

ANNUAL REVIEW
2022



Marine Aggregates

Contents

National overview	3	Wharf development update	18
Sustainability and stewardship	4	Key Resource Area project	19
Reserves and resources	5		
Delivery by region / country	6	Case study: Bournemouth beach	21
		Case study: Bramley Moore Dock infill	22
Extraction and delivery by dredge region	7		
The Humber region	8	UK dredging fleet update	23
The East Coast region	9	The Crown Estate and BMAPA publications	24
The Thames region	10	Marine Minerals Academy	25
The East English Channel region	11		
The South Coast region	12	Obtaining rights for sand and gravel extraction	26
The South West region	13		
The North West region	14	Links and useful references	27
Export to mainland Europe from the UK	15		
Uses of marine aggregates around the UK	16		



Click the titles
to jump ahead

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.

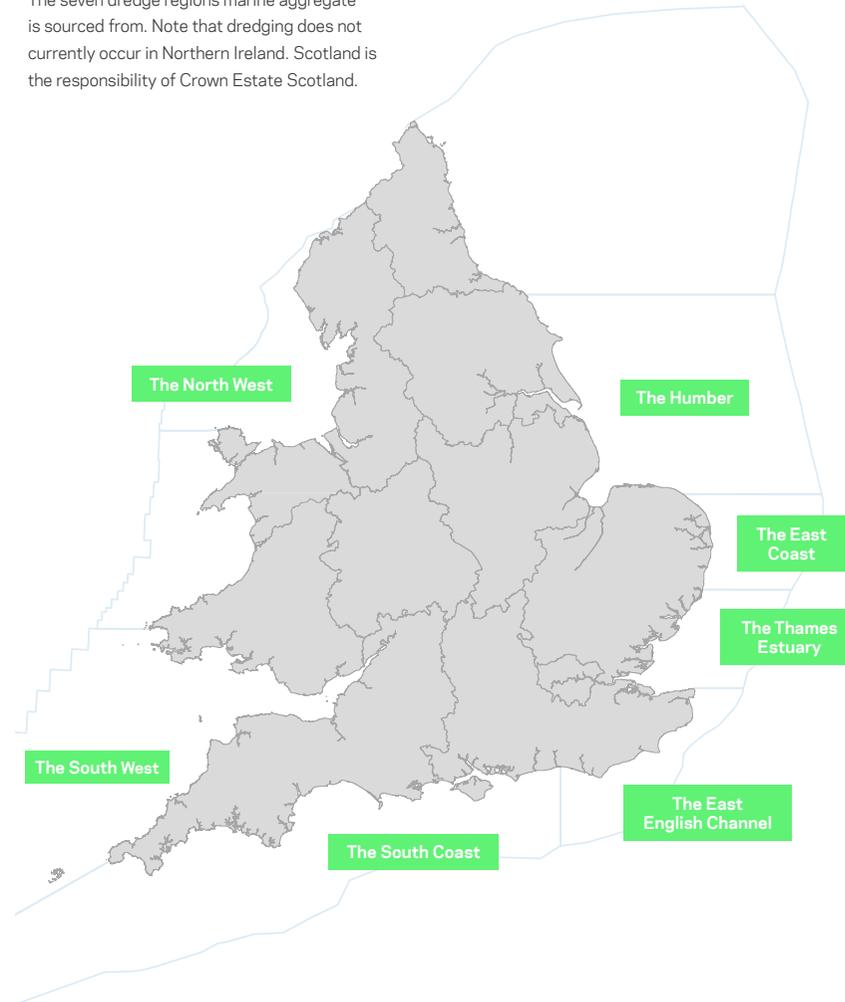
Onshore resources are becoming increasingly constrained, particularly in the South East of England and London. In 2018, marine aggregates satisfied 22% (13.7 million tonnes) of the total construction needs for sand & gravel in Great Britain.*

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.

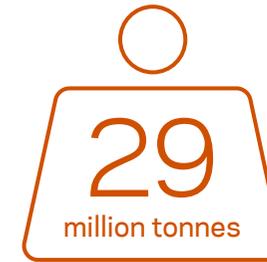
This document is designed to help planning officers in local authorities understand the contribution that marine aggregates can make, by identifying offshore sources and providing information on supply routes. In turn, this is intended to support local authorities in complying with the National Planning 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 2022.

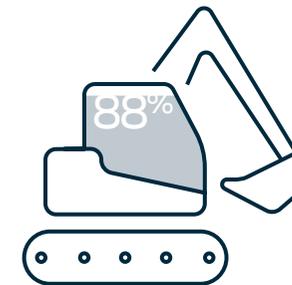
The seven dredge regions marine aggregate is sourced from. Note that dredging does not currently occur in Northern Ireland. Scotland is the responsibility of Crown Estate Scotland.



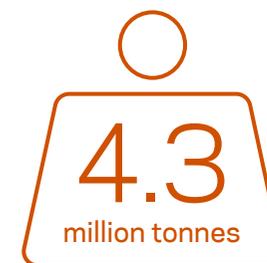
* Source: Mineral Products Association: Profile of the UK Mineral Products Industry 2020 Edition



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



88% of marine aggregates landed in England and Wales are used by the **building industry**



4.3 million tonnes of marine aggregate were exported to **Europe** in 2021 (**23%** of all marine aggregate landed)

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.

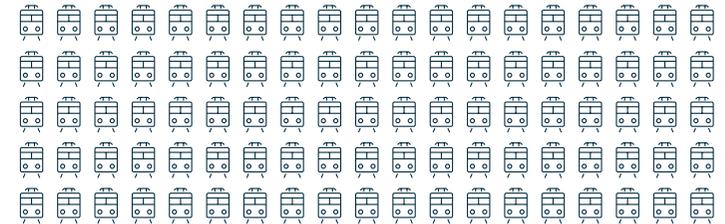


To deliver 8,500 tonnes takes:

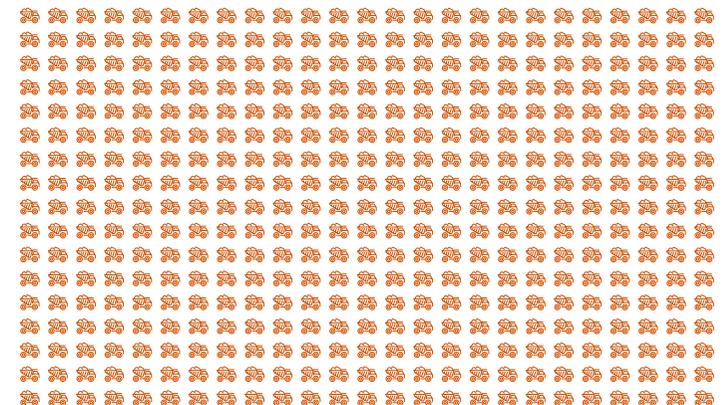
1 dredger
(of 8,500 tonnes)



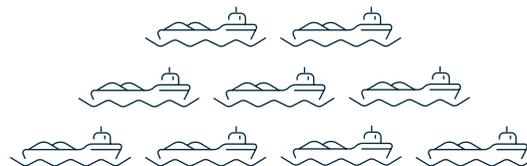
95 train hopper wagons
(of 90 tonnes)



425 aggregate lorries
(of 20 tonnes)



9 barges
(of 1,000 tonnes)



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

21

Current national estimates suggest there are **21 years** of primary marine aggregate production permitted

338

million tonnes

Estimated national 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 March 2022)	Regional reserve life at 10-year average annual offtake
Humber	41.88	2.24	3.51	3.52	6.88	18.69
East Coast	44.37	4.01	3.42	4.72	7.13	11.07
Thames Estuary	38.19	1.38	1.43	1.94	3.80	27.77
East English Channel	95.60	3.98	4.29	4.65	9.92	24.03
South Coast	75.97	3.39	3.50	3.99	8.13	22.44
South West	32.55	1.22	1.36	1.43	3.05	26.62
North West	9.28	0.27	0.21	0.38	1.10	34.00
Total	337.85	16.48	17.71	18.10	39.99	20.50

All figures are in millions of tonnes
Totals are national averages and peaks, not the sum of regional figures

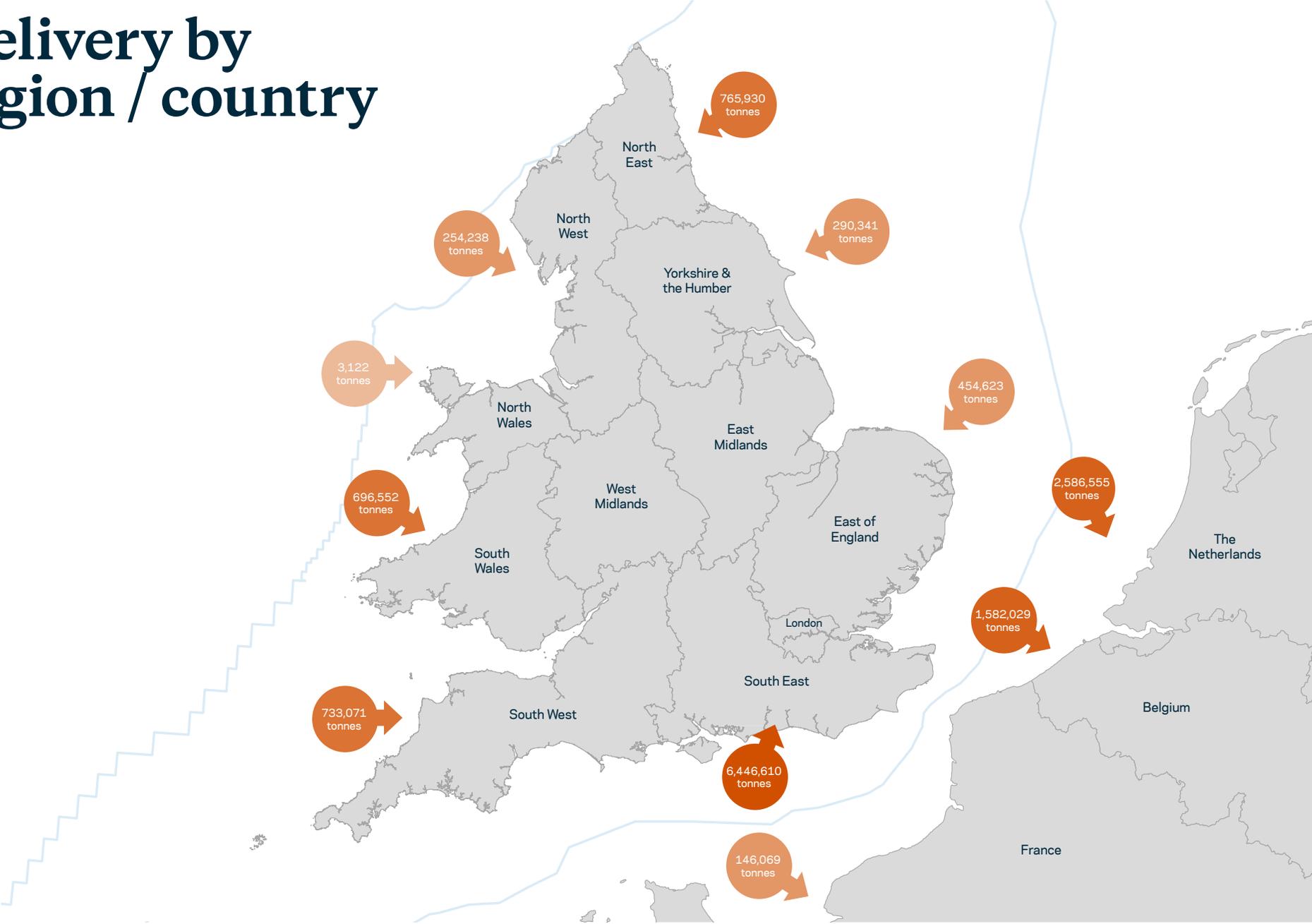


178

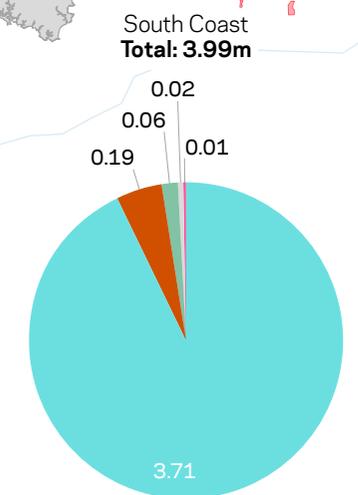
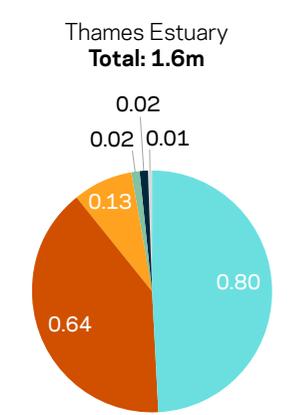
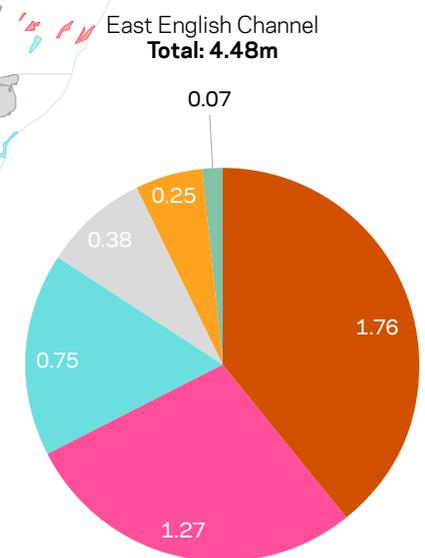
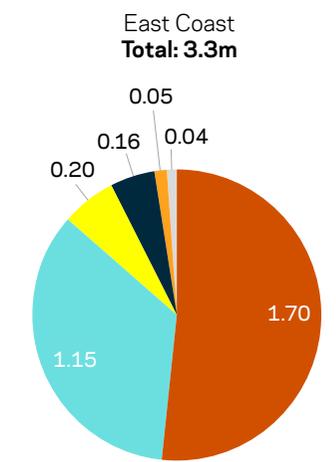
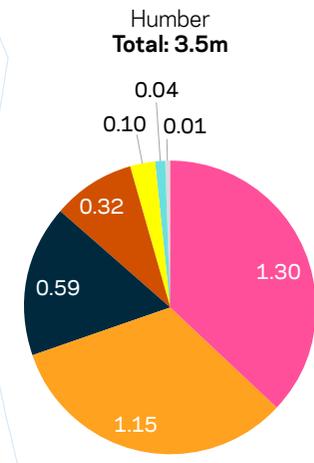
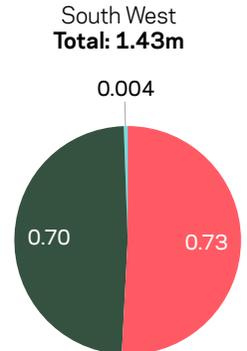
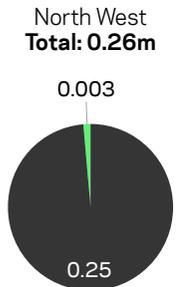
million tonnes

London and the Thames Estuary are supplied by the East Coast, Thames Estuary & East English Channel. These hold reserves of 178m tonnes, giving **London** and the **Thames Estuary** 19 years of production

Delivery by region / country



Extraction and delivery by dredge region



The Humber region

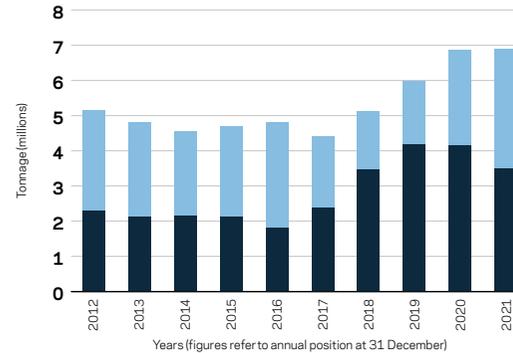
6.88
million tonnes can be extracted
from **10 licences** annually

19
Current estimates suggest there
are **19 years** of primary marine
aggregate production permitted

1
application for a licence could, if
approved, increase the permitted
tonnage by **0.5 million tonnes**

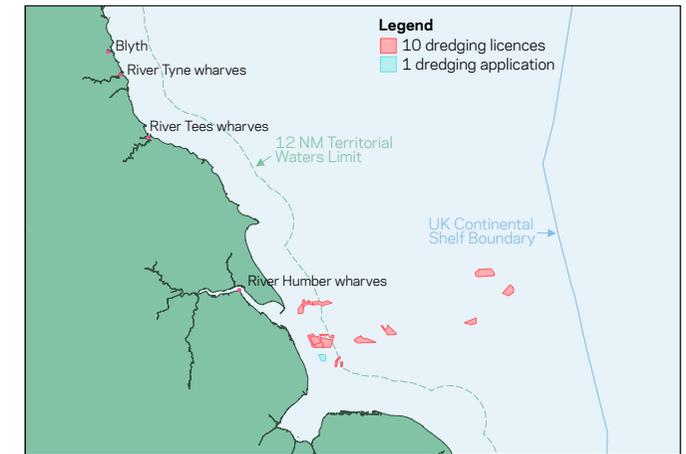
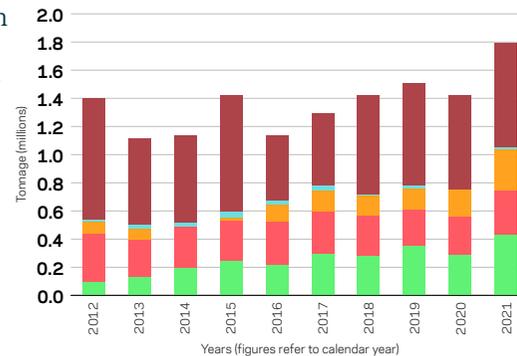
Permitted and extracted tonnage

Unused permitted tonnage
Extracted tonnage



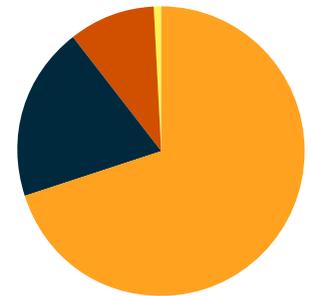
Delivery of marine aggregate to the region

Secondary use from licences
Blyth
River Humber wharves
River Tyne wharves
River Tees wharves



During 2021 material extraction from the region was mainly delivered to :

Mainland Europe (**70.1%**)
Humber (including North East) (**19.6%**)
Thames Estuary (**9.6%**)
East English Channel (**0.7%**)



Sediment and indicative grain sizes



Fine sand
0.063 - 0.25mm



Medium sand
0.25 - 0.5mm



Coarse sand
0.5 - 2mm



Very coarse sand
2 - 4mm



Fine gravel
4 - 20mm



Medium gravel
20 - 40mm



Coarse gravel
40 - 63mm

The East Coast region

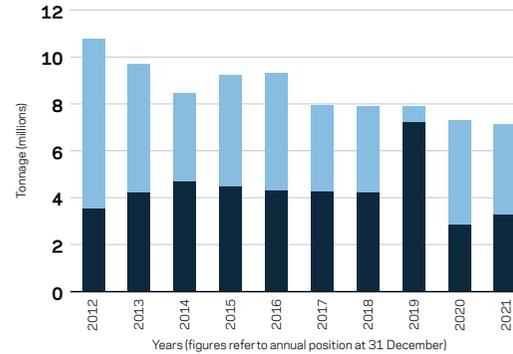
7.13
million tonnes can be extracted
from **11 licences** annually

11
Current estimates suggest there
are **11 years** of primary marine
aggregate production permitted

1
application for a licence could, if
approved, increase the permitted
tonnage by **0.65 million tonnes**

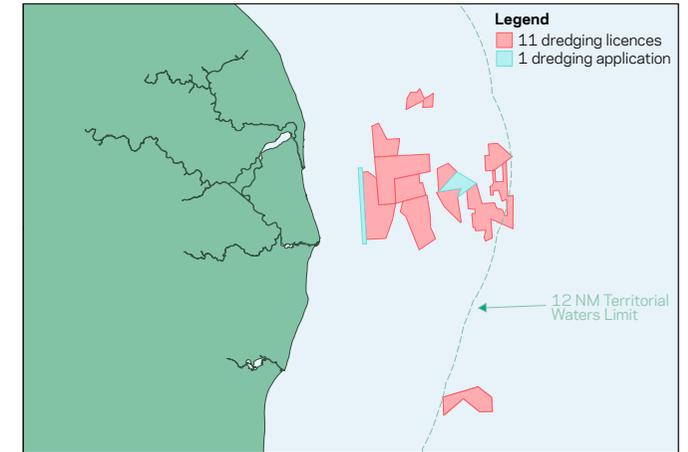
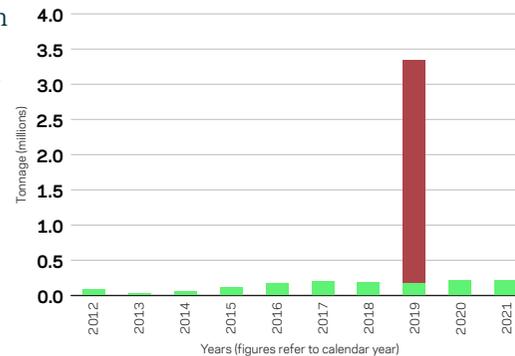
Permitted and extracted tonnage

Unused permitted tonnage
Extracted tonnage



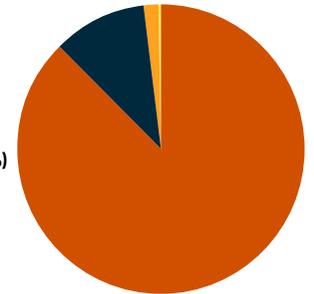
Delivery of marine aggregate to the region

Secondary use from licences
Ipswich



During 2021 material extraction from the region was mainly delivered to :

Thames Estuary (**87.62%**)
Humber (including North East) (**10.67%**)
Mainland Europe (**1.65%**)
East English Channel (**0.05%**)
South Coast (**0.01%**)



Sediment and indicative grain sizes



Fine sand
0.063 - 0.25mm



Medium sand
0.25 - 0.5mm



Coarse sand
0.5 - 2mm



Very coarse sand
2 - 4mm



Fine gravel
4 - 20mm



Medium gravel
20 - 40mm



Coarse gravel
40 - 63mm

The Thames region

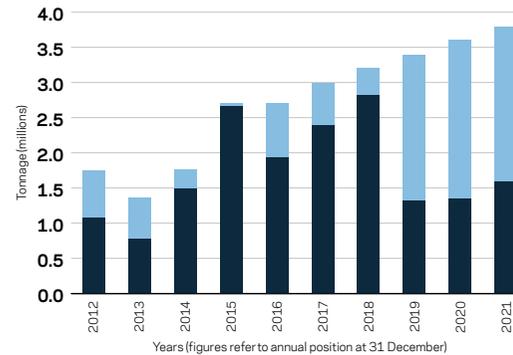
3.80
million tonnes can be extracted
from **8 licences** annually

28
Current estimates suggest there
are **28 years** of primary marine
aggregate production permitted

2
application for a licence could, if
approved, increase the permitted
tonnage by **1.3 million tonnes**

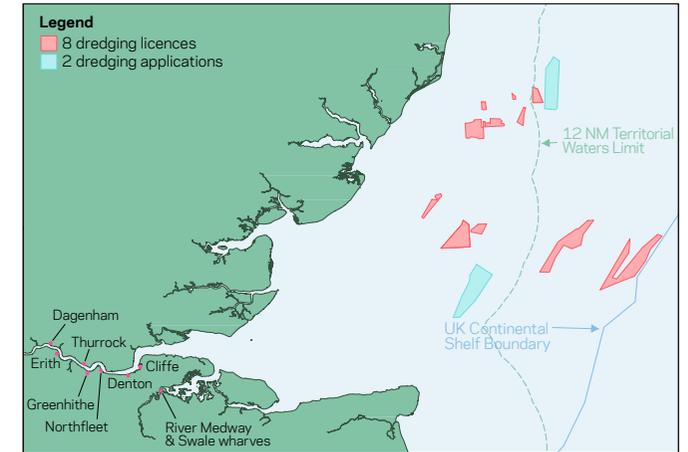
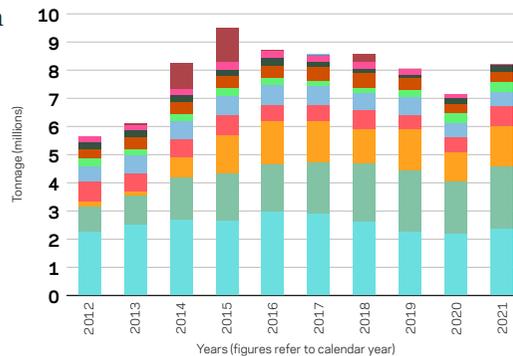
Permitted and extracted tonnage

- Unused permitted tonnage
- Extracted tonnage



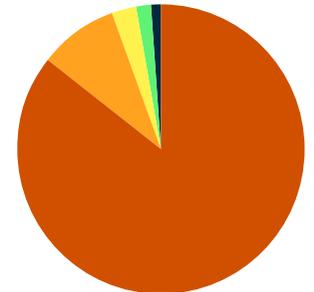
Delivery of marine aggregate to the region

- Secondary use from licences
- Tilbury
- Isle of Grain
- Erith
- Thurrock
- River Medway & Swale wharves
- Greenhithe
- Denton
- Northfleet
- Cliffe
- Dagenham
- Greenwich wharves



During 2021 material extraction from the region was mainly delivered to :

- Thames Estuary (**85.7%**)
- Mainland Europe (**9%**)
- East English Channel (**2.7%**)
- South Coast (**1.5%**)
- Humber (**1.1%**)



Sediment and indicative grain sizes



Fine sand
0.063 - 0.25mm



Medium sand
0.25 - 0.5mm



Coarse sand
0.5 - 2mm



Very coarse sand
2 - 4mm



Fine gravel
4 - 20mm



Medium gravel
20 - 40mm



Coarse gravel
40 - 63mm

The East English Channel region

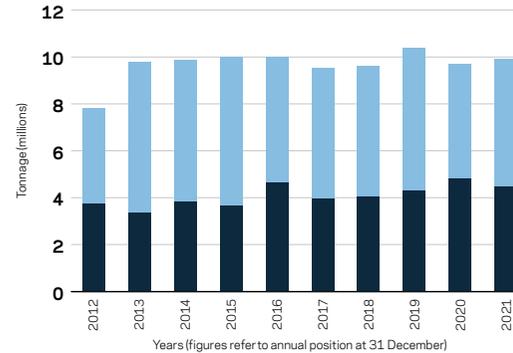
9.92
million tonnes can be extracted
from **10 licences** annually

24
Current estimates suggest there
are **24 years** of primary marine
aggregate production permitted

5
application for a licence could, if
approved, increase the permitted
tonnage by **2.1 million tonnes**

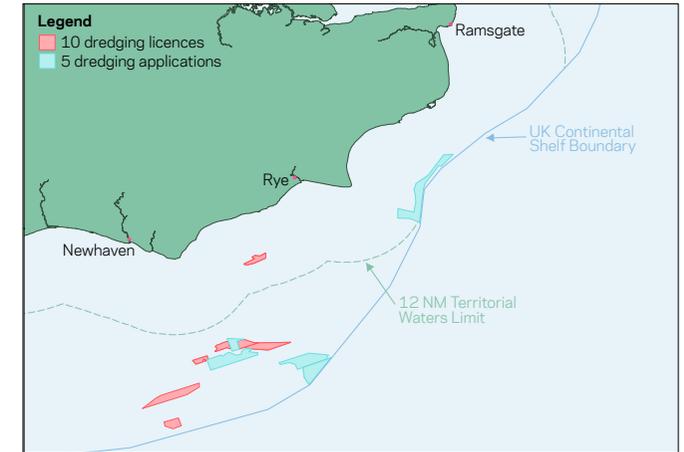
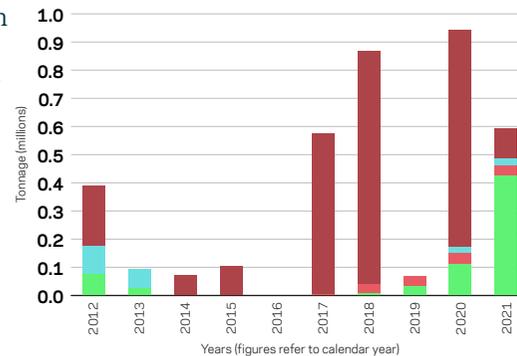
Permitted and extracted tonnage

Unused permitted tonnage
Extracted tonnage



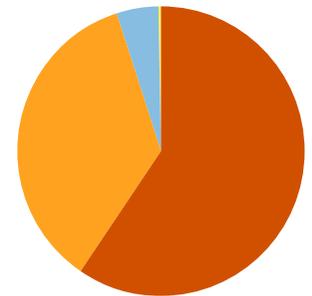
Delivery of marine aggregate to the region

Secondary use from licences
Rye
Dover
Ramsgate
Newhaven



During 2021 material extraction from the region was mainly delivered to :

Thames Estuary (59.5%)
Mainland Europe (35.5%)
East Coast (4.8%)
East English Channel (0.2%)



Sediment and indicative grain sizes



Fine sand
0.063 - 0.25mm



Medium sand
0.25 - 0.5mm



Coarse sand
0.5 - 2mm



Very coarse sand
2 - 4mm



Fine gravel
4 - 20mm



Medium gravel
20 - 40mm



Coarse gravel
40 - 63mm

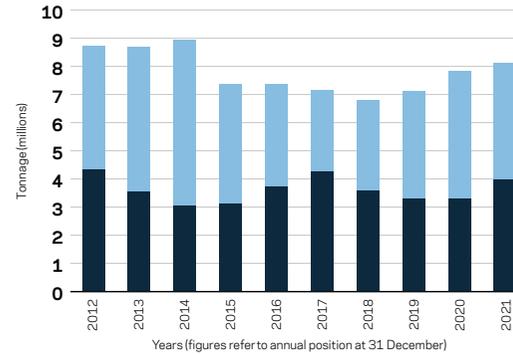
The South Coast region

8.13
million tonnes can be extracted
from **15 licences** annually

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

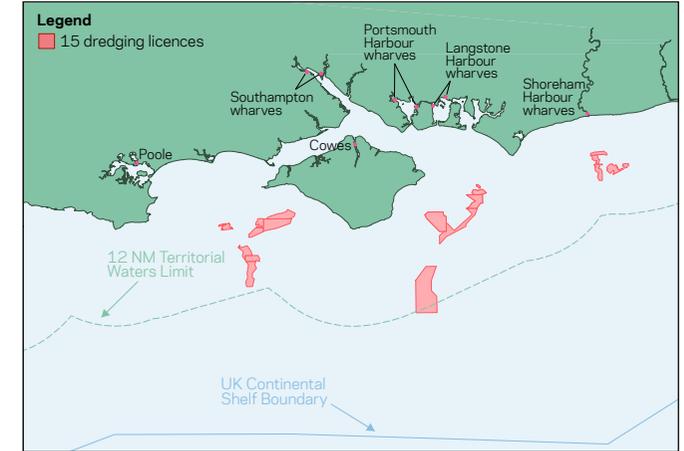
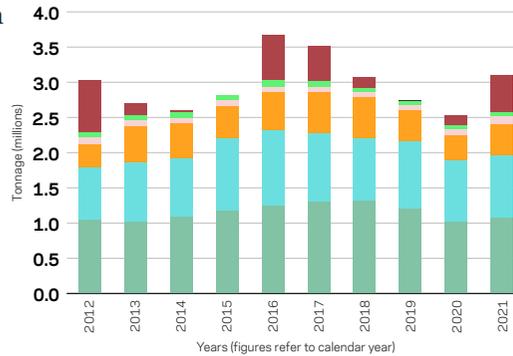
Permitted and extracted tonnage

- Unused permitted tonnage
- Extracted tonnage



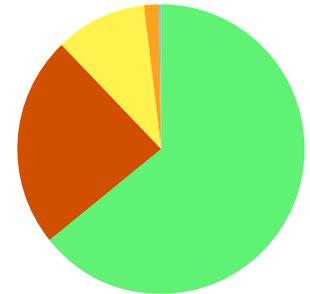
Delivery of marine aggregate to the region

- Secondary use from licences
- Portsmouth Harbour wharves
- Littlehampton
- Cowes
- Poole
- Langstone Harbour wharves
- Southampton wharves
- Shoreham Harbour wharves



During 2021 material extraction from the region was mainly delivered to :

- South Coast (**64.2%**)
- Thames Estuary (**23.7%**)
- East English Channel (**10.3%**)
- Mainland Europe (**1.7%**)
- East Coast (**0.2%**)



Sediment and indicative grain sizes



Fine sand
0.063 - 0.25mm



Medium sand
0.25 - 0.5mm



Coarse sand
0.5 - 2mm



Very coarse sand
2 - 4mm



Fine gravel
4 - 20mm



Medium gravel
20 - 40mm



Coarse gravel
40 - 63mm

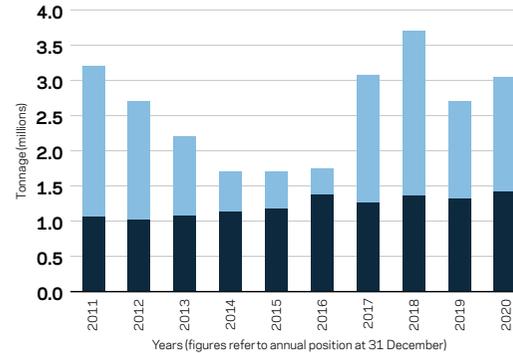
The South West region

3.05
million tonnes can be extracted
from **9 licences** annually

27
Current estimates suggest there
are **27 years** of primary marine
aggregate production permitted

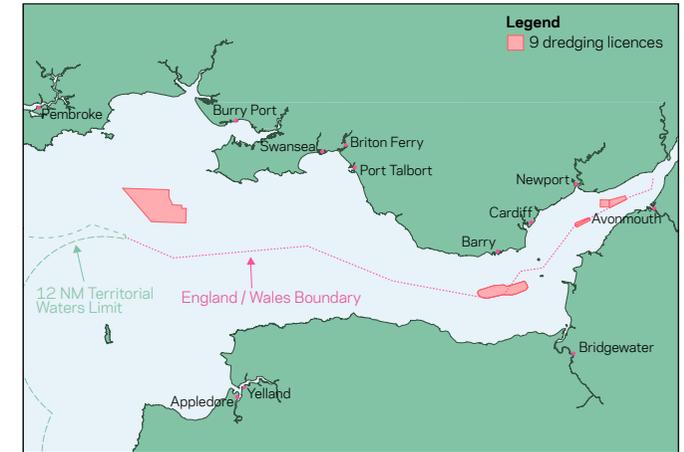
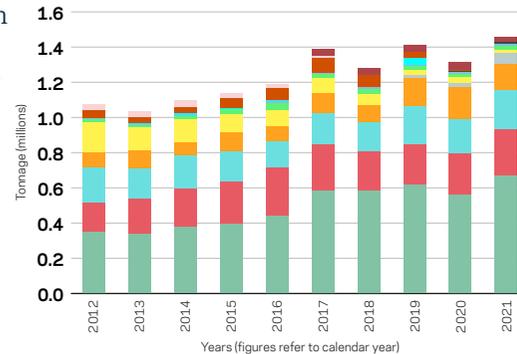
Permitted and extracted tonnage

- Unused permitted tonnage
- Extracted tonnage



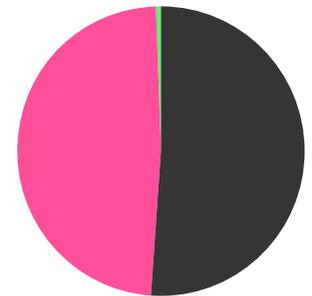
Delivery of marine aggregate to the region

- Secondary use from licences
- Appledore
- Barry
- Bridgewater
- Yelland
- Briton Ferry
- Port Talbot
- Pembroke
- Swansea
- Hinkley
- Burry Port
- Cardiff
- Newport (Wales)
- Avonmouth



During 2021 material extraction from the region was mainly delivered to :

- South West - English wharves (**51.13%**)
- South West - Welsh wharves (**48.58%**)
- South Coast (**0.29%**)



Sediment and indicative grain sizes



Fine sand
0.063 - 0.25mm



Medium sand
0.25 - 0.5mm



Coarse sand
0.5 - 2mm



Very coarse sand
2 - 4mm



Fine gravel
4 - 20mm



Medium gravel
20 - 40mm



Coarse gravel
40 - 63mm

The North West region

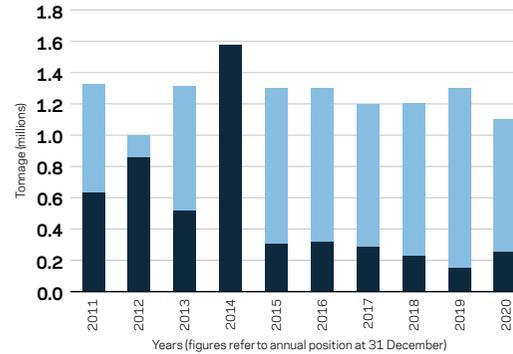
1.10
million tonnes can be extracted
from **2 licences** annually

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

1
application for a licence could, if
approved, increase the permitted
tonnage by **0.5 million tonnes**

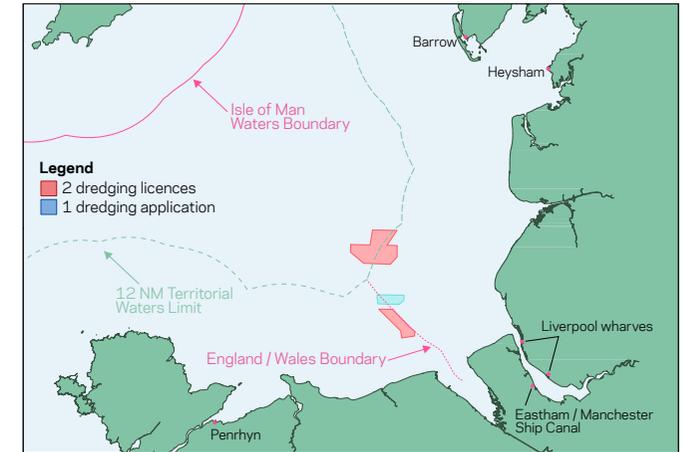
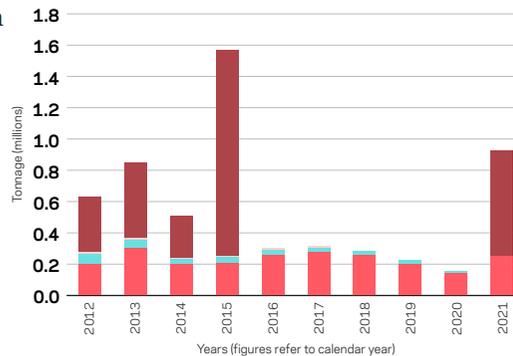
Permitted and extracted tonnage

Unused permitted tonnage
Extracted tonnage



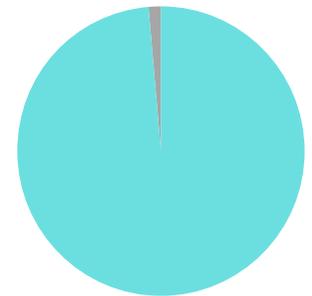
Delivery of marine aggregate to the region

Secondary use from licences
Heysham
Eastham / Manchester Ship Canal
Barrow
Penrhyn
Liverpool wharves



During 2021 material extraction from the region was mainly delivered to :

North West - English wharves (**98.8%**)
North West - Welsh wharves (**1.2%**)



Sediment and indicative grain sizes



Fine sand
0.063 - 0.25mm



Medium sand
0.25 - 0.5mm



Coarse sand
0.5 - 2mm



Very coarse sand
2 - 4mm



Fine gravel
4 - 20mm

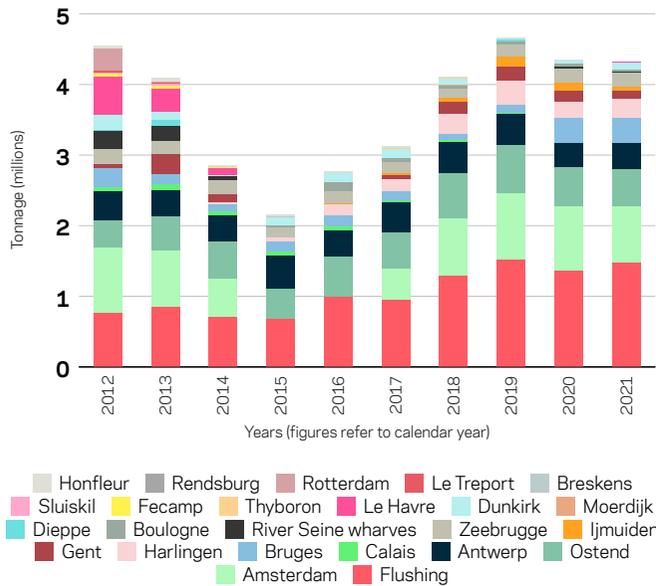


Medium gravel
20 - 40mm

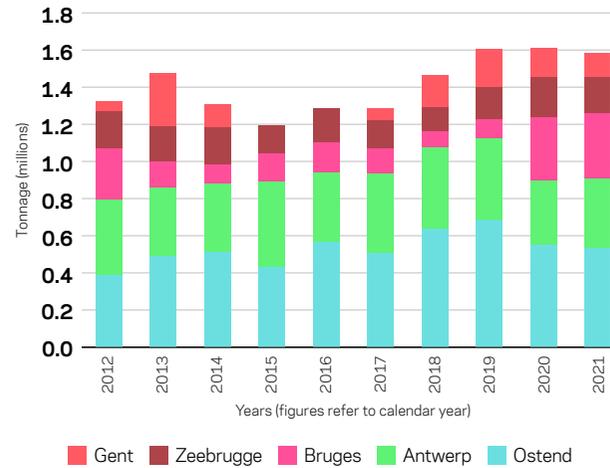


Coarse gravel
40 - 63mm

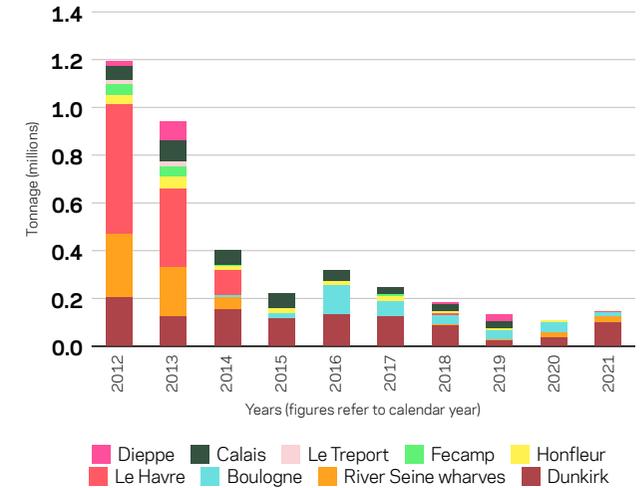
Export to mainland Europe from the UK



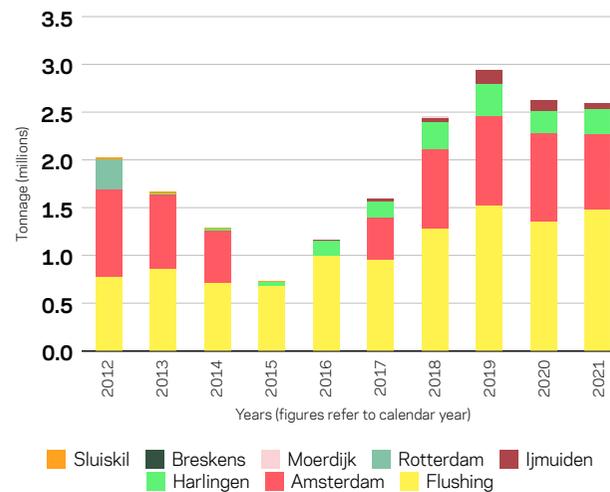
Delivery of marine aggregate to Belgium



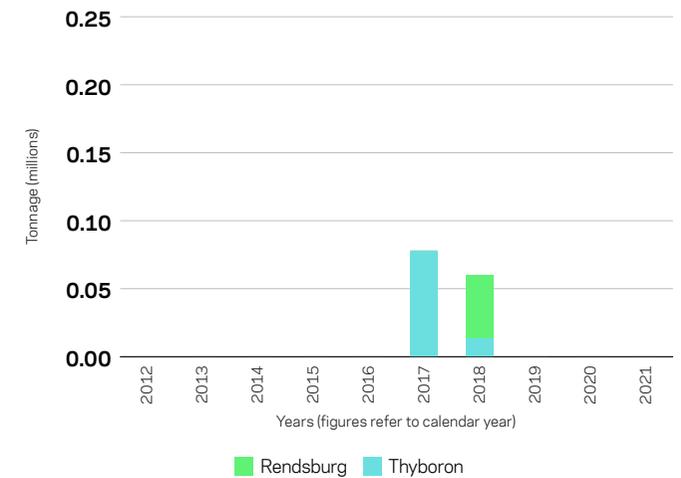
Delivery of marine aggregate to France



Delivery of marine aggregate to The Netherlands

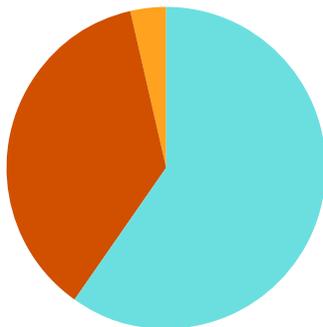


Delivery of marine aggregate to Northern Europe



During 2021 material extracted from Crown Estate licensed areas was exported to:

- The Netherlands (2.59m)
- Belgium (1.58m)
- France (0.15m)



Uses of marine aggregates around the UK

The below projects have all used marine aggregates in their construction.

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 Lincshire 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

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

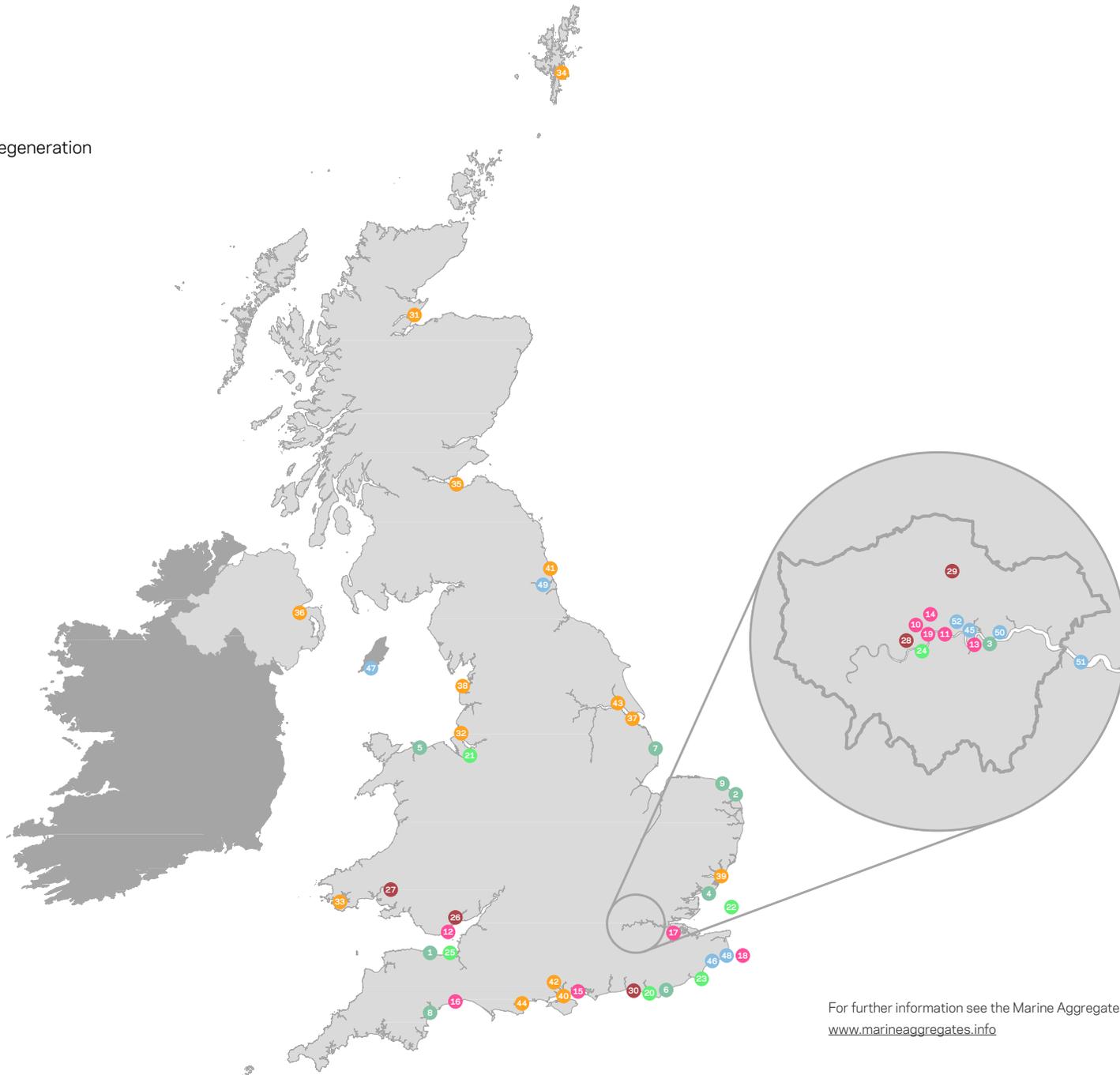
Community & leisure

- 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

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

- Coastal & flood defences
- Commercial development & regeneration
- Energy & utilities
- Port development
- Community & leisure
- Transport infrastructure



For further information see the Marine Aggregates Information Centre website:
www.marineaggregates.info

Wharf development update

Newhaven and Portsmouth

The Demand for Marine Aggregates

As supplies of land-based aggregates become increasingly constrained, the need for marine dredged aggregates continues to grow to support infrastructure and commercial development. Construction materials are vital to local economies and, for example, some 1.4 million tonnes of aggregates are required by East Sussex each year to meet construction demand.

The Brett Marine Network

The Brett Group has significant marine aggregates business interests and is building that business with key partners for long-term mutual benefit. This includes the operation of owned vessel capacity, long-term chartering of vessels, and short-term use of other vessels to enable the delivery of marine and other aggregates close to where they are needed.

Brett operates a network of wharves around the South East both on sites owned by Brett, such as Northfleet, Cliffe, and Ridham, and also in partnership with owners/operators at other terminals such as Ipswich, Ramsgate, Rye, Whitstable, Newhaven and Portsmouth.

Brett is continuing to significantly expand its marine aggregates capability across the South Coast. This means aggregates may be supplied into local markets with lower transport distance than the historic supply from further afield, reducing the emissions generated in meeting local construction demand.

Newhaven Port, East Sussex

Brett developed its Newhaven marine terminal on the South Coast in 2020, enabling aggregates to be supplied locally into the East Sussex market that has in the past relied upon long-distance delivery of aggregates from outside the county. With

access to over 50mt of consented marine aggregate licence capacity in the English Channel, this development has delivered the need for local marine minerals through Newhaven as identified in the East Sussex draft minerals plan.

The Newhaven site is also rail-linked and Brett Aggregates has a long-term contract with rail freight operator DB Cargo for the transport of aggregates into local markets and beyond - for example, to London.

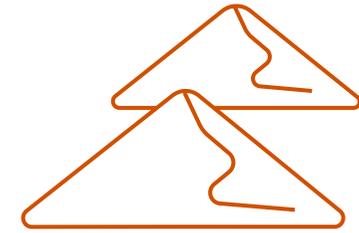
Portsmouth Port, Hampshire

The port, which is operated by Portico Ltd and owned by Portsmouth City Council, is also close to the Brett Group's marine aggregates licences in the Channel. Working with Portico, Brett established a marine aggregates terminal at Portsmouth in February 2022.

Both developments are capable of taking 10,000t cargoes of marine aggregates, the largest size delivered into

any of the wharves on the South Coast. Equivalent to 500 HGV loads these large vessels can deliver aggregates from nearby licences in the Channel with the lowest possible emissions per tonne, helping to reduce the CO₂ produced in meeting local demand for construction materials.

The long-term Brett operations at Newhaven and Portsmouth will enable local demand for construction materials to be met for future generations as well as support the growth of rail-linked supplies into areas such as London.



1.4 million tonnes

of aggregate required by East Sussex each year



Images courtesy of Brett Group

Key Resource Area project

Marine aggregates are an essential component of the UK building materials supply chain and can only be extracted from where they occur. Until recently, the assessment of these world class, nationally strategic mineral assets, consisted of a series of distribution maps and reports completed for The Crown Estate, by the British Geological Survey, in 2013.

Since then, a step change in the pace and scale of offshore development has become evident, which is likely to continue to grow for the foreseeable future. The anticipated scale and speed of marine development is leading to increasing competition for seabed space and environmental capacity. This is feeding a need to optimise marine planning decisions, which in turn requires acquisition of the best data, and its interpretation and a realisation that a more detailed understanding of the marine aggregate distribution and quality is essential to allow future long-term supply, avoid permanent sterilisation of

critical resource and assist in the delivery of wider seabed activity.

The Key Resource Area project aim is to build on the British Geological survey data and create a High-Resolution resources inventory for marine aggregates in England and Wales. The first phase of this project was to start to build this model based on marine aggregate industry data, supplemented by data available through the marine data exchange to identify strategic resource of offshore sand and gravel. However, many resource block assessments were still based on a limited data set and the confidence of the model varied from one part of the seabed to another, restricting the value of the output.

To build confidence and understanding The Crown Estate decided to target the acquisition and analysis of new data to fill the gaps and enhance the model's reliability by completing a geophysical survey of the regions, consisting of single beam & multi beam swath bathymetry, side scan sonar and high

resolution sub-bottom profiling.

1,300-line kilometres were surveyed, targeting the upper portion of the seabed across four key regions: the East English Channel, Thames Estuary, the East Coast and the Humber.

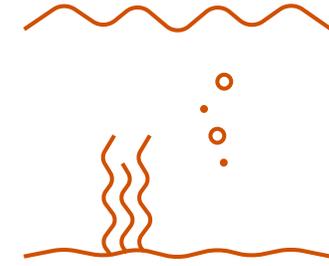
The Crown Estate are confident that the output of this project will assist marine planning capabilities and support decision-making in relation to the future deployment of a range of offshore assets. It will also add to society's wider understanding of the seabed, helping a broad range of stakeholders - including government, regulators, industry and academia.

E22

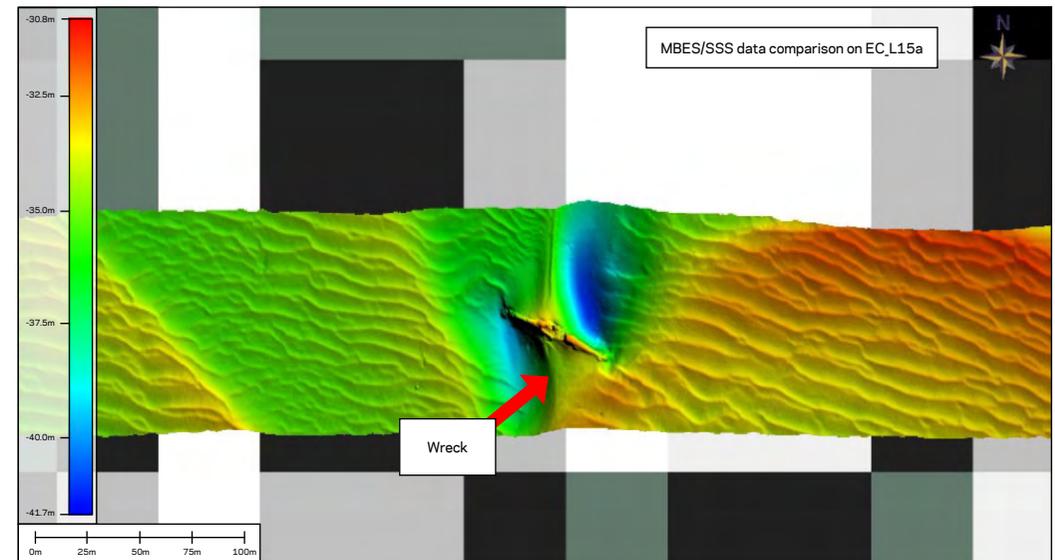
During the survey, the high-resolution bathymetry images revealed the wreck of a submarine, located around 70 km off the coast of East Anglia. The vessel was lying, totally uncovered, on the seabed, in around 35m of water. The structure was almost intact, with the hull broken just behind

the conning tower. Due to its location, it was identified as wreck ID 28012 on the Admiralty database.

Wessex Archaeology work closely with both the Crown Estate and the Marine Aggregate Industry to protect our underwater cultural heritage by running the Marine Aggregate Industry Archaeological Protocol whereby any archaeology recovered from cargoes is reported and assessed. ▶



1,300km
length of seabed was surveyed



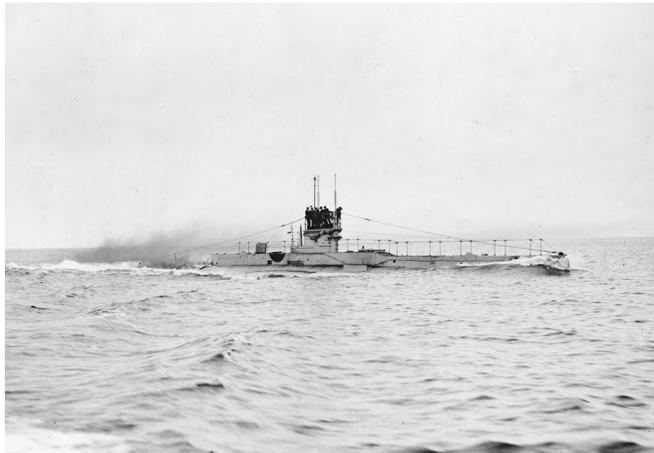
► The protocol includes an awareness programme where marine archaeologists visit wharves and vessels to enhance the knowledge of those working in the industry.

As a result of this ongoing relationship, we asked Wessex Archaeology if they would be able to help identify this wreck and its history.

Research shows that the submarine wreck is that of the E 22. The E-class submarines served with the Royal Navy throughout World War I as the backbone of the submarine fleet with the last surviving ones withdrawn from service by 1922. E 22 had a total length of 180 feet (55 m) and a beam of 22 feet 8.5 inches (6.922 m). The submarine's complement was three officers and 28 other ranks.

E 22 was involved in the first experiment by the Royal Naval Air Service using a submarine to carry aircraft on 24 April 1916. The submarine was modified to carry two Sopwith Schneider seaplanes on the rear casing.

The boat would then submerge in calm waters and the planes would float on the surface before taking off and then return to the East coast of England at Felixstowe. The trials were not repeated due to



the structural failures the two aircraft suffered during the trial, leading to neither taking off, compounded by the loss of the E22 and its logbook.

The following day, at around 11:50, the E 22 was torpedoed whilst on the surface by the German U-boat, UB-18, off Great Yarmouth at which time the submarine's commander Lieutenant Reginald Thomas Dimsdale had been in command of the submarine for only six days. The only two survivors, Engine Room Artificer (ERA) Frederick Samuel Buckingham (26) and Signalman William Thomas George Harrod (23), who was the lookout, were taken prisoner by the U-Boat.

Buckingham, whose account was written in July 1918, also

noticed two British submarines, one ahead and almost out of sight, and one on the port side, as well as their escort destroyer going over the horizon just before the torpedo struck.

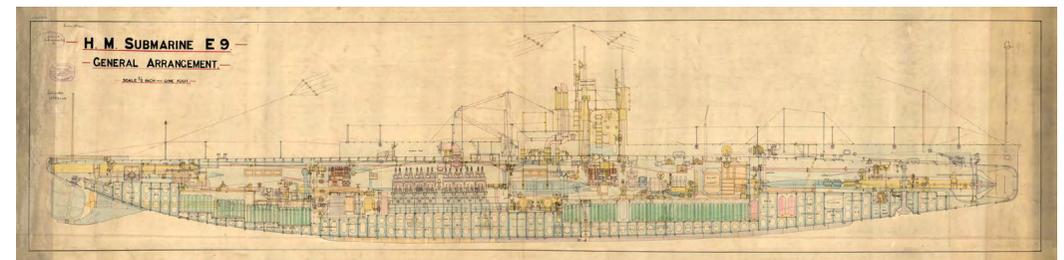
The two men were rescued after an hour and a quarter in the water by UB-18, commanded by Lieutenant Commander Otto Steinbrink, and became Prisoners of War for the remaining duration of the war at a prison camp in Dülmen, near Münster, in Westphalia. Buckingham's wife Ethel received a postcard 16 days after the sinking informing her that he was a prisoner of war but no further details of their time in the camp have been found at this time.

UB-18 was a German Type

UB II submarine of the German Imperial Navy during World War I. It was rammed by the trawler Ben Lawer and sunk in the English Channel on 9 December 1917 with the loss of all hands, after surfacing close to the ship.

We are fortunate that the German Navy's records for the attack have survived. The war diary for the UB-18 patrol concerning the sinking of HMS E 22 was translated during this research and was an interesting counterpoint to the statement by Buckingham, including that the U-boat also hunted for a second British submarine that it had seen, before return to pick up the two survivors.

The E 22 was one of only four submarines known to be lost to a German submarine torpedo attack during WWI, out of a total of 137 in service, with 54 boats, including 26 of the 57 E-class vessels built, being lost, or scuttled during the conflict.



This very human story involves the loss of 29 of the 31 crew on board,

and is a sobering reminder that the sea, which offers so much opportunity, can also be a difficult and dangerous place

Case study: Bournemouth beach

In 2020, Boskalis Westminster was appointed as the contractor for the latest beach replenishment works (BIS6) at Bournemouth as part of the £50 million Poole Bay Beach Management Scheme. BIS6 is part of a long-term project to renew coastal defences and will provide ongoing protection to seafront assets and property caused by coastal erosion and damage. The Poole Bay Beach Management Scheme is a 17-year programme commencing in 2015 and ending in 2032. Over this time the scheme aims to complete three beach nourishments along the Bournemouth seafront, with this nourishment forming the second campaign of three.

Preparations for the project began in December 2020, with the planning and mobilisation of the 1.3km sinker line, which was required to pump material onto the beach. Towing a 1.3km long sinker pipeline across the North Sea in the wintertime is no small feat due to the adverse weather conditions. However, on 27th January 2021, the sinker line was successfully installed at

Southbourne Beach, ready to receive the first load on 4th February 2021.

Two very tight grading specifications were required to replenish the beach, which required a total of 350,000m³ of sand to be deposited along eight identified sites in Poole Bay. The sand required for the beach nourishment needed to comply with specific grading envelopes for each area to match the native beach material. Due to limited resources on the South Coast which met the grading requirements, the majority of the sand was sourced from Westminster Gravels Licence Area 501, located in the Outer Thames Estuary.

Due to the high sailing distance to Area 501, the large Trailer Suction Hopper Dredger Willem van Oranje was deployed for the project to reduce total sailing times. With a hopper volume of 12,000m³, the Willem van Oranje was able to optimise cycle times. To ensure project deadlines were met the Trailer Suction Hopper Dredger Scheldt River was also used to dredge Area 501. The

material dredged from Area 501 was used to renourish sites 3-8.

Sites 1 and 2 were renourished using sand beneficially reused from the nearby Swash Navigation Channel. This was dredged by the Trailer Suction Hopper Dredger Scheldt River.

Prior to its arrival on site, the Willem van Oranje was fitted with The Crown Estate Contractor Electronic Monitoring System. Not only was this the first time the new system was used in the UK, it was also the first time for the system to be fitted onboard the vessel remotely. With Covid 19 restrictions still in place, technicians from Foreshore Technology were unable to board the vessel to install the EMS, and so with their assistance, vessel technicians successfully fitted the system. The same system was also fitted onboard the Scheldt River.

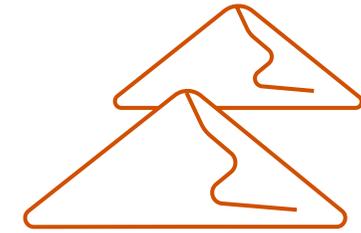
A rigorous sampling and testing regime was used to check the material pumped ashore, and all 350,000m³ of sand was proved to be

fully compliant with the specifications.

The ongoing beach nourishments coupled with the replacement or repair of the existing groynes, including Hengistbury Head Long Groyne, play a vital role in managing the risks of coastal erosion along Poole Bay, through a mostly 'Hold the Line' approach.



Image courtesy of Boskalis



350,000m³
volume of sand deposited



Case study: Bramley Moore Dock infill

In July 2021, Boskalis Westminster began work on the Bramley Moore Dock Reclamation for Laing O'Rourke as part of the contract to construct the new stadium for Everton Football Club. This high-profile piece of work comprised the supply and placement of material to infill Bramley-Moore Dock and to provide "additional land" to act as the base for the new state-of-the-art 52,000 capacity stadium.

The existing quay walls within the dock formed the majority of the project enclosure, however the gap between Bramley-Moore Dock and Sandon Half Tide Dock needed to be isolated in order to retain the dock infill and create a working platform for the project between the north and west wharf. A stone bund wall was installed across the 18m gap, comprising 12,000 tonnes of Class 6F5 material in accordance with the client's specification.

Prior to the bund installation, a silt screen with a geotextile membrane was connected between the west and east

side of the lock, minimising the migration of silts during the subsequent construction of the temporary stone bund.

The material used for the dock infill was sourced from Westminster Gravels Licence Area 457, situated approximately 42km from the hopper connection at Bramley-Moore Dock on the River Mersey. For the project the Trailer Suction Hopper Dredger Shoalway was mobilised, which has a hopper capacity of 4,500m³. Approximately 450,000m³ of material was dredged from Area 457 and pumped ashore via a 660m pipeline into the infill site. The material sourced from Area 457 was subject to rigorous testing and was proven to be consistent and compliant with the client's specification.

Before the infill of Bramley Moore Dock took place, two sets of specifically designed bird rafts were installed in Nelson Dock (to the south of Bramley-Moore Dock), providing an alternative resting place for the species of birdlife that are resident along the River Mersey.

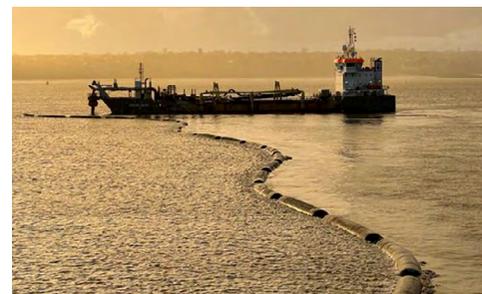
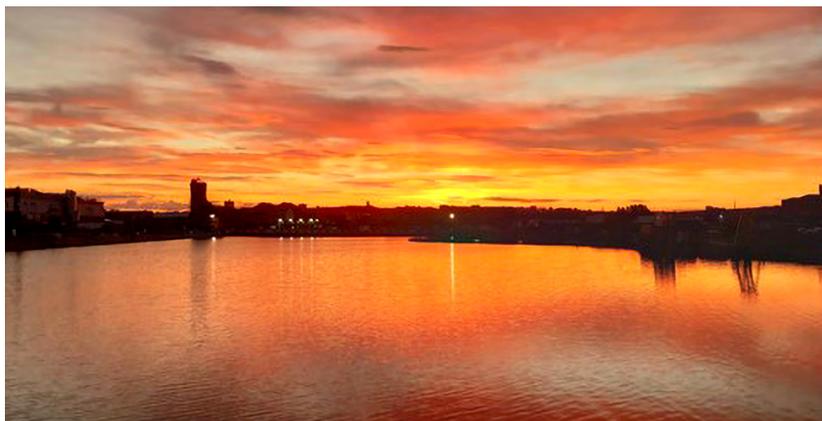
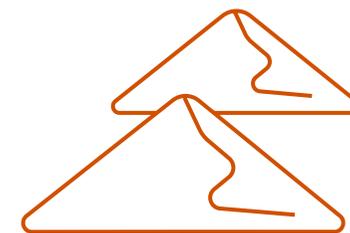


Image courtesy of Boskalis



450,000m³

volume of material dredged from Area 457



660m

length of pipeline

UK dredging fleet update

The UK dredging fleet is now entering a period of renewed investment, and as a result several new vessels have recently begun operations on Crown Estate licenced areas, the newest being the Hanson Thames.

Hanson Thames

After completing sea trials and safety certifications, Hanson launched its new vessel the

Hanson Thames into the market in January 2022.

Built by Damen Shipyards Group (NL) at its Galati yard in Romania, the vessel is capable of extracting marine-dredged aggregates in water up to 55 metres deep and now operates in the North Sea and English Channel primarily serving Hanson's London and Thames wharves, but also further afield.

Its innovative design provides increased payload

and efficiency, which allow it to carry up to 6,000 tonnes of marine aggregates, as well as reducing fuel consumption (and associated CO₂ emissions) and improving operational and maintenance savings.

Other benefits include:

- Reduced maintenance
- Increased vessel uptime
- Modular design enables easy replacement of parts

- Exceptional stability offering crew comfort and extended capability
- Fast and efficient dry-side unloading.

The introduction of Hanson Thames forms part of Hanson's strategy to replace its existing ageing dredgers, which supply essential sand and gravel to projects in the UK as well as its sister companies in the near continent.



6,000t
capacity



Images courtesy of Hanson Aggregates Marine

The Crown Estate and BMAPA publications

The Crown Estate and BMAPA* collaborate to provide insights into aggregate extraction off the Isle of Wight

To provide a better understanding to local authorities and the public about the link between marine aggregate extraction and the coastline, The Crown Estate has worked with BMAPA in recent years to explain the relationship between the offshore aggregate dredging areas and the coastline inshore.

A series of pamphlets giving regional perspectives on marine sand and gravel off the coasts of eastern and southern England have been written and published by the Crown Estate and BMAPA, focussing on the ancient geological origins of marine aggregates and how their formation demonstrates that coastal processes are unaffected by their extraction.

Marine aggregates originated during the Pleistocene Ice Age when global sea level was much lower than at present. Like their terrestrial counterparts, these

natural sands and gravels formed from deposition by glacial meltwater and in braided river floodplains when the continental shelf was exposed as dry land.

The now submerged and relict sands and gravels are immobile in the present marine environment and have no connection to the present coastline. The brochures explain these aspects in more detail, by region, from the Humber to the South Coast. The most recently completed document covers the coasts of Dorset, Hampshire, the Isle of Wight and Sussex and was launched during a SCOPAC** webinar in May 2022. The joint Crown Estate and BMAPA presentation was recorded and it is available to hear via the SCOPAC website.

These are all available to download from the Crown Estate and BMAPA websites.



Pages extracted from the newest TCE and BMAPA document, for the South Coast region. This adds to the series already published for licence areas offshore of coastlines bordering the southern North Sea

* British Marine Aggregate Producers Association
 ** Standing Conference on Problems associated with the Coastline

Marine Minerals Academy

The Crown Estate recognises that knowledge forms a key component of the landscape in this specialist sector.

It has therefore designed and delivered a course to equip future company leaders and decision makers associated with the Marine Aggregates industry with the skills and understanding required for success.

The Marine Minerals Academy comprises eight one day workshops spread over the course of a 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 120 alumni. 2022 saw the welcome return of the course following a Covid-19 enforced hiatus.

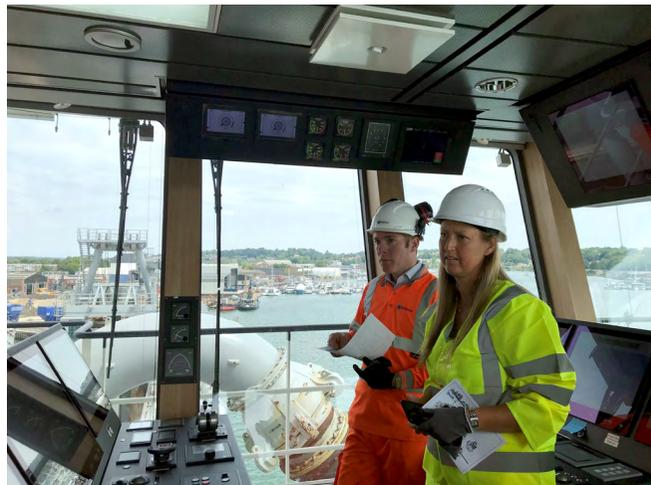
The course aims to provide a full sector perspective for upcoming business leaders and associated practitioners (including regulators, planners and advisors) to the wider policy, regulatory, operating and financial environment, as

well as addressing key risks and opportunities.

The course delivers a focused, high intensity immersion in the sector, delivered by leading experts from industry, government and consultancies.

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
- Marine archaeology and munitions and their impact on operations
- Dredger management – productivity and optimisation, crewing & people
- Business performance, optimisation and efficiencies
- Sustainability and environmental performance.



Obtaining rights for sand and gravel extraction

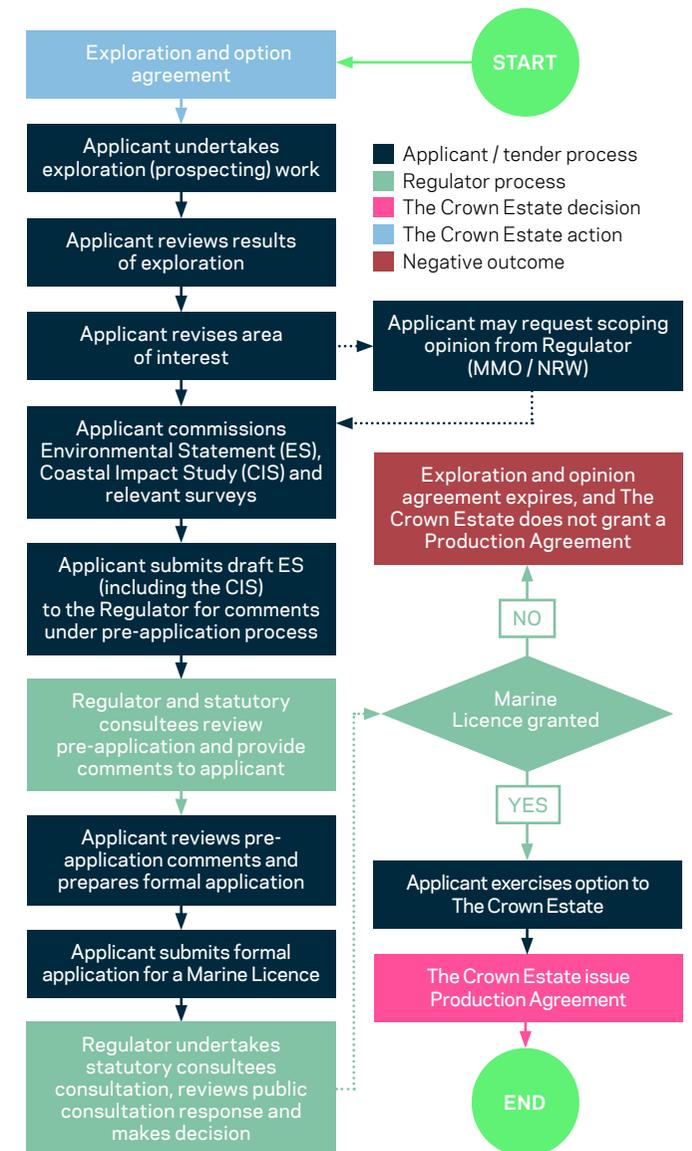
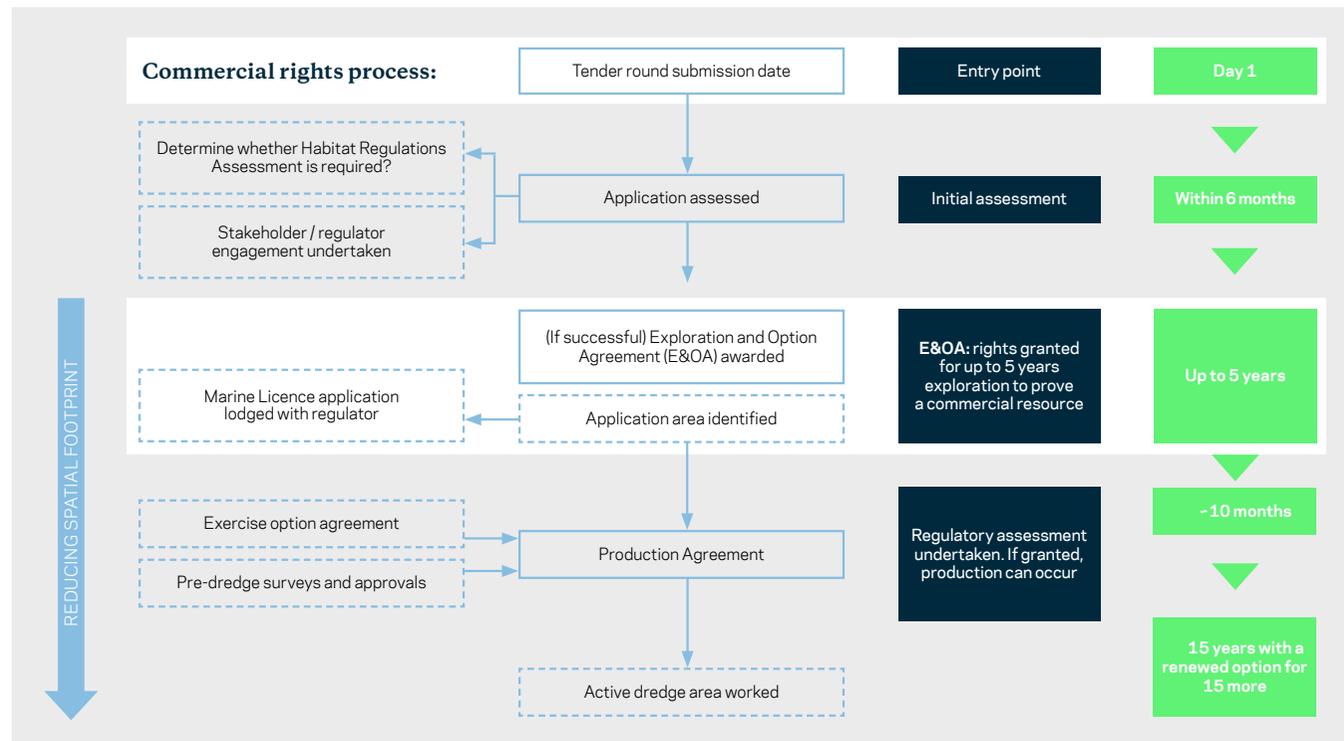
To obtain a licence from The Crown Estate for the rights to extract marine aggregates from the seabed, a number of stages are involved.

- The first stage is to identify an area of interest and submit a tender bid during a Marine Aggregates Tender Round
- 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 the second phase of the application process commences

- The successful tenderer is 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 unique business with a diverse portfolio that stretches across the country. It includes some of London's best places to work, shop and experience, regional retail and leisure destinations, and a substantial rural portfolio.

We manage the seabed and half the foreshore around England, Wales and Northern Ireland, and play a fundamental role in the sustainable development of this national asset, including the UK's world-leading offshore wind sector.

We are also custodians of the Windsor Estate, including the world-renowned Windsor Great Park.

Established by an Act of Parliament, we are tasked with generating profit for the Treasury for the benefit of the nation's finances. This has totalled £3bn over the last ten years.

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Links and useful references

The Crown Estate

www.thecrownestate.co.uk/en-gb/what-we-do/on-the-seabed/minerals-dredging

Marine Aggregate Information Centre

www.marineaggregates.info

British Marine Aggregate Producers Association

www.bmapa.org

Marine Management Organisation

www.gov.uk/mmo

Natural Resources Wales

www.naturalresourceswales.gov.uk

British Geological Survey - Minerals UK

www2.bgs.ac.uk/mineralsUK

Southern Coastal Group and SCOPAC

southerncoastalgroup-scopac.org.uk