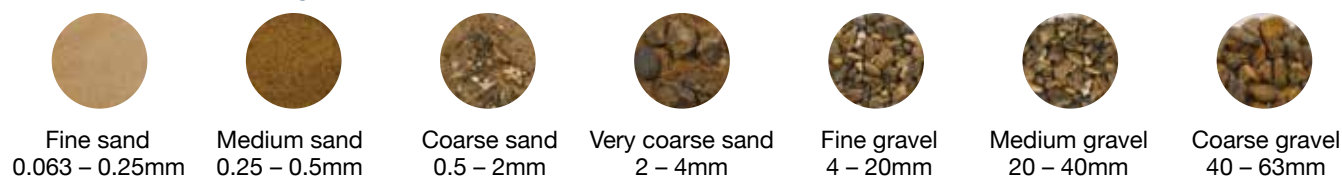
During 2018 material extraction from  
the region was mainly delivered to:



Delivery of marine aggregate to the region



Sediments and indicative grain sizes



# The South Coast region

# 8.53

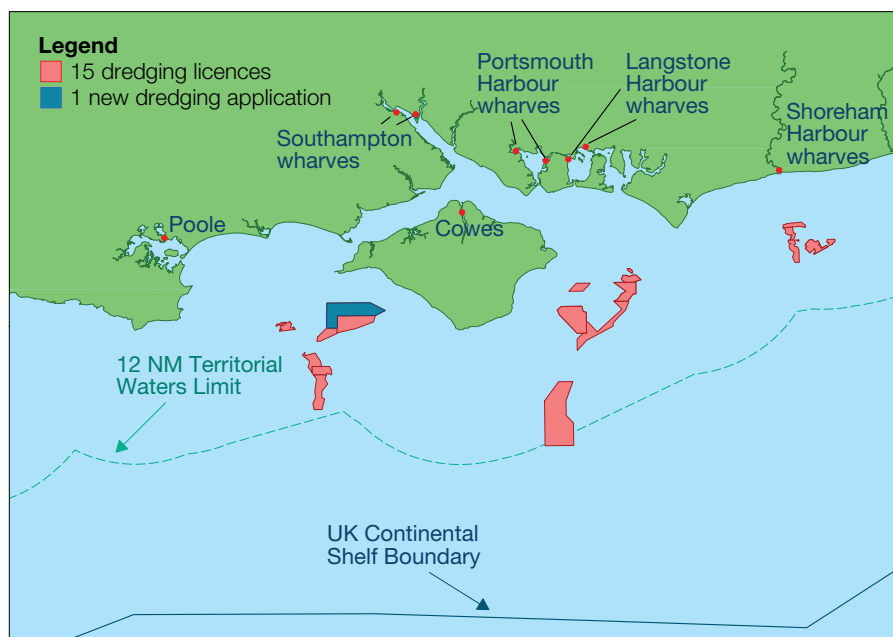
**million tonnes** can be extracted from **15 licences** annually

# 25

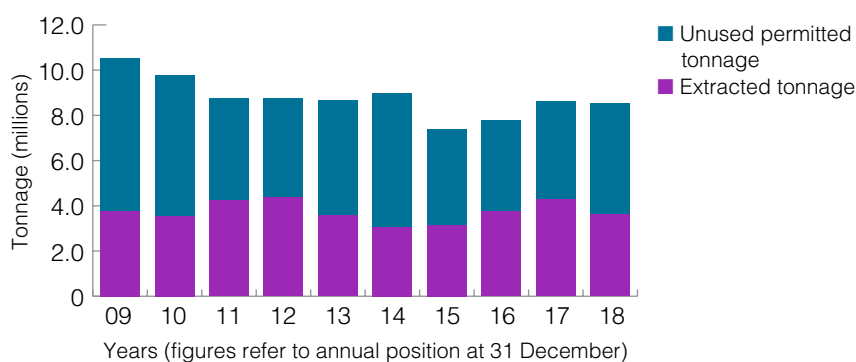
Current estimates suggest there are **25 years** of primary marine aggregate production permitted

# 1

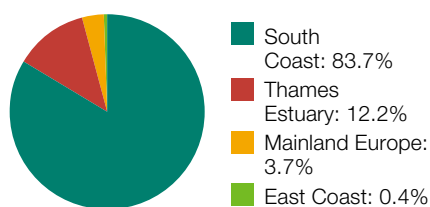
application for a licence could, if approved, increase the permitted tonnage by **0.3 million tonnes**



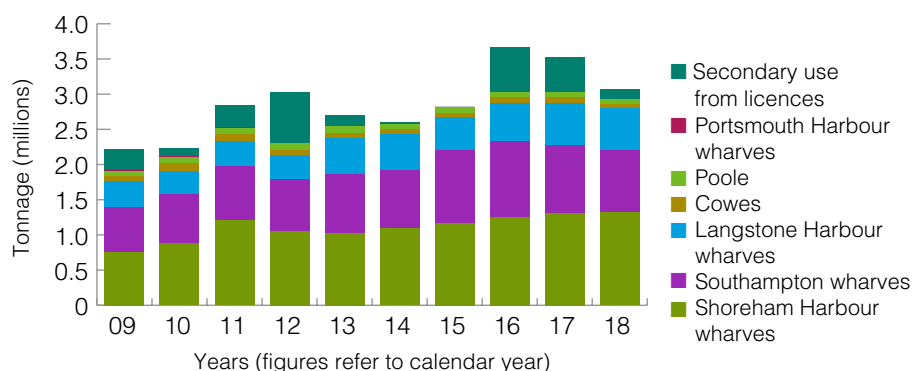
Permitted & extracted tonnage



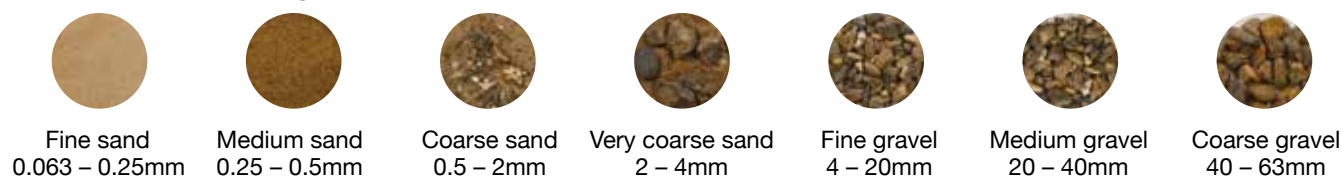
During 2018 material extraction from the region was mainly delivered to:



Delivery of marine aggregate to the region



Sediments and indicative grain sizes





# The South West region

## 3.75

million tonnes can be extracted from 10 licences annually

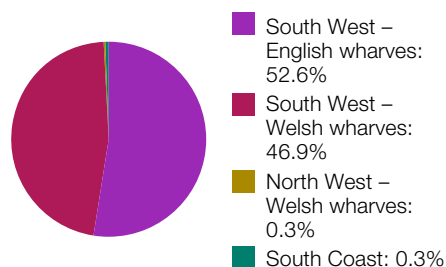
## 34

Current estimates suggest there are **34 years** of primary marine aggregate production permitted

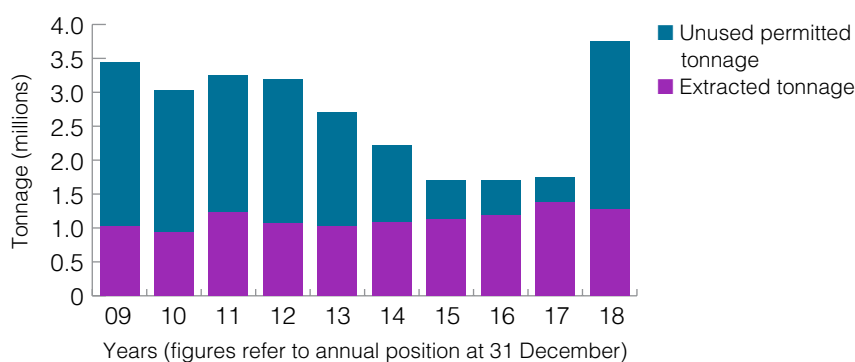
## 2

applications for licences could, if approved, increase the permitted tonnage by **0.05 million tonnes**

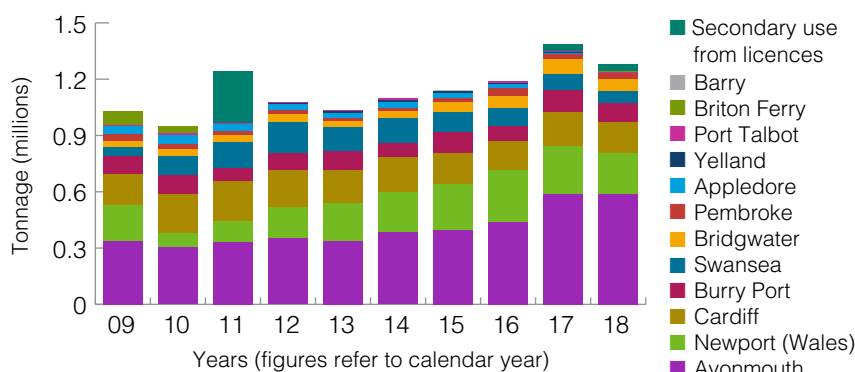
During 2018 material extraction from the region was mainly delivered to:



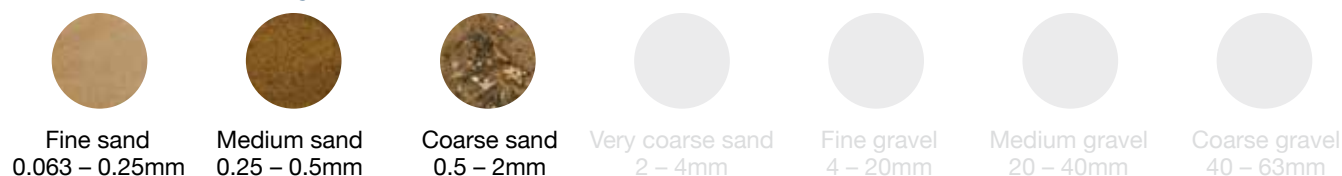
Permitted & extracted tonnage



Delivery of marine aggregate to the region



Sediments and indicative grain sizes



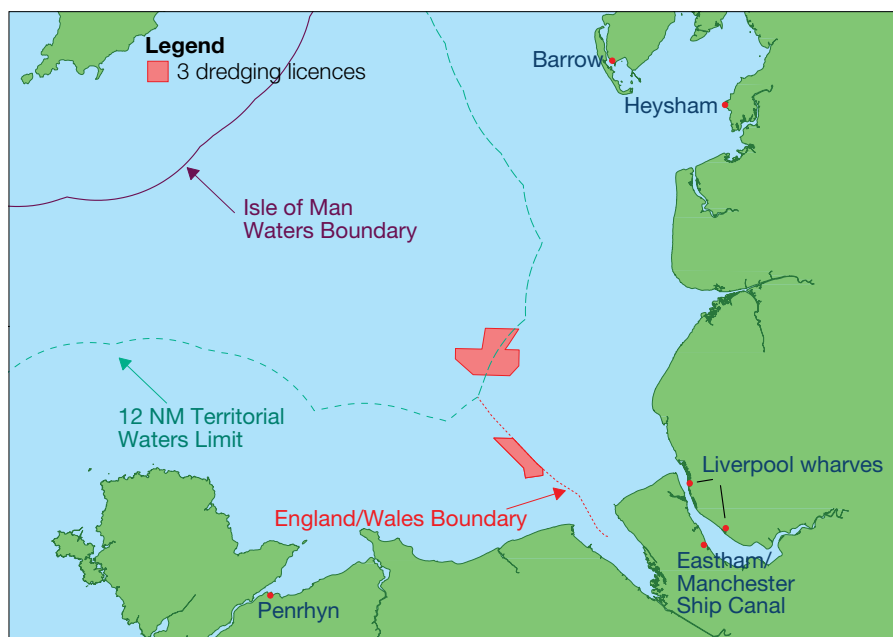
# The North West region

1.3

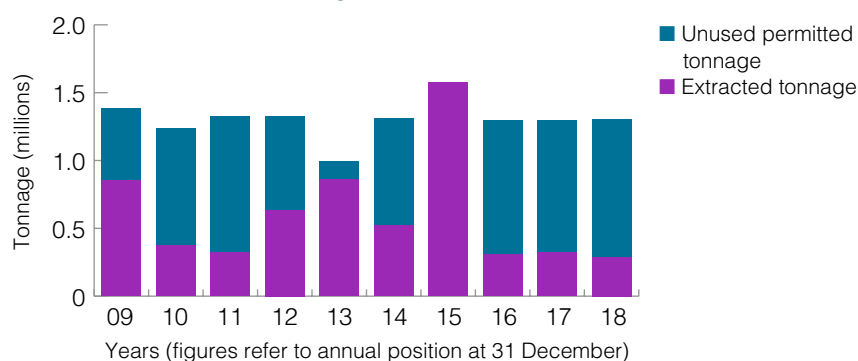
million tonnes can be  
extracted from  
3 licences annually

42

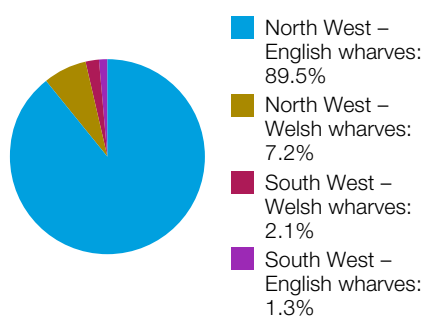
Current estimates suggest  
there are **42 years** of  
primary marine aggregate  
production permitted



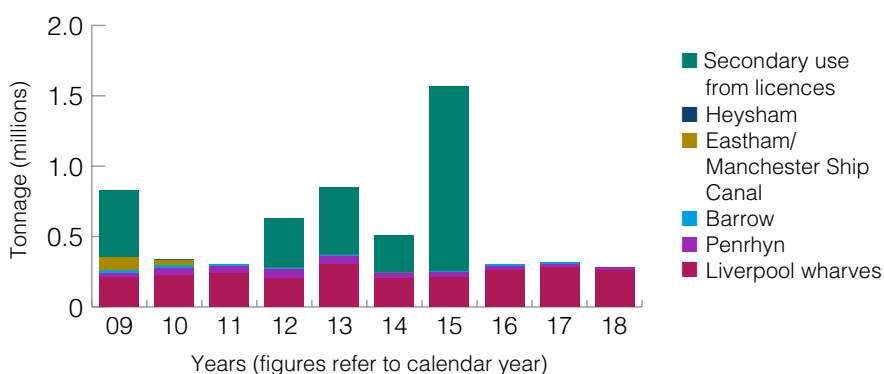
Permitted & extracted tonnage



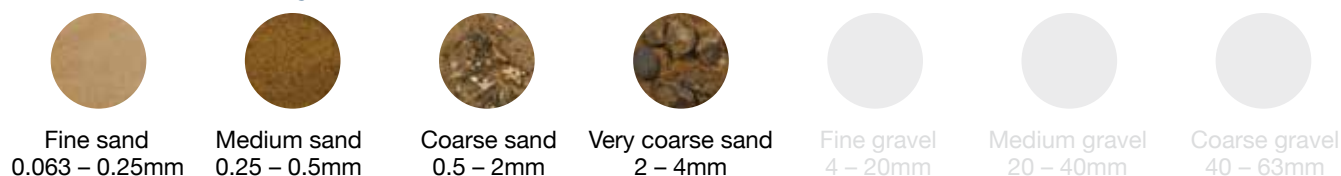
During 2018 material extraction from  
the region was mainly delivered to:



Delivery of marine aggregate to the region

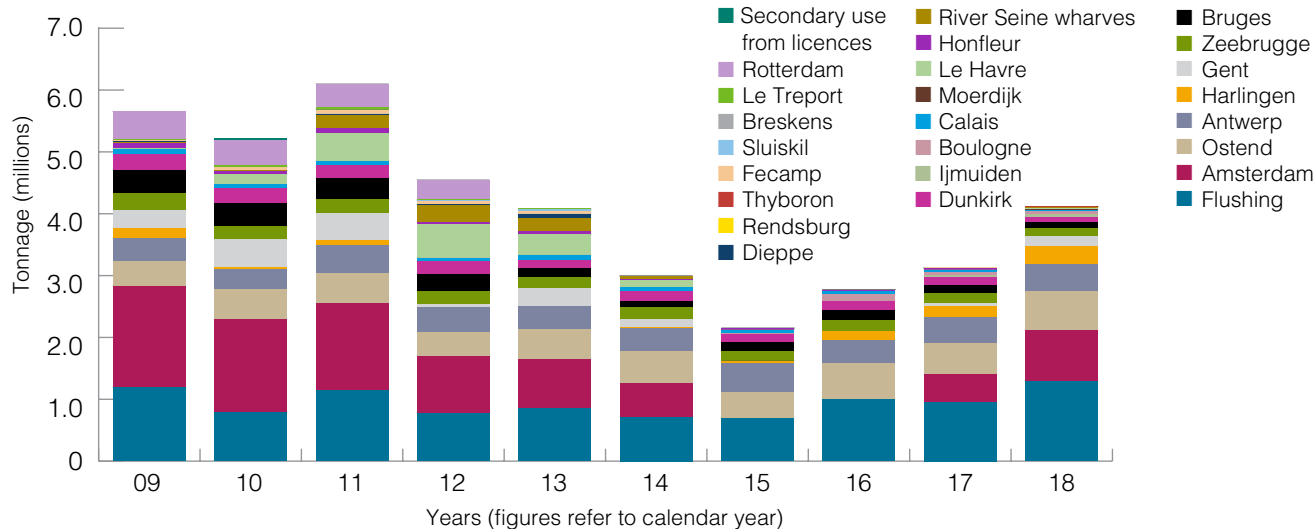


Sediments and indicative grain sizes

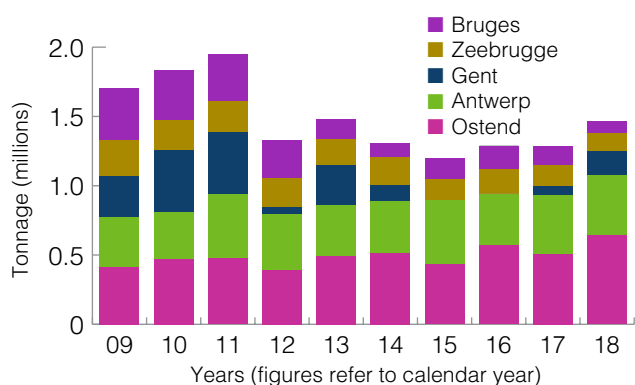


# Exports to Mainland Europe from the UK

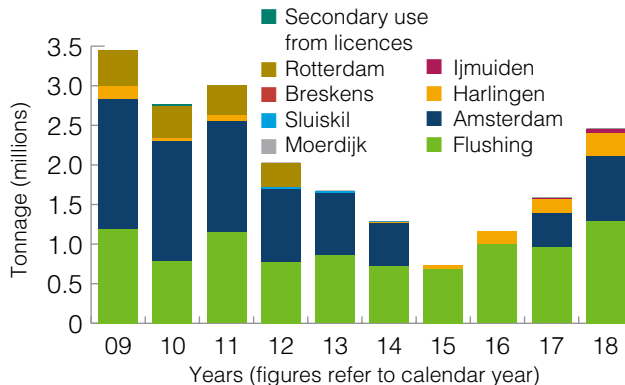
Delivery of marine aggregates to the region



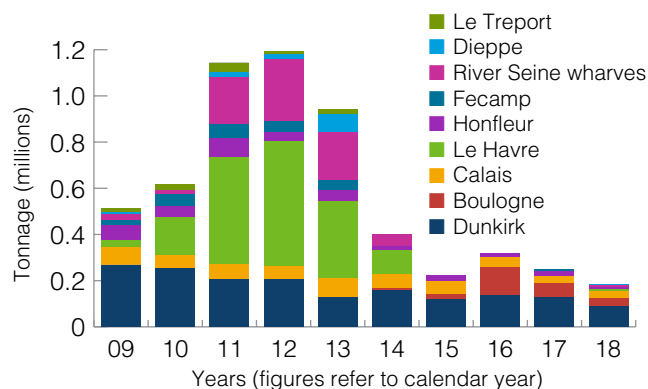
Delivery of marine aggregates to Belgium



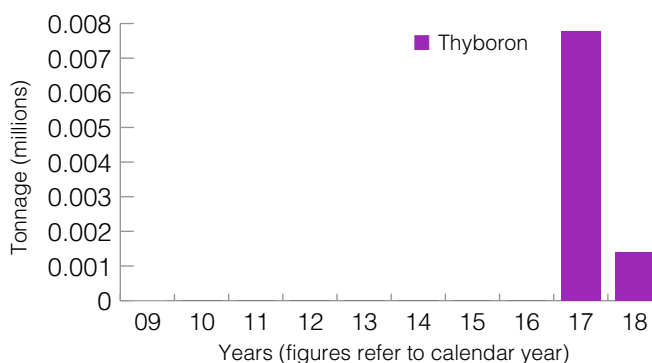
Delivery of marine aggregates to the Netherlands



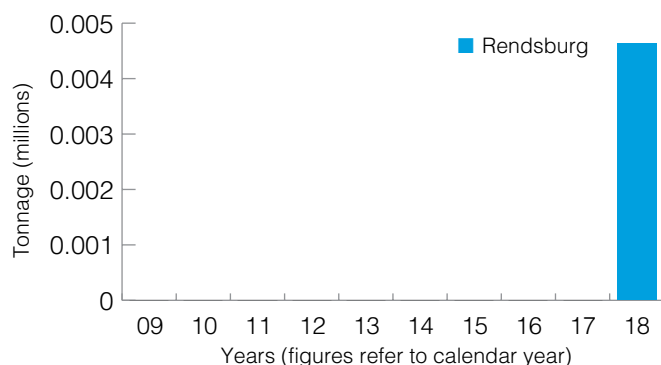
Delivery of marine aggregates to France



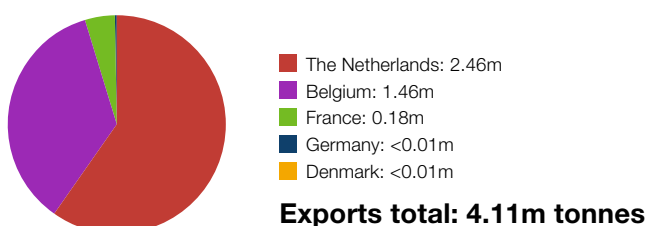
Delivery of marine aggregates to Denmark



Delivery of marine aggregates to Germany



During 2018 material extraction from The Crown Estate licensed areas was exported to:





# Uses of marine aggregates around the UK

Image supplied by Boskalis Westminster Ltd



## Coastal & flood defences

- 1 Minehead Beach
- 2 Sea Defences (reefs), Sea Palling
- 3 Thames Barrier, London
- 4 Clacton Beach
- 5 Colwyn Bay Beach
- 6 Pevensey Bay Beach
- 7 Lincshore Beach
- 8 Dawlish Warren Beach
- 9 Bacton to Walcott Sandscaping scheme

## Commercial development & regeneration

- 10 1 New Burlington Place W1, London
- 11 20 Fenchurch Street (Walkie-Talkie), London
- 12 Cardiff Bay Barrage
- 13 Canary Wharf & Docklands Developments, London
- 14 Central St Martins, London
- 15 Spinnaker Tower, Portsmouth
- 16 Superstore site raising, Seaton
- 17 Land reclamation, Rochester Riverside
- 18 Dover Western Docks Revival
- 19 St James's Market, London

## Energy & utilities

- 20 Energy Recovery Facility, Newhaven
- 21 Wastewater Treatment Plant, Birkenhead
- 22 London Array Wind Farm
- 23 Nuclear Power Station, Dungeness
- 24 Thames Tideway Tunnel, London
- 25 Hinkley Point C Nuclear Power Station, Bridgwater

## Community & leisure

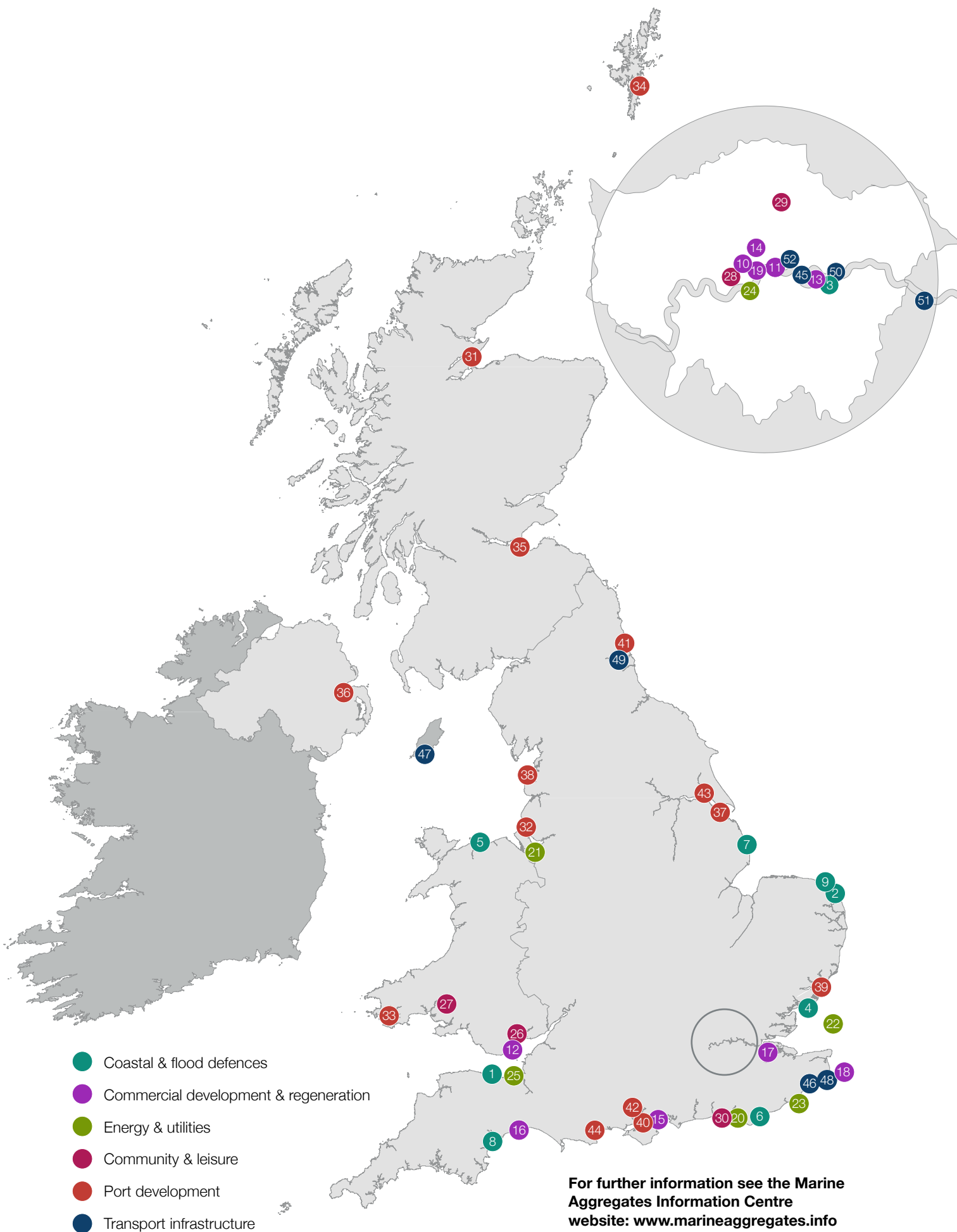
- 26 Principality Stadium, Cardiff
- 27 National Botanic Gardens of Wales, Great Glasshouse, Carmarthenshire
- 28 The Darwin Centre, Natural History Museum, London
- 29 Northumberland Development Project, Tottenham Hotspur FC, London
- 30 British Airways i360 Observation Tower, Brighton

## Port development

- 31 Nigg Yard, Cromarty Firth
- 32 Liverpool2 Container Terminal
- 33 Oil Terminal, Milford Haven
- 34 Lerwick, Shetland Islands
- 35 Leith Docks, Edinburgh
- 36 Belfast
- 37 Grimsby
- 38 Fleetwood
- 39 Container Terminal, Felixstowe
- 40 Breakwater, Cowes
- 41 Blyth
- 42 Container Terminal, Southampton
- 43 Green Port Hull
- 44 South Quay, Poole

## Transport infrastructure

- 45 Canary Wharf Underground Station, London
- 46 Channel Tunnel Rail Link
- 47 Ronaldsway Airport Extension, Isle of Man
- 48 Ferry Terminal, Dover
- 49 Gateshead Millennium Bridge, Newcastle-upon-Tyne
- 50 City Airport, London
- 51 Queen Elizabeth II Bridge, Dartford
- 52 Crossrail, London



# Case study: uses of marine aggregates

## Dover Western Docks Revival

### The Port of Dover's flagship Dover Western Docks Revival (DWDR) development will deliver:

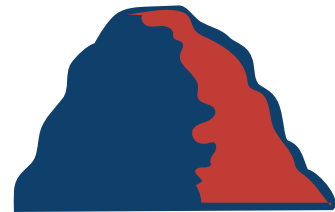
- a transformed waterfront with a new marina pier and marina curve to ultimately attract a host of shops, bars, cafes and restaurants with Dover's unique backdrop of the harbour, cliffs and castle;
- relocation and further development of cargo business with new cargo terminal; and
- a distribution centre; creation of greater space with Eastern Docks for ferry traffic; and much needed high-quality employment opportunities for local people.

DWDR represents the next exciting evolution of the Port, delivering long-term capacity for a key international gateway handling trade to the value of £122bn representing up to 17% of UK trade in goods. It is the single biggest investment ever undertaken by the Port of Dover with c.£250m committed for its delivery.



The 27-month construction programme has required the delivery of 914,000m<sup>3</sup> of marine aggregate which has primarily been supplied by Boskalis Westminster in collaboration with VolkerStevin. The marine civil engineering stage of the works is due to complete in 2019 with some landside elements planned for 2020.

Stages 1, 2 and 3A of the DWDR development are due for completion in 2020 with a programming decision regarding Stage 3B anticipated following the UK's exit from the EU.



**914,000m<sup>3</sup>**  
of marine aggregate  
delivered to site





# Case study: sandscaping protection

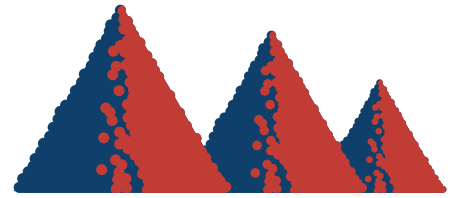
## The Bacton to Walcott Sandscaping scheme

**The Crown Estate, North Norfolk District Council and project partners have celebrated the completion of the innovative Bacton to Walcott Sandscaping Scheme. The UK-first, multi-partner project was an internationally significant undertaking and has been many years in the making. This pioneering approach has been designed to protect the local**

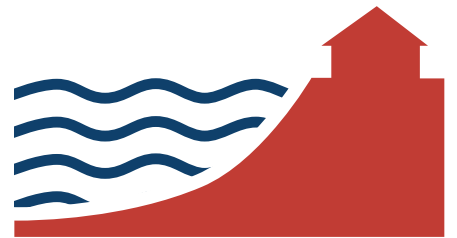
**communities of Bacton and Walcott and critical infrastructure at the Bacton Gas Terminal site from the full force of the North Sea.**

Sandscaping saw approximately 1.8 million m<sup>3</sup> of sand, dredged from marine sand sources, placed on Bacton and Walcott beaches and engineered to create significantly wider beaches and much-improved access. This bold new approach to sandscaping is expected to offer 15-20 years of protection from coastal erosion and the effects of climate change to this stretch of North Norfolk's coastline.

The sand placement has substantially increased the height and width of the beaches. The waves and tides will now help distribute the sand along this part of the coast. This natural defence will protect the coast from erosion in the event of major storm surges in the future. In addition to keeping the neighbouring communities safe, the scheme re-creates the dry beaches that the area used to have, while also creating dunes to enhance biodiversity.



**1.8 million m<sup>3</sup>**  
marine sand placed on  
the beaches



**15-20 years**  
estimated period of  
protection from coastal  
erosion



# Sustainability and stewardship

The Crown Estate has a commitment to being a responsible landlord, which includes minimising the impact that marine aggregate dredging has on the natural environment, helping local communities and preserving archaeological finds.

Although the quantity of sand and gravel potentially available from marine sources is vast, the industry is aware that it is extracting from a large but ultimately finite natural mineral resource and is keen to ensure that these valuable minerals are used in the most efficient and effective manner possible.

We work in partnership with industry, regulators and stakeholders to improve the sustainability of the sector, in particular reducing the area of seabed licensed that is dredged year on year.

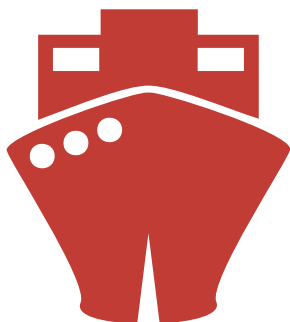


Via our Electronic Monitoring System, we ensure all dredging is undertaken in the correct locations, and every licence application must be supported by a full Environmental Impact Assessment

including a Coastal Impact Study to determine whether a marine licence (essentially the planning consent) can be granted, a process governed by the Marine Licensing process.

## To deliver 8,500 tonnes takes:

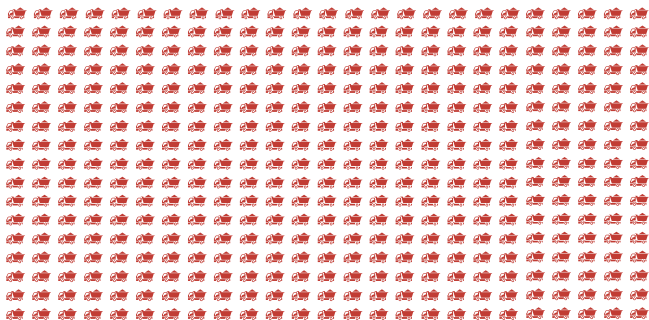
**1 dredger**  
(of 8,500 tonnes)



**95 train hopper wagons**  
(of 90 tonnes)



**425 aggregate lorries**  
(of 20 tonnes)



**9 barges**  
(of 1,000 tonnes)





# Marine Aggregates Business Leadership Programme

**The Crown Estate recognises that knowledge forms a key component of the landscape in this specialist sector. It therefore sponsors a high impact, business-focussed course to equip future company leaders and decision-makers associated with the Marine Aggregates industry with the skills and understanding required for success.**

Designed with the support of the Mineral Products Association and the British Marine Aggregate Producers Association, the Marine Aggregate Business Leadership Programme comprises eight one day workshops spread over the course of one year where interaction is encouraged to stimulate wide-ranging discussion.

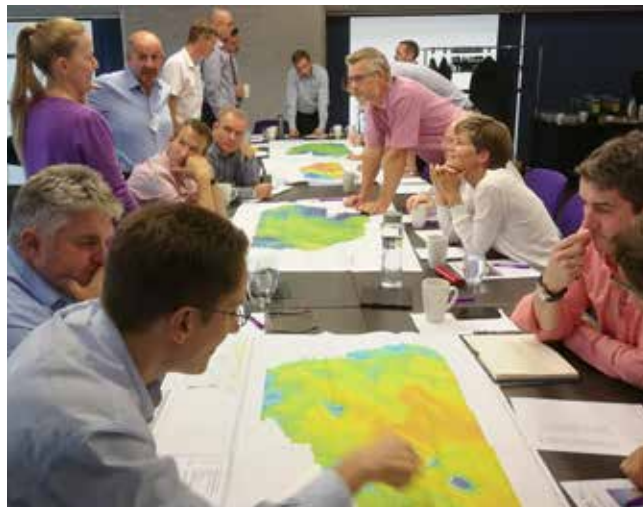
First launched in 2015, the course runs annually and continues to grow in popularity with an output totalling over 80 alumni.

The course aims to provide a full-sector perspective for upcoming business leaders and associated practitioners (including regulators

and advisors) to the wider policy, regulatory, operating and financial environment, as well as addressing key risks and opportunities. The course delivers a focussed, high-intensity immersion in the sector, delivered by leading experts from industry, government and consultants.

## Topics include:

- Marine sand and gravel industry history
- Markets: construction, coastal adaptation
- Resources – identification, evaluation and management
- Marine policy and planning
- Marine licensing and regulation
- Access to minerals - commercial licensing & asset management
- Vessel and wharf visits
- Research
- Marine archaeology and munitions and their impact on operations
- Dry docking and vessel classification
- Dredger management - productivity and optimisation, crewing & people
- Business performance, optimisation and efficiencies
- Sustainability and environmental performance



“I thought it was a true leadership course providing great content relevant to current and future leaders within a Marine Business. The modules were delivered in a professional manner and by people experienced within the industry. The structure of the course and each module ensured that attendees were thoroughly engaged at all times and able to contribute, discuss and debate bringing different experiences to the table. A very worthwhile leadership course.”

– Kurt Cowdery, Director, Marine Aggregates, CEMEX UK Marine Ltd

# Marine aggregate wharf developments

## Tilbury2

**Tarmac has partnered with the Port of Tilbury to create the UK's largest construction materials aggregates terminal at Tilbury2, the new port being constructed on the north bank of the River Thames.**

The work will see the creation of new aggregate processing and manufacturing facilities, including an asphalt and ready-mix concrete plant, at the new port terminal, supported by the terminal's deep-sea capacity for vessels up to 100,000 metric tonnes. Its riverside location will enable the easy import of raw materials and facilitate the use of the River Thames as a delivery route for processed construction materials into Central London.



In February 2019, Forth Ports, owner of The Port of Tilbury, obtained approval under a development consent order (DCO) from the Planning

Inspectorate to build a new terminal adjacent to its current port in Thurrock. The new, privately funded port is being built on a 152-acre site and it is envisaged that Tilbury2 will act as a satellite of the main port, comprising a:

- Roll-on/roll-off ferry terminal for importing and exporting containers and trailers
- Construction Materials and Aggregate Terminal (CMAT) for importing, processing, manufacturing and distributing construction materials
- New nationally strategic rail and road connection into the site.

Joint development of the site by the Port of Tilbury and Tarmac will take place through late 2019 to establish most operations by the end of 2020.



Images courtesy of Forth Ports

## Peruvian Wharf

**Delivery of marine aggregates to Peruvian Wharf resumed in 2019. The eight-acre site had laid vacant for 17 years but was purchased in 2016 by the Port of London Authority and Brett Aggregates subsequently leased part of the site, including the 200-metre quay, to establish a river-fed aggregates hub with a high-output concrete**

**batching plant in the heart of East London.**

The development of Peruvian Wharf is part of Brett Aggregates' expansion of marine and river-borne aggregates and related products and delivery of materials into London by river and rail.

Processed aggregates from Brett

Aggregates Cliffe site will be brought into Peruvian Wharf by a variety of vessels including barges and self-discharging coasters. Aggregates will feed Capital Concrete's Silvertown high-output batching plant on the site which is ideally located to supply the busy construction market in Central and East London with minimum road miles.



# UK dredging fleet update

**2019 marked the start of a new phase of investment in dredging vessels by the UK offshore aggregate industry.**

The CEMEX Go Innovation, a state-of-the-art marine aggregate dredger commissioned by CEMEX, was officially launched in August 2019. This represents the first new vessel in both the CEMEX fleet and the UK aggregate industry in over 20 years.

The CEMEX Go Innovation is the first of Damen's new Marine Aggregate Dredger class, a 103.5 metre MAD 3500. The vessel is the result of close cooperation between CEMEX and Damen and represents the first of a new generation of efficient and economical dredgers specialising in the extraction of sand and gravel from the seabed. It is designed to extract aggregates from the sea bed up to depths of 55 metres, including in the challenging conditions experienced in the North Sea.

The CEMEX Go Innovation has been developed to offer major environmental savings while ensuring safety, high performance and sustainability. The result is a dredger which will have a



"This is a ground-breaking ship that leads the industry thanks to the major environmental savings that it offers, its increased capacity and dredging depth, and its safety-enhancing external pipework. We look forward to the CEMEX Go Innovation arriving in the UK and beginning its work early next year."

- Laurence Dagley, managing director, CEMEX Materials UK Southern

25% increased capacity, nearly double the dredging depth and discharge rate increase of 20%. Further design

features include optimal balance between payload and efficiency, overall length of 103.5 metres, a deadweight of just under 7,000 tonnes and a maximum loaded speed of approximately 12 knots.

Following its launch, the CEMEX Go Innovation will complete its fitting out with commissioning due to begin at the end of the year, and delivery expected in the early spring of 2020.

In addition to the CEMEX Go Innovation, Hanson has given the green light to Damen Shipyards Gorinchem to build a new marine aggregate dredger to join its fleet.

The investment is part of the company's overall strategy to replace its existing marine aggregates fleet. On delivery, expected in the first quarter of 2021, the new dredger will operate as part of Hanson Aggregates Marine.



Images courtesy of Cemex UK Marine



# Marine aggregates tender 2018/2019

**The Crown Estate has now completed the plan-level Habitats Regulations Assessment (HRA) for the 2018/19 marine aggregate tender round, confirming that all eight of the dredging sites proposed will now progress to award of rights.**

The Crown Estate will now offer the successful bidders initial five-year exploration and option agreements. Bidders will then be required to obtain statutory permission in the form of a Marine Licence from the relevant regulator, prior to any extraction taking place.

The plan-level Habitats Regulations Assessment assesses the possible impact of the sites proposed for the extraction of marine aggregates, on the relevant nature conservation sites of

European importance.

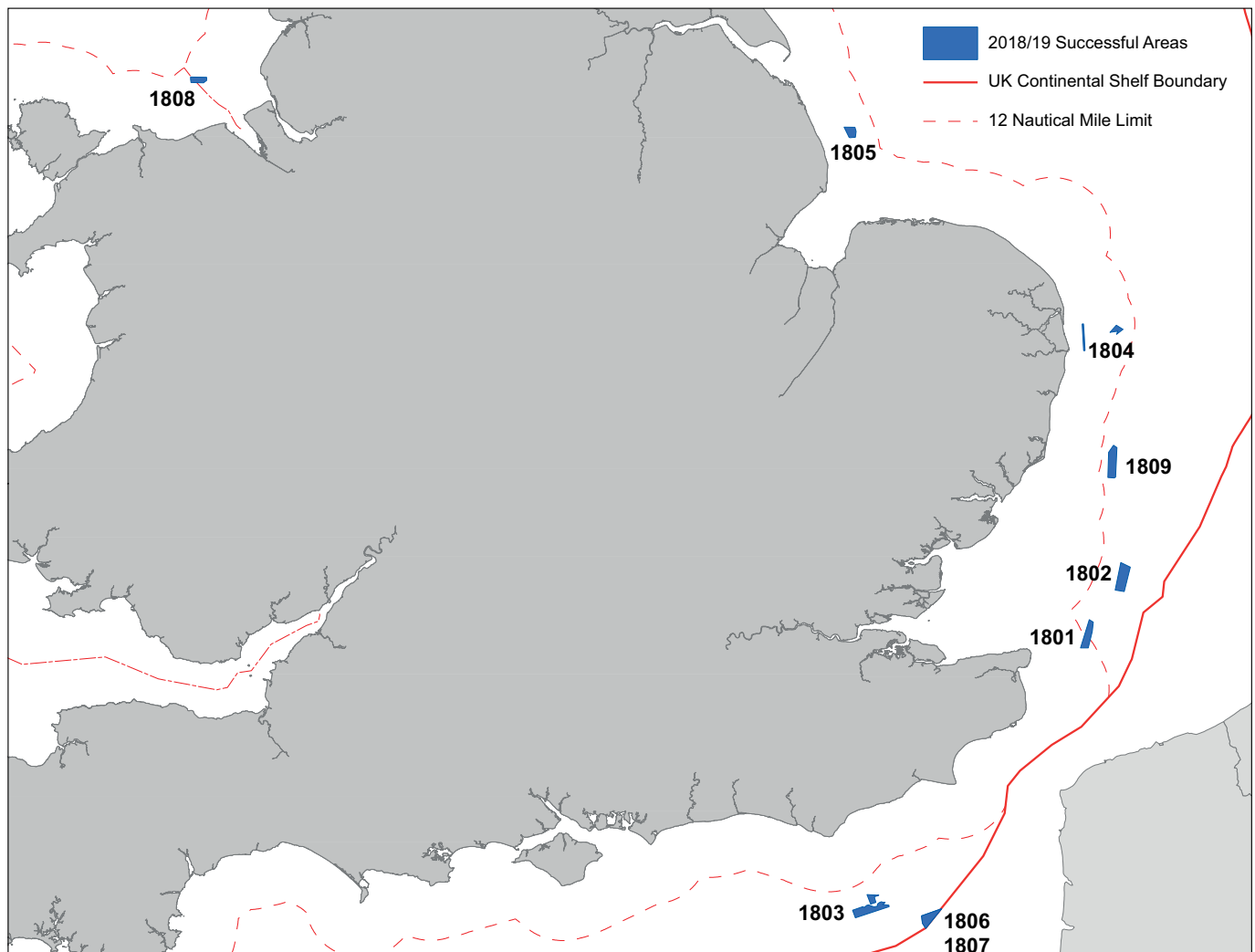
Throughout the HRA process, The Crown Estate, supported by expert independent advisors, has consulted with the statutory marine planning authorities, the statutory nature conservation bodies and a number of non-governmental stakeholders.

Following the conclusion of the HRA, The Crown Estate's Appropriate Assessment, which includes an overview of the HRA methodology, has been made available on Marine Data Exchange, along with the Report to Inform the Appropriate Assessment (RIAA) prepared by its advisors.

“As managers of the seabed around England, Northern Ireland and Wales, we take our role as careful stewards of this resource very seriously and work in partnership with industry to help support the sustainable use of sand and gravel resources.

“This latest tender round has shown increased interest from industry in affording continuity of supply of a crucial component in the building material supply chain, against increasing constraints around extraction of aggregate from land-based sources.

- Nick Everington, Portfolio manager, Marine Minerals



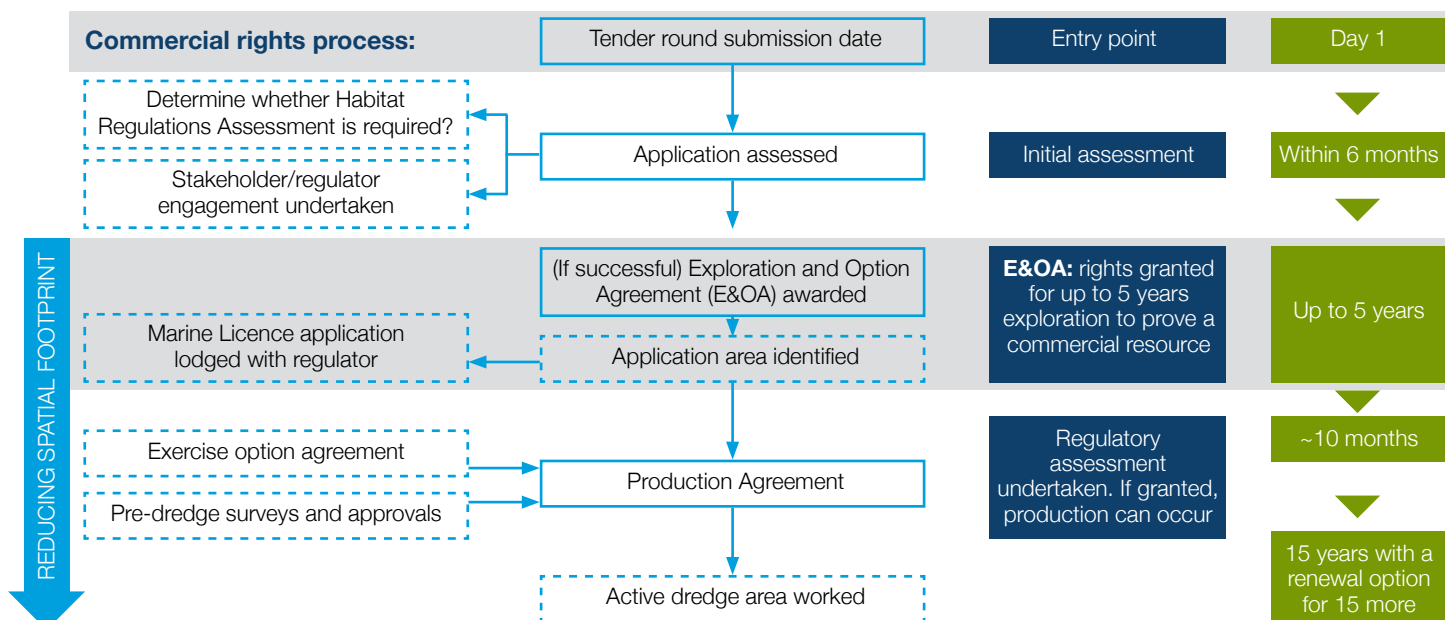
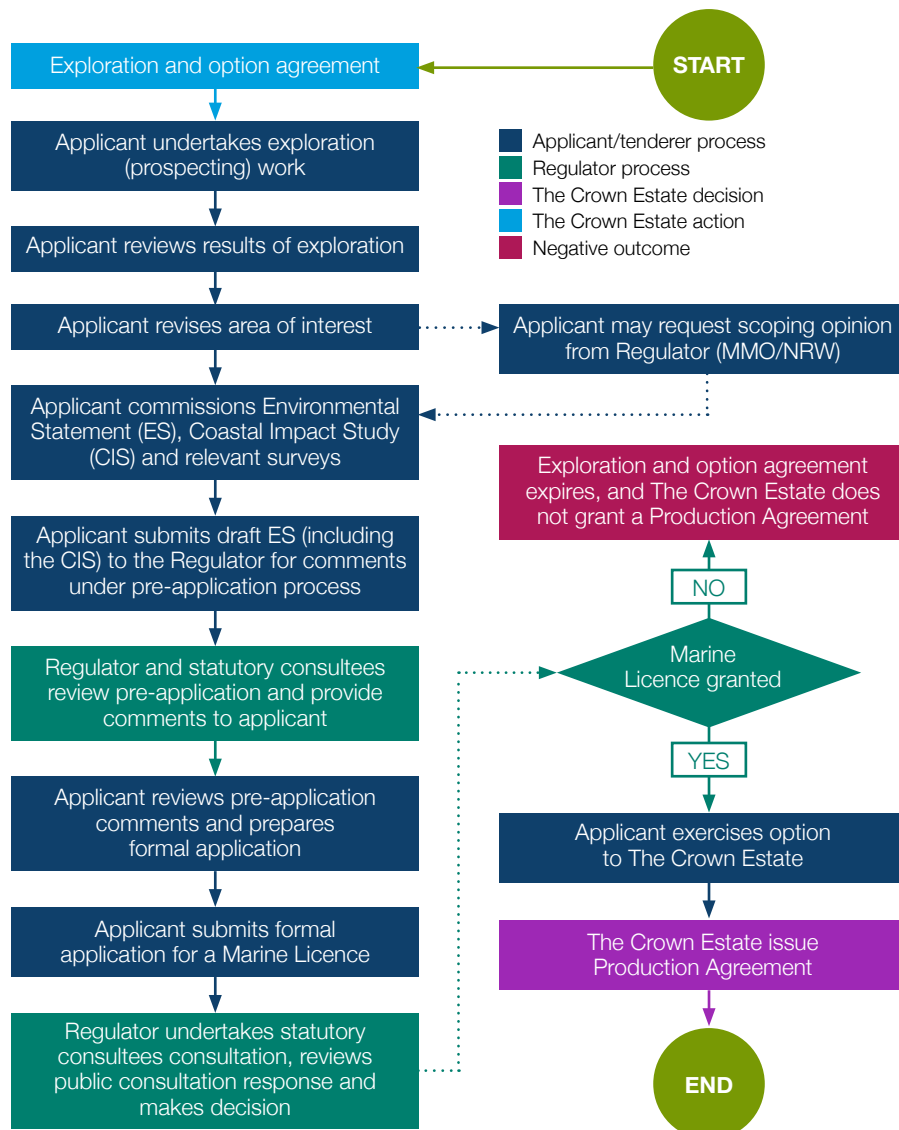
# Obtaining rights for sand and gravel extraction

**To obtain a licence from The Crown Estate for the rights to extract marine aggregates from the seabed, a number of stages are involved.**

- The first stage is to identify an area of interest and submit a tender bid during a Marine Aggregates Tender Round (usually held every two years by The Crown Estate).
- Once a bid is submitted the tenders will be assessed by The Crown Estate and rights may be awarded.
- Once the commercial rights have been secured from The Crown Estate then the second phase of the application process commences.
- The successful tenderer is then required to apply for a Marine Licence (environment and legal rights/permissions) from the regulator (Marine Management Organisation in England, and Natural Resources Wales in Wales).

Only if a Marine Licence is received will the applicant be able to request The Crown Estate issue a Production Agreement for extraction to commence.

The Marine Licence and commercial rights processes are summarised in the following flowcharts.



The Crown Estate is a £14.3bn real estate business specialising in commercial property in central London, prime regional retail and offshore wind. It also has a substantial rural and coastal portfolio and manages the seabed around England, Wales and Northern Ireland. Established by an Act of Parliament, as an independent commercial business, it returns 100% of its annual profits to the Treasury for the benefit of the public finances. This has totalled £2.8bn over the last ten years.

## Links and useful references

### **The Crown Estate**

[www.thecrownestate.co.uk/en-gb/what-we-do/on-the-seabed/minerals-dredging/](http://www.thecrownestate.co.uk/en-gb/what-we-do/on-the-seabed/minerals-dredging/)

### **Marine Aggregate Information Centre**

[www.marineaggregates.info](http://www.marineaggregates.info)

### **British Marine Aggregate Producers Association**

[www.bmapa.org](http://www.bmapa.org)

### **Marine Management Organisation**

[www.gov.uk/mmo](http://www.gov.uk/mmo)

### **Natural Resources Wales**

[www.naturalresourceswales.gov.uk](http://www.naturalresourceswales.gov.uk)

### **British Geological Survey – Minerals UK**

[www.bgs.ac.uk/mineralsuk](http://www.bgs.ac.uk/mineralsuk)

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[www.thecrownestate.co.uk](http://www.thecrownestate.co.uk)

 @TheCrownEstate

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