

Marine Aggregates

Capability & Portfolio 2020



National overview

Why are marine aggregates important to Britain?

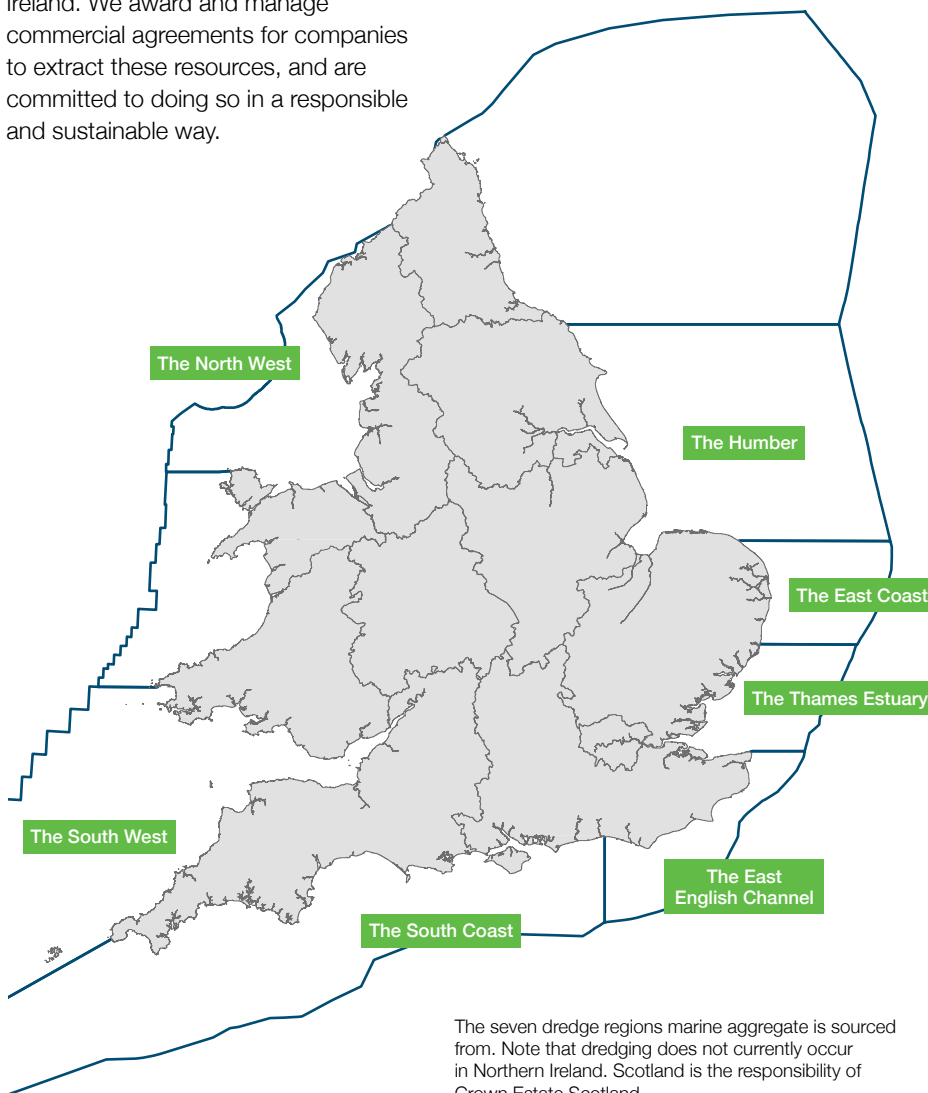
Britain has one of the world's most developed marine aggregate industries, extracting 15 to 20 million tonnes from the seabed annually. Much of this is used for building houses, transport infrastructure, replenishing beaches and improving coastal defences.

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.

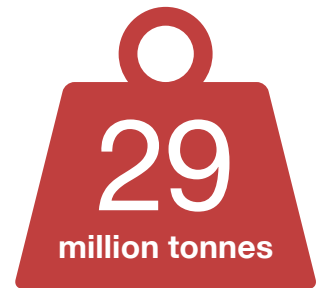
The Crown Estate owns almost all of the sand and gravel resources lying off of the coast of England, Wales and Northern Ireland. We award and manage commercial agreements for companies to extract these resources, and are committed to doing so in a responsible and sustainable way.

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.

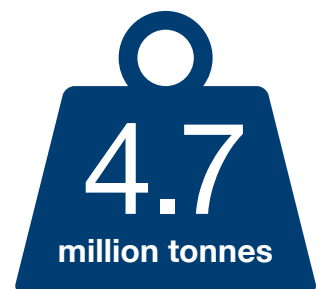
Unless otherwise stated, all figures in this document are correct as of July 2020.



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**



4.7 million tonnes of marine aggregate was exported to **Europe** in 2019 (**21%** of all marine aggregate landed)

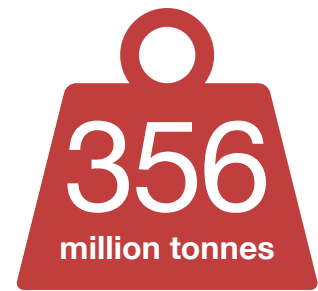
Reserves and resources

Reserves and Resources

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

22

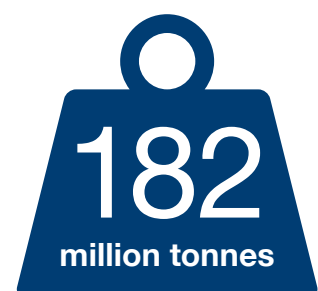
Current national estimates suggest there are **22 years** of primary marine aggregate production permitted



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 at July 2020)	Regional reserve life at 10-year average annual offtake
		Primary (construction aggregate)				
Humber	50.35	2.02	2.72	3.50	6.88	24.93
East Coast	62.49	4.41	4.20	5.28	7.33	14.17
Thames Estuary	31.61	1.20	1.64	1.94	3.60	26.34
East English Channel	88.18	3.80	4.11	4.65	8.97	23.21
South Coast	79.46	3.40	3.51	3.92	7.83	23.37
South West	33.75	1.14	1.34	1.38	2.70	29.61
North West	10.33	0.30	0.28	0.38	1.30	34.43
Total	356.16	16.26	17.81	18.10	38.59	21.90

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

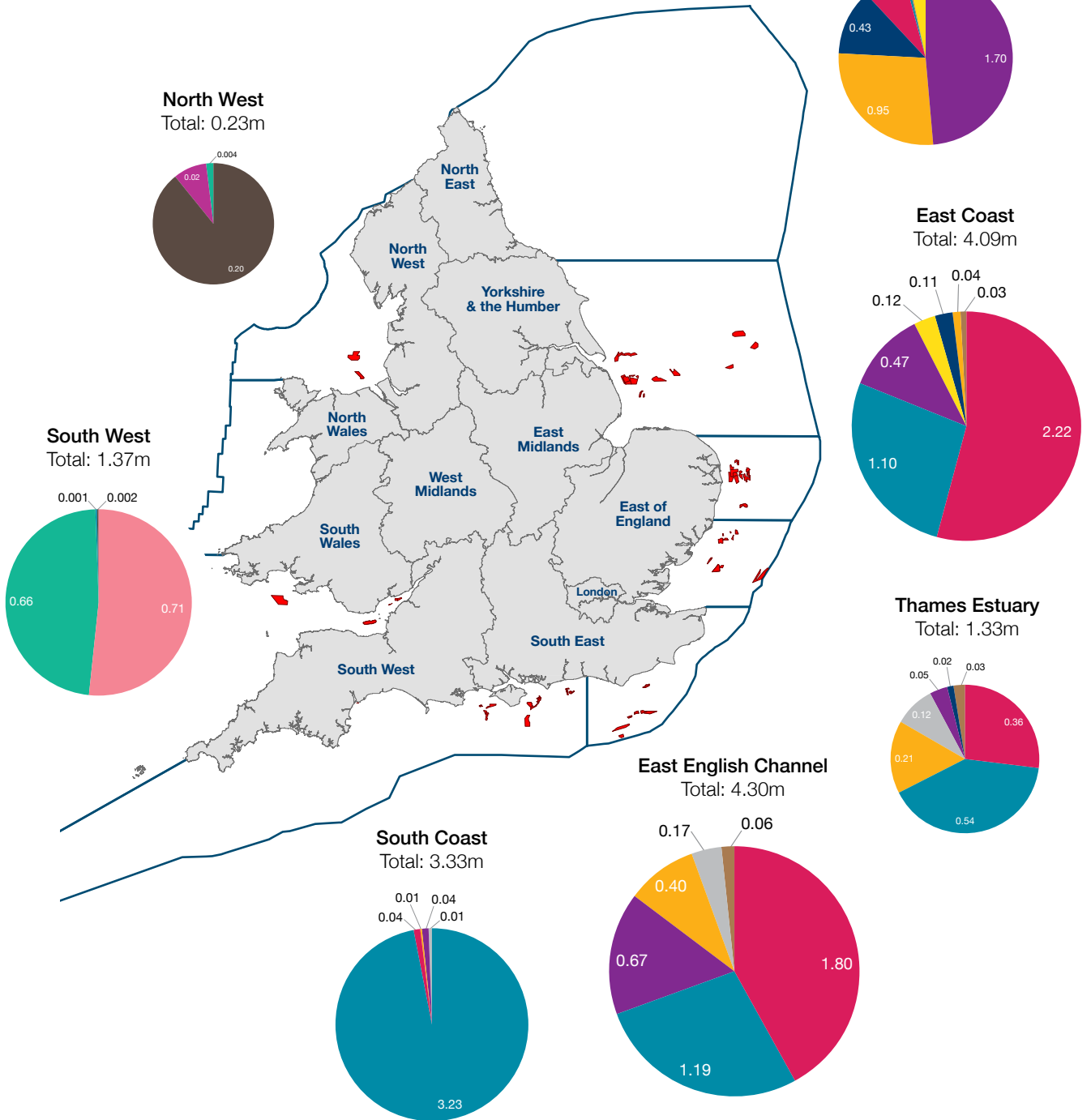


London and the Thames Estuary are supplied by the East Coast, Thames Estuary & East English Channel. These hold reserves of 182 million tonnes, giving **London** and the **Thames Estuary** 19 years of production

Delivery by region / country



Extraction and delivery by dredge region



The Humber region

6.88

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

25

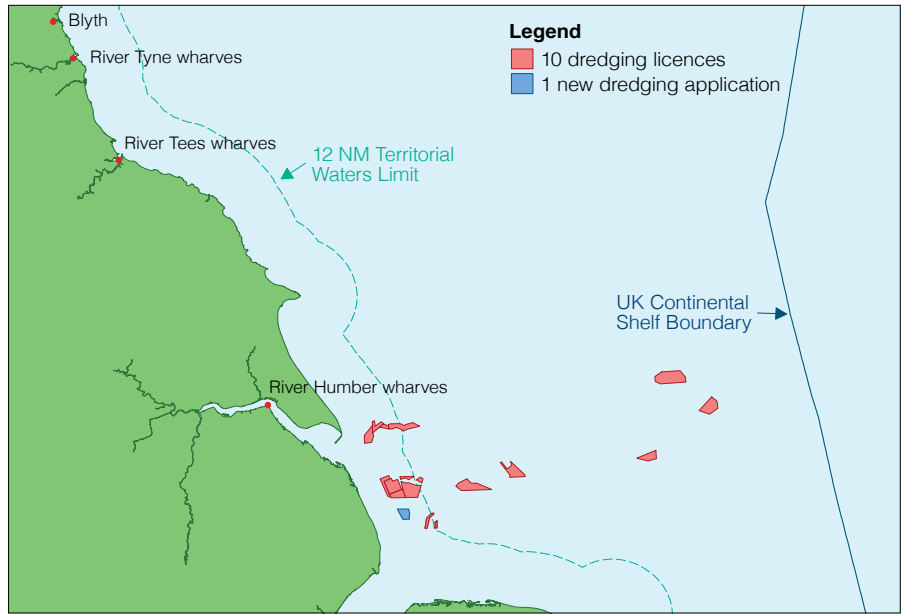
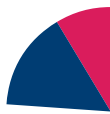
Current estimates suggest there are **25 years** of primary marine aggregate production permitted

1

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

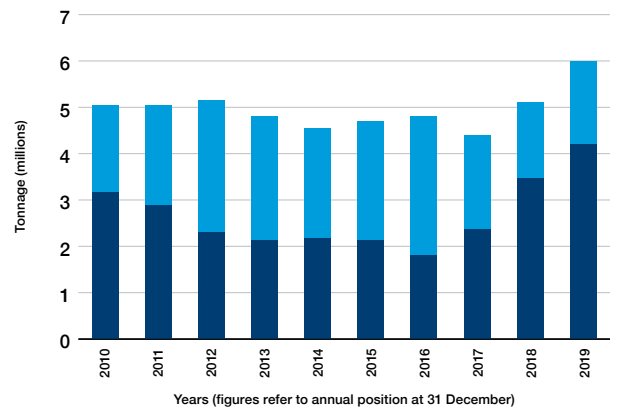
During 2019 material extracted from the region was delivered to:

- Mainland Europe (76.2%)
- Humber (including North East) (15.3%)
- Thames Estuary (8.5%)



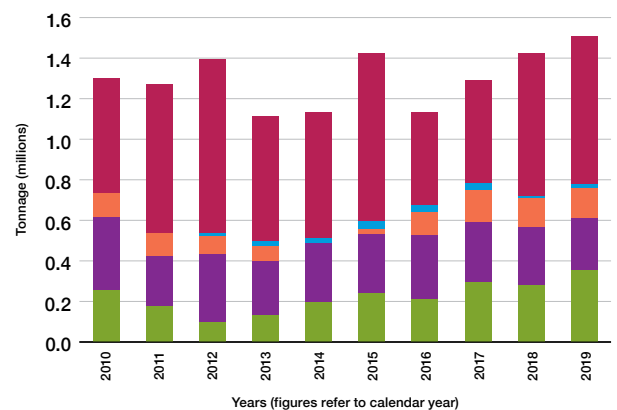
Permitted and extracted tonnage

- 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



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

7.33

million tonnes can be extracted from **12 licences** annually

14

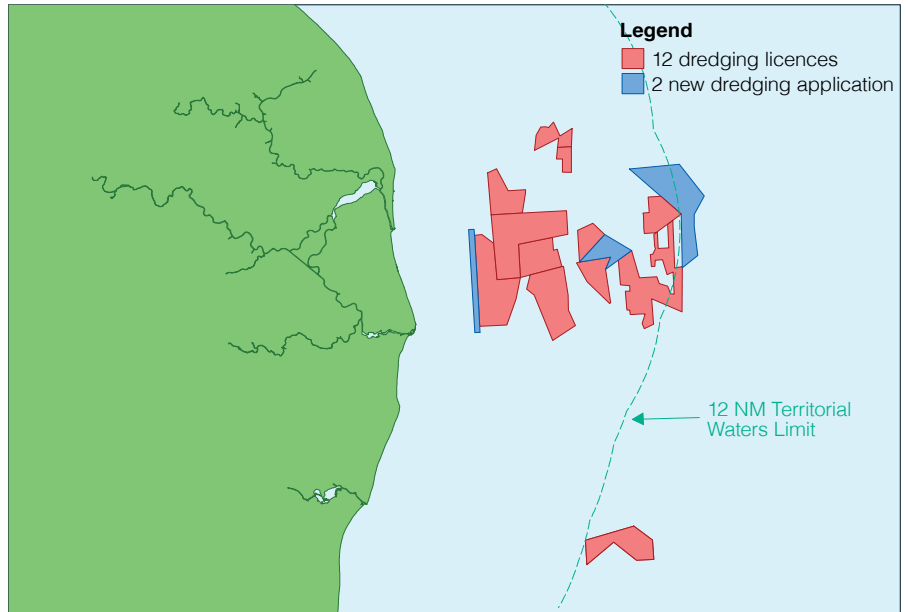
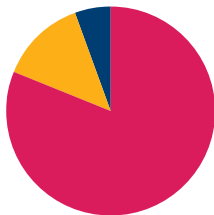
Current estimates suggest there are **14 years** of primary marine aggregate production permitted

2

applications for licences could, if approved, increase the permitted tonnage by **1.25 million tonnes**

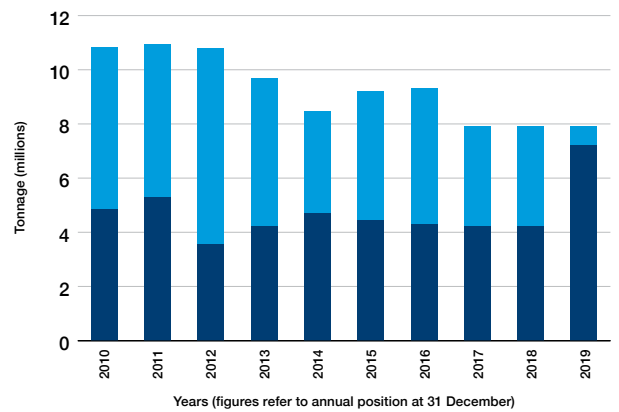
During 2019 material extracted from the region was delivered to:

- Thames Estuary (**81.3%**)
- Mainland Europe (**13.11%**)
- Humber (including North East) (**5.6%**)



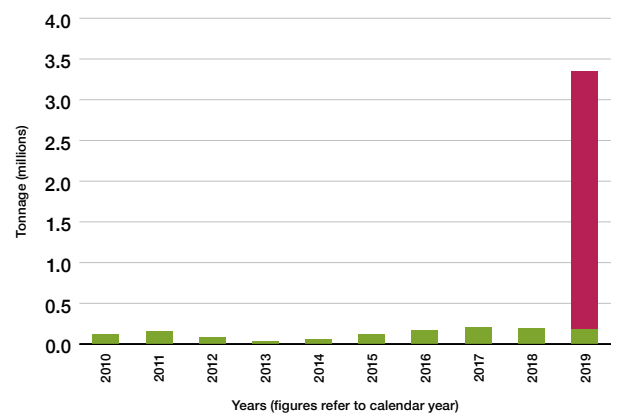
Permitted and extracted tonnage

- Unused permitted tonnage
- Extracted tonnage



Delivery of marine aggregate to the region

- Secondary use from licences
- Ipswich



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

3.6

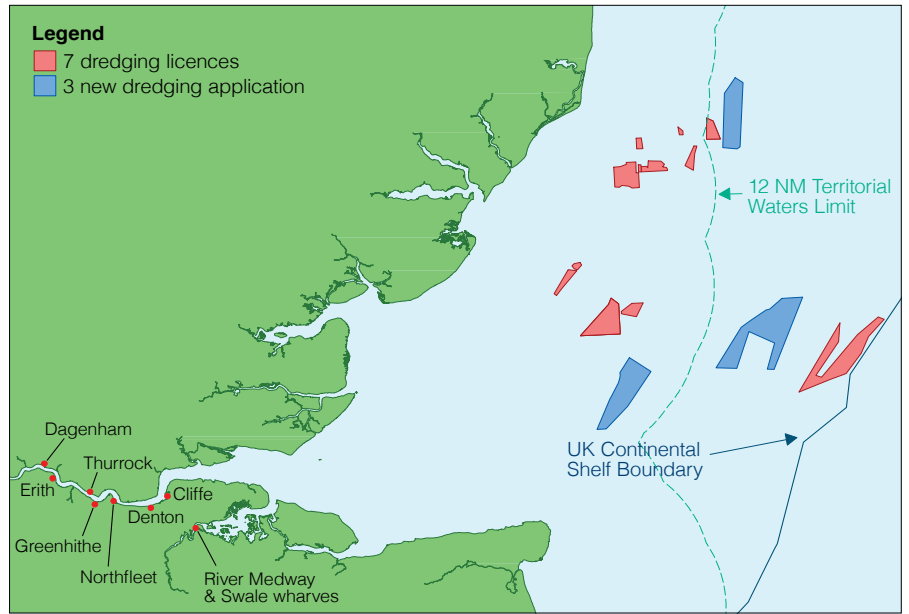
million tonnes can be extracted from **7 licences** annually

26

Current estimates suggest there are **26 years** of primary marine aggregate production permitted

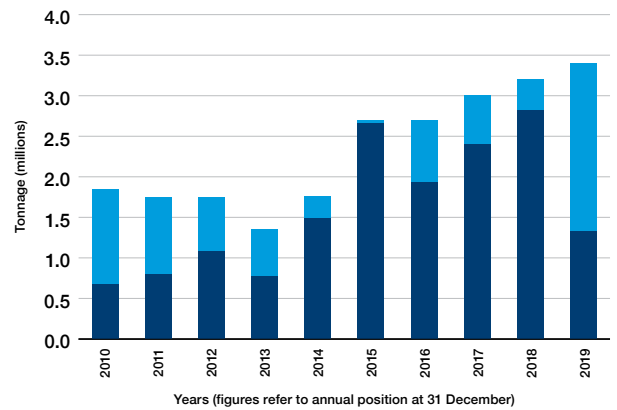
3

applications for licences could, if approved, increase the permitted tonnage by **1.85 million tonnes**

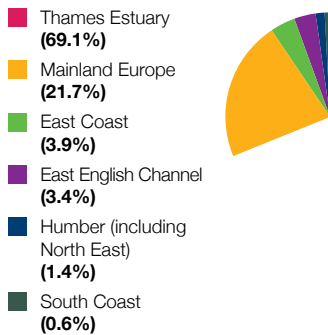


Permitted and extracted tonnage

- Unused permitted tonnage
- Extracted tonnage

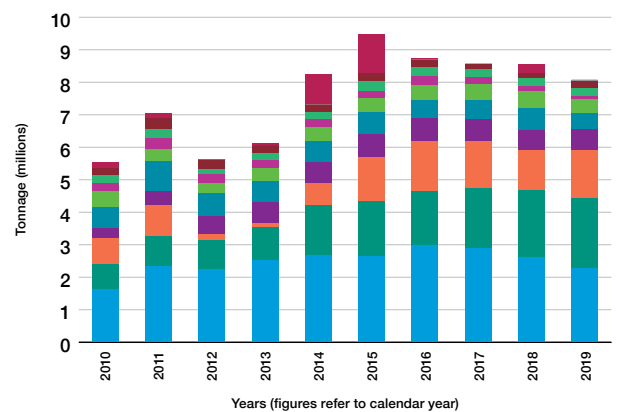


During 2019 material extracted from the region was delivered to:



Delivery of marine aggregate to the region

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



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

8.97

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

23

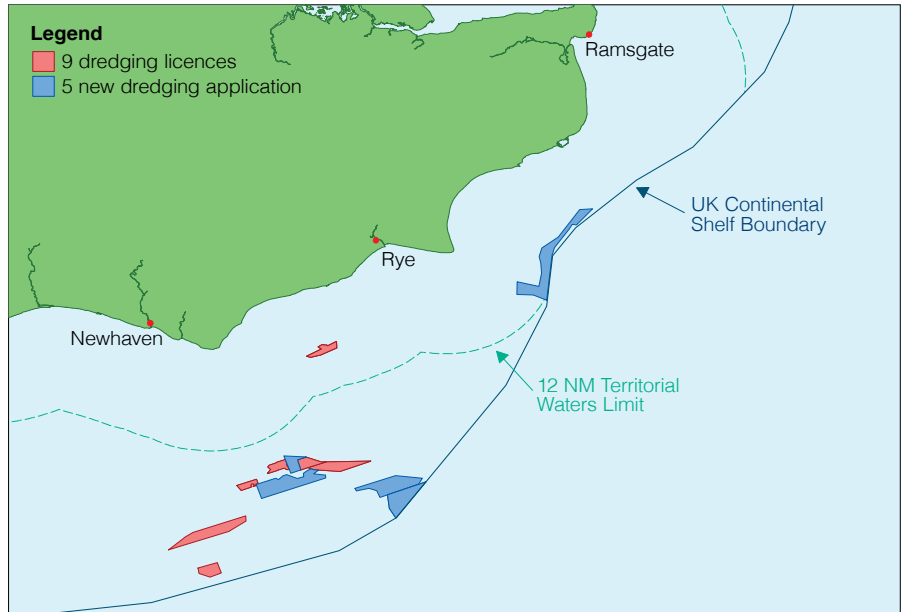
Current estimates suggest there are **23 years** of primary marine aggregate production permitted

5

applications for licences could, if approved, increase the permitted tonnage by **4.1 million tonnes**

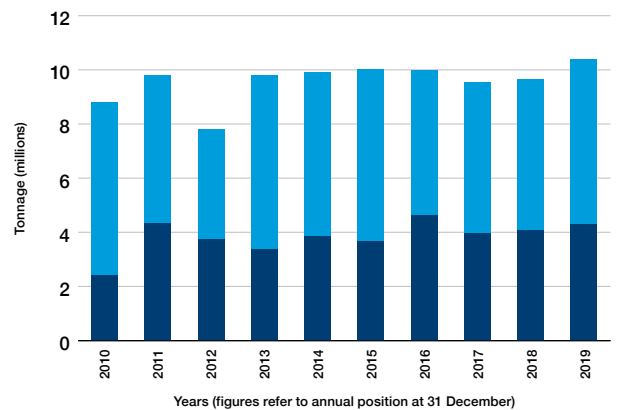
During 2019 material extracted from the region was delivered to:

- Thames Estuary (69.7%)
- Mainland Europe (26.6%)
- East Coast (3.2%)
- East English Channel (0.5%)
- South Coast (0.1%)
- Humber (including North East) (<0.1%)



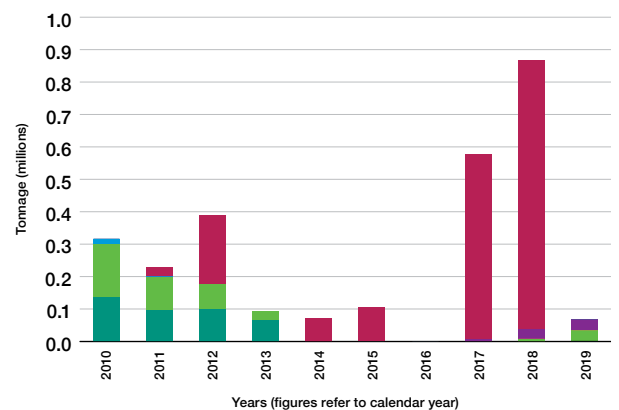
Permitted and extracted tonnage

- Unused permitted tonnage
- Extracted tonnage



Delivery of marine aggregate to the region

- Secondary use from licences
- Ramsgate
- Rye
- Newhaven
- Dover



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

7.83

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

23

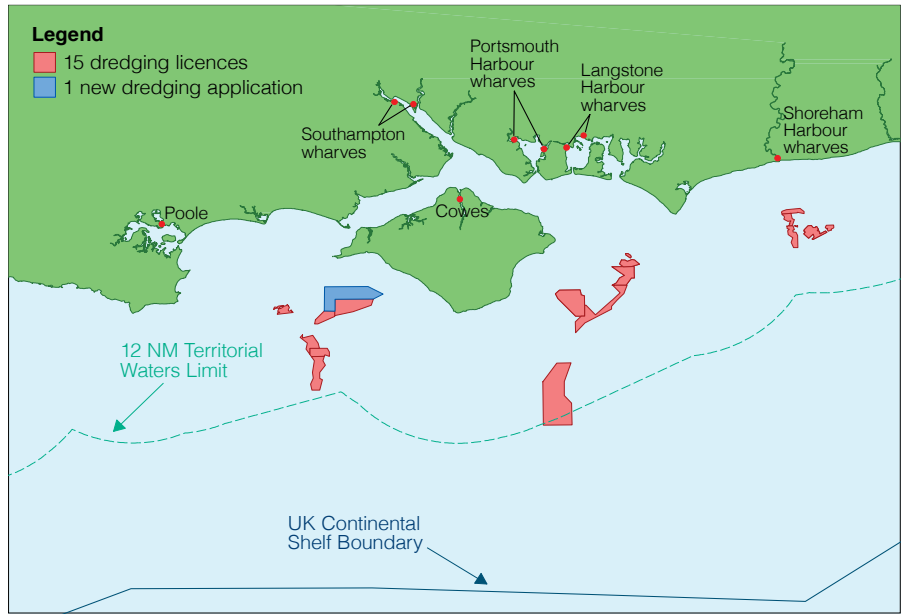
Current estimates suggest there are **23 years** of primary marine aggregate production permitted

1

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

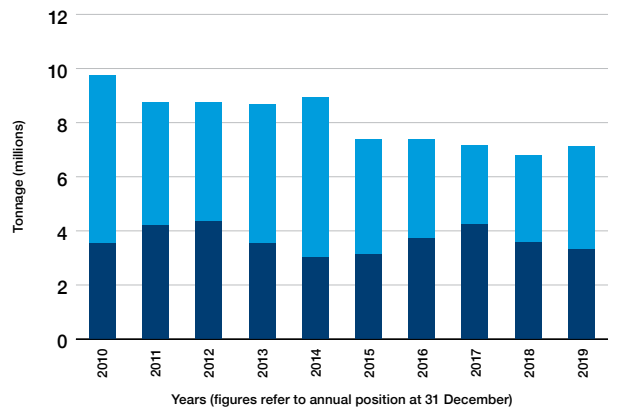
During 2019 material extracted from the region was delivered to:

- South Coast (82%)
- Thames Estuary (16.6%)
- Mainland Europe (1.4%)



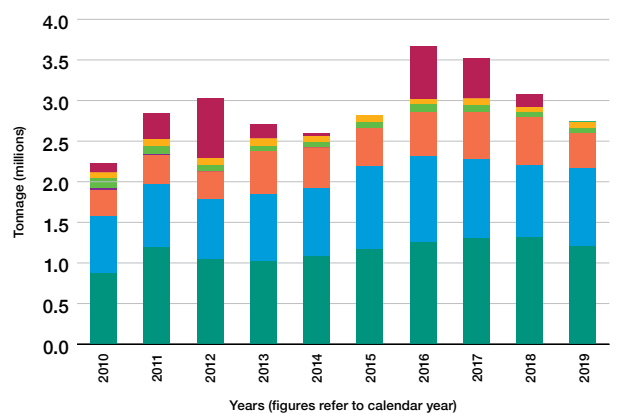
Permitted and extracted tonnage

- Unused permitted tonnage
- Extracted tonnage



Delivery of marine aggregate to the region

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



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

2.7

million tonnes can be extracted from **7 licences** annually

30

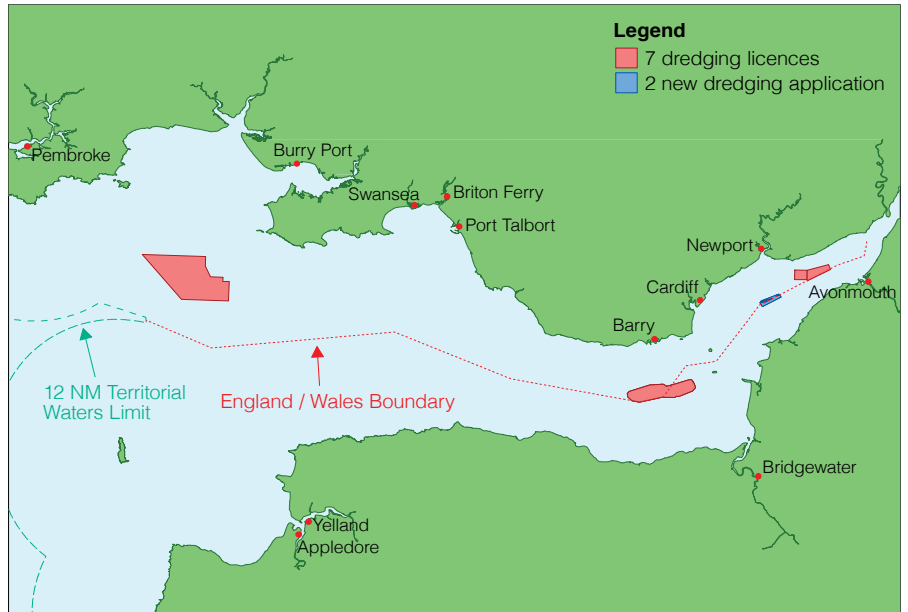
Current estimates suggest there are **30 years** of primary marine aggregate production permitted

2

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

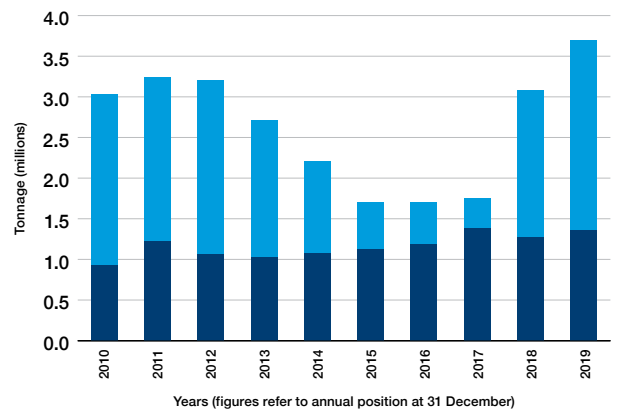
During 2019 material extracted from the region was delivered to:

- South West - Welsh wharves (**49.4%**)
- South West - English wharves (**50.4%**)
- North West - English wharves (**0.2%**)
- South Coast (**0.1%**)



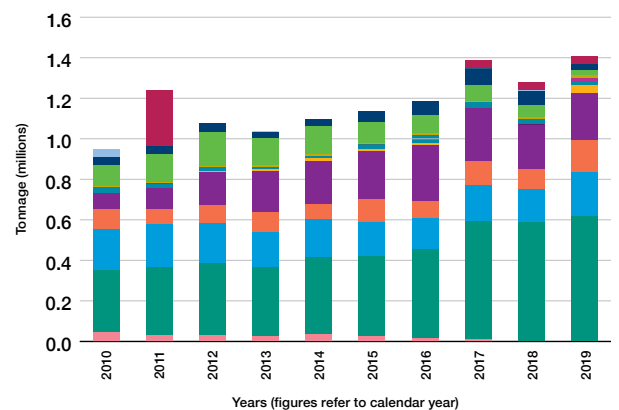
Permitted and extracted tonnage

- Unused permitted tonnage
- Extracted tonnage



Delivery of marine aggregate to the region

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



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



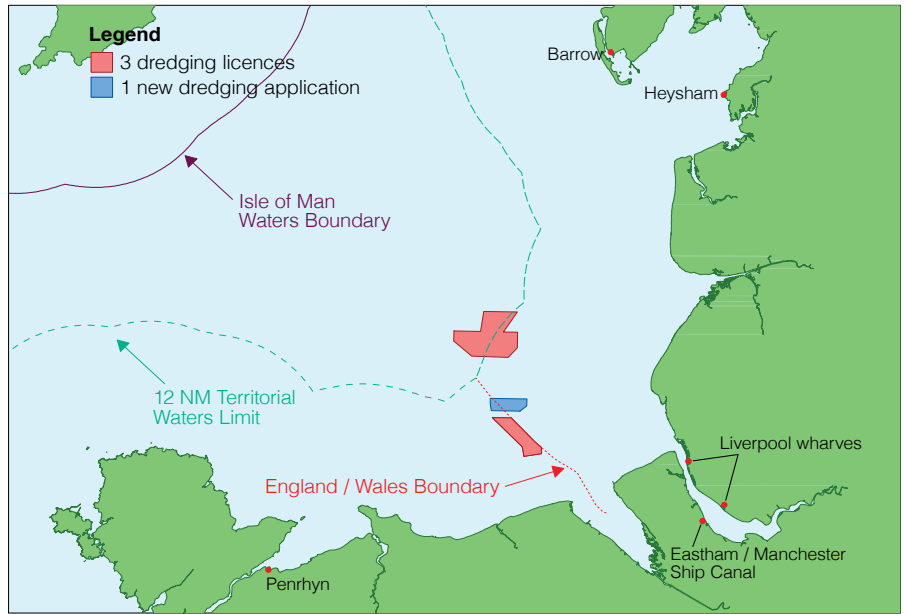
Coarse gravel
40 – 63mm

The North West region

1.3
million tonnes can be extracted from **3 licences** annually

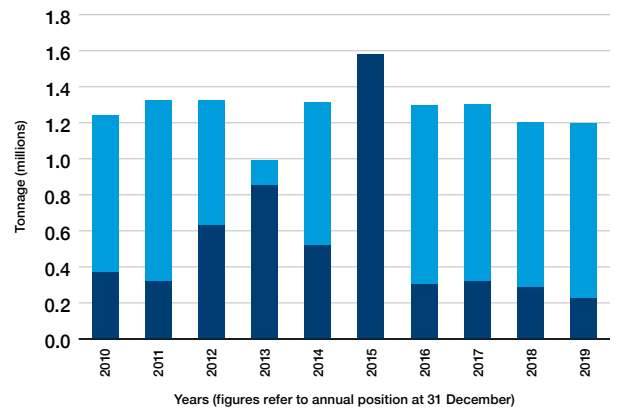
35
Current estimates suggest there are **35 years** of primary marine aggregate production permitted

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



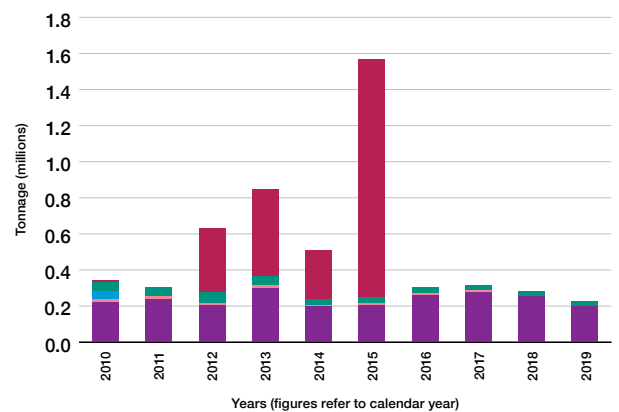
During 2019 material extracted from the region was delivered to:

- North West - English wharves (88.7%)
- North West - Welsh wharves (9.7%)
- South West - Welsh wharves (1.6%)



Delivery of marine aggregate to the region

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



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

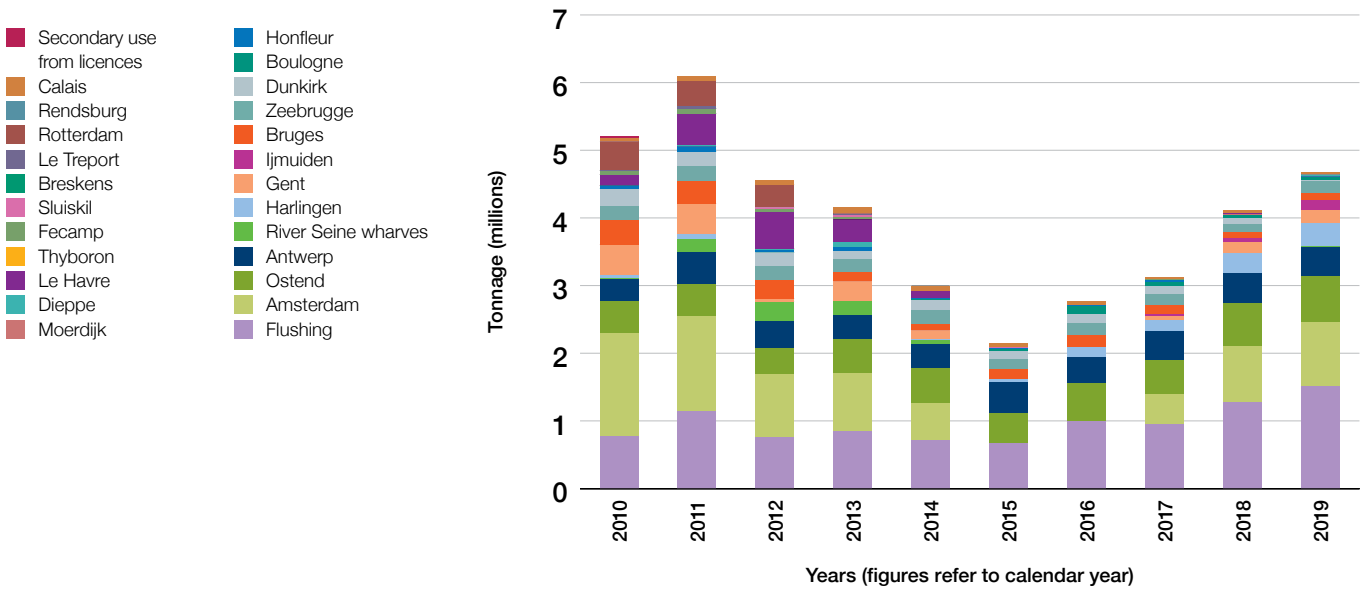


Medium gravel
20 – 40mm

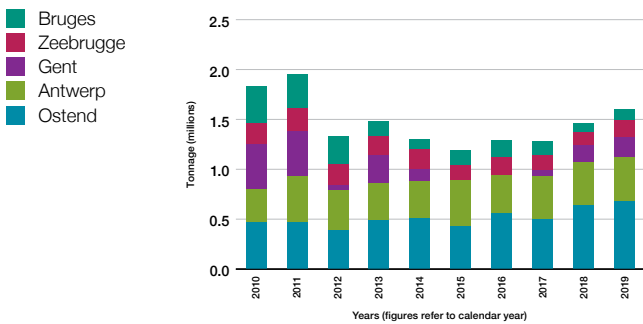


Coarse gravel
40 – 63mm

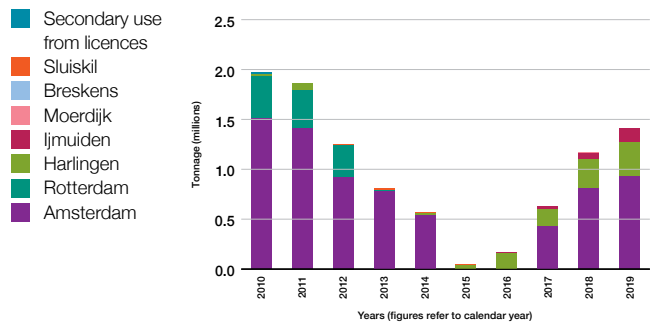
Export to Mainland Europe from the UK



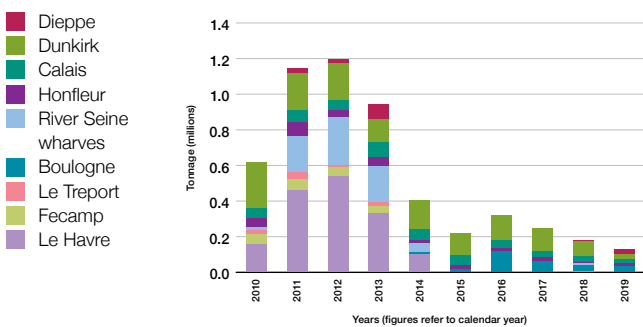
Delivery of marine aggregate to Belgium



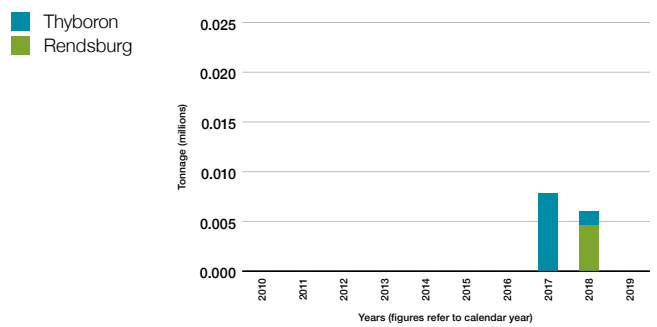
Delivery of marine aggregate to The Netherlands



Delivery of marine aggregate to France

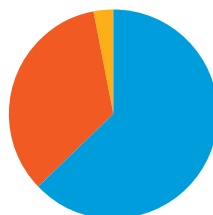


Delivery of marine aggregate to Northern Europe



During 2019 material extracted from Crown Estate licensed areas was exported to:

- The Netherlands (2.94m)
- Belgium (1.6m)
- France (0.13m)



Uses of marine aggregates around the UK

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

Community & leisure

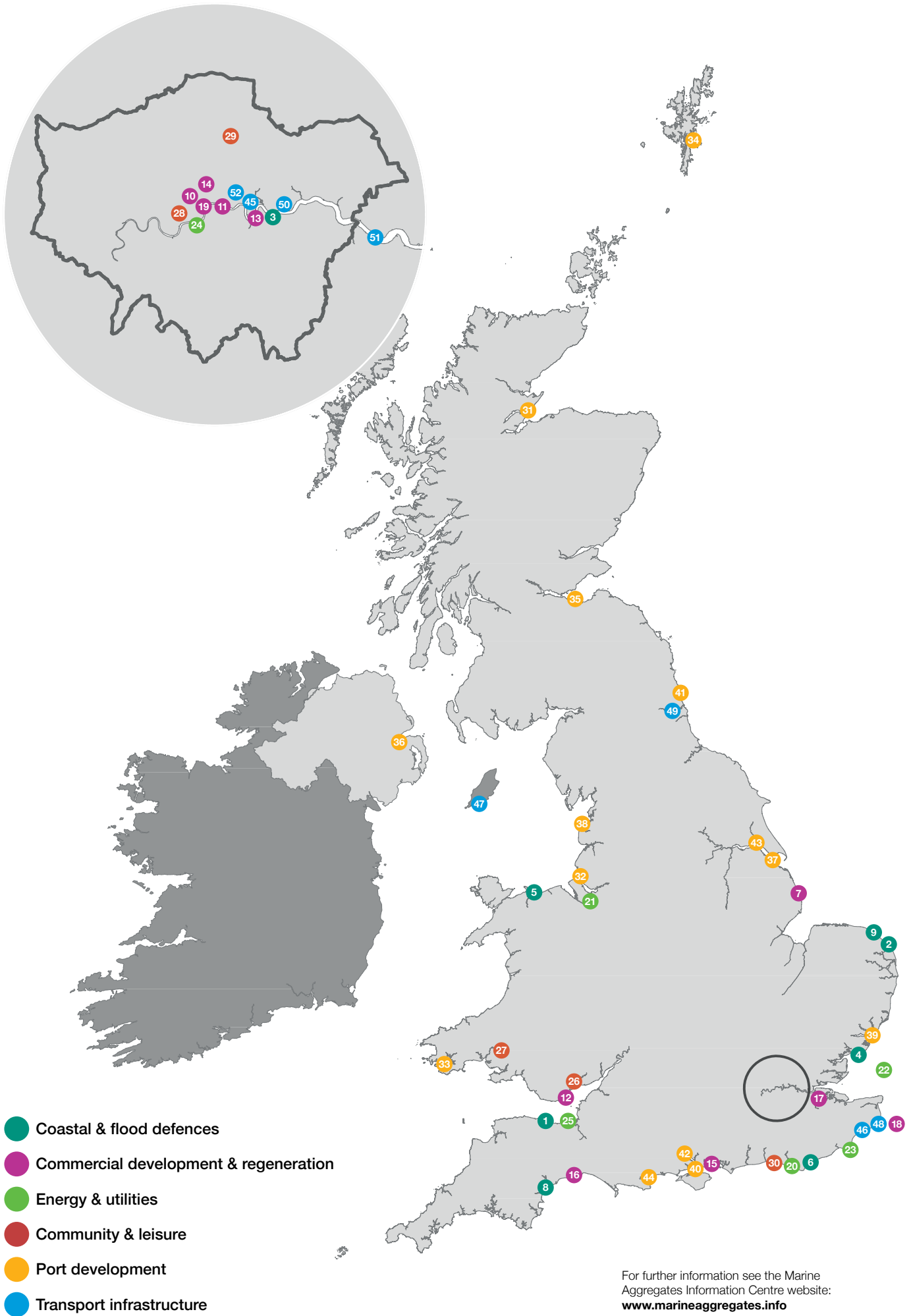
- 26 Principality Stadium, Cardiff
- 27 National Botanic Gardens of Wales, Great Glasshouse, Carmarthenshire
- 28 The Darwin Centre, Natural History Museum, London
- 29 Northumberland Development Project, Tottenham Hotspur FC, London
- 30 British Airways i360 Observation Tower, Brighton

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: Agricultural bedding

Images courtesy of Boskalis



When most people think of a cow resting in a warm barn, they see a comfy layer of fluffy straw bedding

However there is an alternative, that has enhanced benefits to this traditional and somewhat idyllic picture and that is the use of marine dredged sand.

A chance meeting between Boskalis Westminster Ltd and Mid Hants Ltd in early 2017 led to discussions on the supply of marine dredged sand for cow bedding into the West Country from Westminster Gravels Area 476, located in the Bristol Channel, off the Welsh coast.

Boskalis have been landing this material into South Wales for many years, supplying into the traditional construction market.

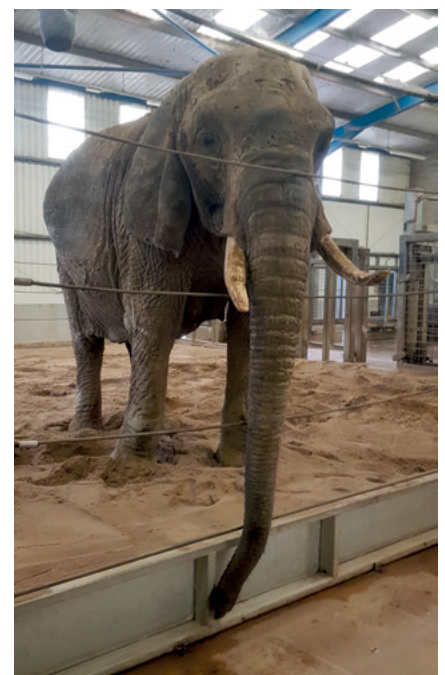
Subsequently, and somewhat surprisingly, Boskalis has now been supplying this sand to Mid Hants, by dredging the material with its vessel Deo Gloria and dry discharging it at a quayside near Barnstaple. The sand is then distributed by trucks to farms in the South West.

Marine dredged sand bedding has a number of advantages over traditional bedding, such as

- The high pH helps to kill bacteria
- It helps to reduce livestock leg abrasions and swollen legs / knees
- Livestock remain cleaner for longer which is particularly important for dairy cows
- It has non slip properties leading to reduced falls and strains
- Using sand has been shown to increase cow comfort and therefore laying time, leading to reduced lameness and increased milk yields
- The sand is free of dust and therefore better for both cows and humans when being distributed
- In certain soils it can be used as a soil improver when spread in manure.

As a further diversification in animal bedding, the sand is now also being used for the likes of elephants and giraffes in wildlife parks!

A very versatile resource!



Case study: Hinkley Point C

EDF is building two new nuclear reactors at Hinkley Point C (HPC) in Somerset

It is one of the biggest construction projects in Europe and the first in a new generation of nuclear power stations in the UK.

HPC will make a major contribution to the UK's move to reach net zero: the electricity generated by its two reactors will offset 9 million tonnes of carbon dioxide emissions a year over its 60-year lifespan.

Hanson UK is the key supplier of heavy building materials to the project, including 300,000 tonnes of marine

sand. This is being supplied to main civils contractor BYLOR, which operates the on-site batching plant, producing the high-quality concrete used to create the bases for the two reactor buildings. Completion of this phase of works was completed on time and marks the transition from below ground activity to the construction of permanent reactor buildings above ground.

The marine aggregate supplies are vital to the HPC project, which uses an average of 10,000 tonnes of sand a month. They are delivered by sea to a 500 metre-long jetty, managed by Hanson, which is playing a crucial role in helping to reduce the number of lorry movements and emissions.

The multi-billion pound project is expected to commission the first reactor by 2025 and will provide low-carbon electricity for around six million homes.



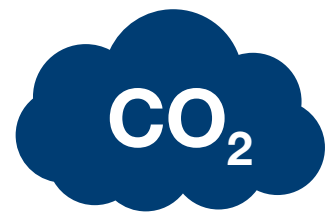
0.3 million tonnes

of marine sand has been supplied



10,000 tonnes

of sand used each month



9 million tonnes

of carbon dioxide emissions offset over the plant's 60-year lifespan

Images courtesy of EDF energy / Hanson



Marine aggregate wharf developments

Brett Aggregates has recently opened a new marine aggregates terminal at Newhaven Port capable of receiving 10,000 tonne cargo dredgers.

Brett will import a range of materials including marine dredged aggregates into the site using a range of vessels such as Brett vessel the mv Britannia Beaver and cargo from its key dredging supplier, Deme Building Materials Ltd. on their vessels the mv Charlemagne and the mv Victor Horta.

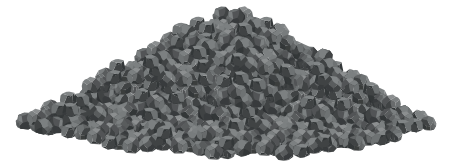
The site is located on the South Coast of the UK and close to the marine licences in the English Channel and the Isle of Wight.

Oliver Brown, Development Director for the Brett Group commented, "This new investment significantly strengthens the aggregate supply base for East Sussex, which is increasingly reliant on marine aggregates as very few options remain for land-based quarries. Construction materials are vital to the local economy and some 1.4 million tonnes of aggregates are required by East Sussex each year to meet construction demand. This new Brett development means that aggregates can now be brought into the heart of the market rather than using lorries to import materials into the county by road."

Brett has also reinstated and significantly expanded the rail connection, enabling aggregates to be exported by rail across East Sussex and beyond. Together with Brett marine aggregate terminals at Cliffe in Kent and Ipswich in Suffolk this significantly strengthens Brett rail-linked marine aggregate capability. With the addition of Newhaven, Brett now has rail-linked marine aggregate terminals close to the marine aggregate licence areas of the East Coast, Thames and English Channel, which enables distribution to local markets and into London using sustainable transport by rail and by river.

Establishment works at the site were completed in June 2020 and the East Sussex draft minerals plan is reliant on the site processing over 400,000 tonnes of marine aggregates per year to help meet local demand. Imported aggregate will be sorted using a bespoke aggregate processing plant manufactured by Atherton Materials Handling and incorporating state of the art components and design to minimise noise generated by the activity.

With access to over 50 million tonnes of consented marine aggregate licence capacity the long-term Brett operation at Newhaven will enable local demand for construction materials to be met for future generations.



0.4 million tonnes

of marine aggregate can be processed each year to meet local demand



1.4 million tonnes

of aggregate is required by East Sussex each year

Image courtesy of Brett Group



UK dredging fleet update

Image courtesy of Hanson



Image courtesy of Cemex UK Marine



Image courtesy of Barkmeijer Shipyards



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, Europe's largest producer of marine-dredged sand and gravel.

Marine aggregates are critical to Hanson's UK business as they are used in around half of our ready-mixed concrete plants and are becoming more and more important due to the increasing scarcity of land-won sand and gravel, particularly around London and south east England.

The new vessel is being built in Galati, Romania. Its innovative design provides increased payload and efficiency, which will allow it to carry up to 7,000 tonnes of marine aggregates per trip, as well as improved fuel consumption and operational and maintenance savings. Other benefits include:

- Focus on safety, performance and sustainability
- Reduced maintenance, increasing uptime
- Modular design allows easy replacement of worn parts

- Exceptional stability offering crew comfort and the capability to work in rough seas
- Fast and efficient dry-side unloading.

Working sustainably is a key priority for Hanson and, while the use of marine aggregates reduces the need for quarrying on land as well as the associated transport emissions, dredging the seabed brings with it a responsibility to protect the marine environment.

Two other new dredging vessels have been built in the last several years which are intended for use in the UK marine aggregate industry.

The CEMEX Go Innovation, commissioned by CEMEX, was officially launched in August 2019. This represents the first new vessel in the CEMEX fleet for over 20 years, and is due to start operations in late 2020.

The Anchorage was launched in June 2020. This vessel is owned by De Hoop Terneuzen, a family owned company which is a major supplier of building materials in Holland and Belgium. The vessel is scheduled to operate on a new dredging Production Agreement area in the East English Channel.

The building of these vessels represents a welcome new phase of investment in the UK marine aggregate industry.



7,000 tonnes

of marine aggregates per trip

Cornish mineral tender

Image courtesy of Robo17/Morguefile.com



Following considerable market interest in deposits of metallic minerals in Cornwall, The Crown Estate decided to offer rights to extract minerals on or under the seabed off the coast.

British industry¹ is keen to see a thriving UK-based minerals extraction sector, and the associated economic benefits this could bring, and this tender round helps to meet that ambition.

Our priority was to run a robust process that ensured that applicants could demonstrate that they met high technical, financial and environmental

performance standards, including how they intended to engage and work with local stakeholders and communities in the region.

From The Crown Estate's perspective, we have been keen to engage with people and organisations in the area and have been in communication with key local groups, regional politicians and NGOs to keep them informed.

Following the completion of this process, and subject to the requirements of a plan-level Habitats Regulations Assessment, rights could be awarded late 2020.

Should rights be granted, they would initially provide the opportunity to explore the potential mineral resources and would not amount to permission to carry out extraction activity.

Successful applicants would be required to obtain all relevant statutory consents prior to the commencement of activities.

¹UK Minerals Strategy

A Strategy prepared by the UK minerals and mineral products industry, facilitated by members of the CBI Minerals Group and the Mineral Products Association July 2018.

Sustainability and stewardship

The Crown Estate is committed to being a responsible landlord, which includes minimising the impact that marine aggregate dredging has on the natural environment.

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)



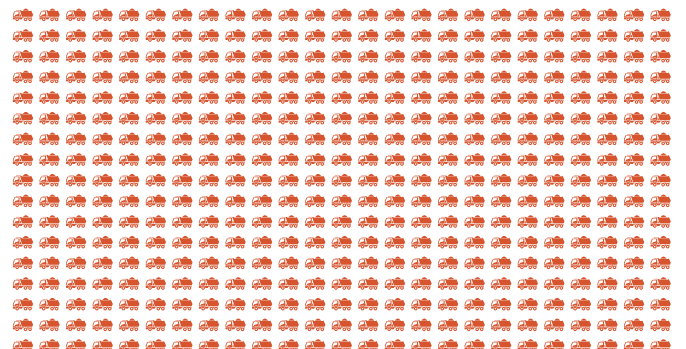
95 train hopper wagons
(of 90 tonnes)



9 barges
(of 1,000 tonnes)



425 aggregate lorries
(of 20 tonnes)

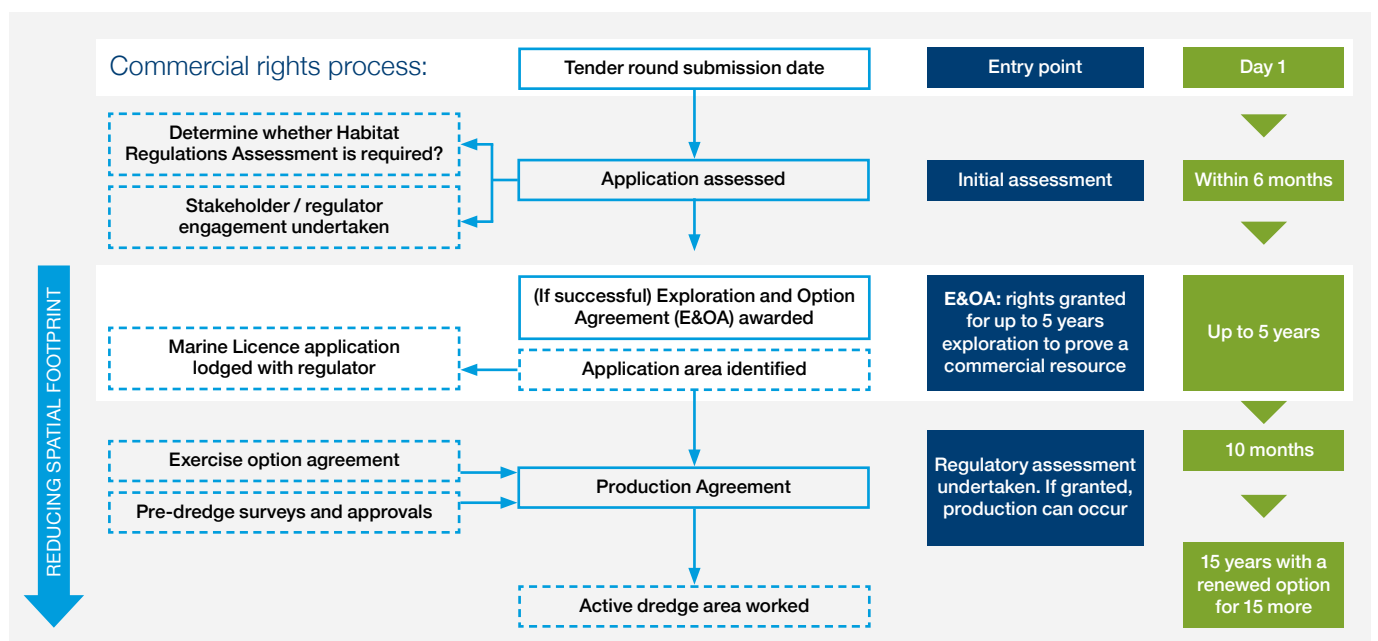
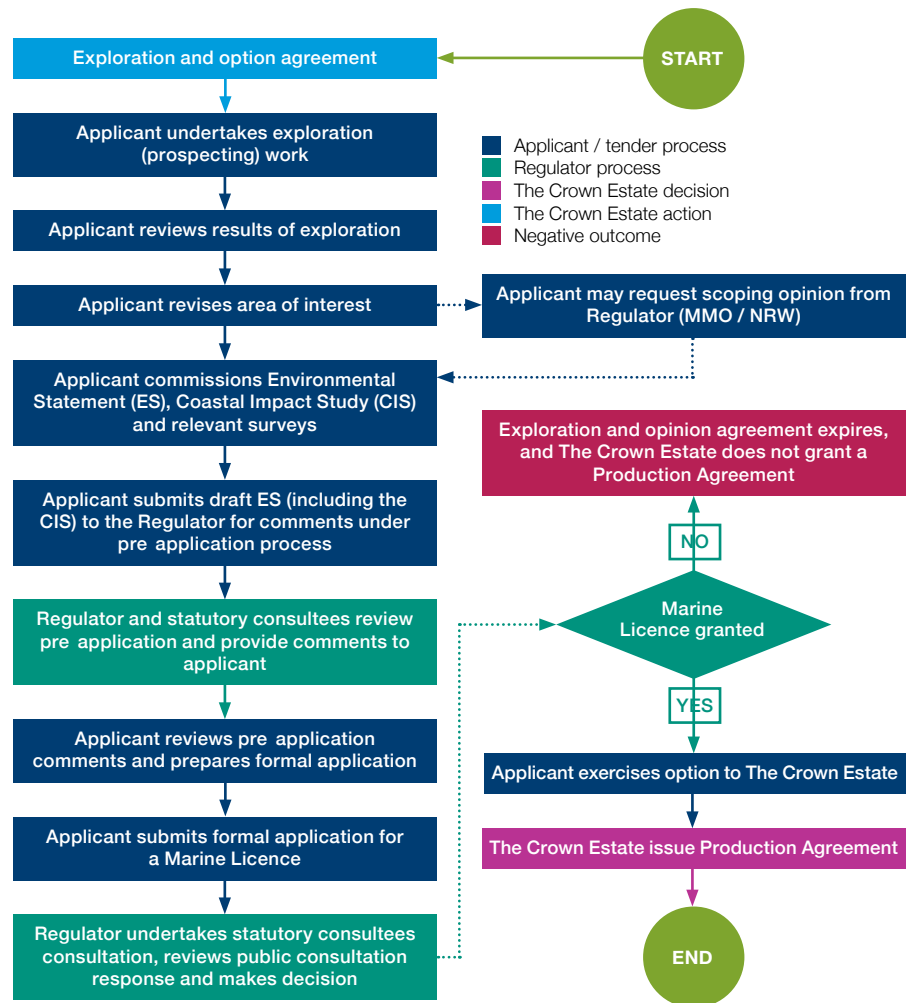


Obtaining rights for sand and gravel extraction

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 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 manages a unique portfolio, which includes the seabed, natural marine resources and much of the foreshore around England, Wales and Northern Ireland. In this capacity we are responsible for awarding seabed rights for offshore renewable energy projects as well as marine minerals, cables and pipelines. We play a unique role in developing and helping sustain UK energy supply and infrastructure, working in collaboration with a wide range of organisations. Established by an Act of Parliament, we return all our profit to Treasury for the benefit of the nation.

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 [@TheCrownEstate](https://twitter.com/TheCrownEstate)

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

www.bgs.ac.uk/mineralsuk