

Energy and infrastructure

outlook 2014-15

Aggregates and marine minerals



Overview

England and Wales have one of the largest and most efficient dredging industries in the world, extracting 15 to 20 million tonnes of sand and gravel from the seabed each year for a range of uses, from building homes, to major projects such as construction of the “Shard” and the London Aquatics centre, port developments and coastal adaptation.

The Crown Estate owns almost all of the sand and gravel resources lying off the coast of the UK and we award and manage commercial agreements for extraction. We also award and manage leases for the extraction of other minerals such as potash from undersea deposits that extend several kilometres offshore.

Marine aggregates have been playing an increasingly important role in the building industry since the 1960s and today meet about 20 per cent of sand and gravel demand in England and Wales.

Our portfolio

In 2013, the total area of seabed licensed for aggregate extraction in UK waters was 739.08km² but, as part of the ongoing area of seabed dredged commitment between The Crown Estate and the British Marine Aggregate Producers Association to limit environmental and social impacts on the seabed and other marine users, 90 per cent of dredging took place from an area of 39.20km².

A number of licence holders are currently in the process of renewing their licences with the Marine Management Organisation to ensure they comply with the European Union's Habitats Directive. We expect this process to be completed by the end of 2014. During this renewal period, companies are restricted in the area of seabed they can dredge.

Over two thirds of the aggregates from our licences are used in the UK, and have helped to construct key developments, such as the Shard, the London Gateway port and the London Aquatics Centre. The remaining one third of dredged materials supply other European countries.

The Crown Estate's energy and infrastructure portfolio is part of a diverse £8 billion UK property portfolio



The portfolio includes the rights for renewable energy generation on the UK Continental Shelf



Over the last ten years The Crown Estate has contributed over £2 billion to the Treasury



Marine minerals

Aggregates are mixtures of sand, gravel, crushed rock or other bulk minerals. They are primarily used in construction to make concrete and other building products, but also for beach replenishment and land reclamation schemes.

Sylvinite is the main form of potash mined in the UK. This is a mixture of potassium chloride and salt. Around 90 per cent of potash mined in the UK is used to make fertiliser and the remaining 10 per cent is used by the chemical and pharmaceutical industries.

16.03m

The Crown Estate licensed areas produced 16.03 million tonnes of marine aggregate in 2013, down from 16.31 million in 2012

New licences

This year we have invited companies to bid for rights to explore and develop new licences for marine aggregates.

This tender process is expected to continue throughout 2014, with successful bidders likely to be confirmed in late spring 2015.

Fifteen year review

In 2014, we will produce a 15-year review of marine aggregate dredging in the UK, detailing how the industry developed from 1998 to 2012. It reveals that during those 15 years:

- The area of seabed licensed decreased by 748 km², with the greatest reductions occurring between 6 and 12 nautical miles of the coast.
- The area of seabed dredged in a single year ranged from 223 km² in 1998 to 97 km² in 2012.
- A total of 314 million tonnes of marine sand and gravel was dredged.

Working with the British Marine Aggregates Producers Association (BMAPA), last year we issued our 15th annual "Area Involved" report showing the intensity and

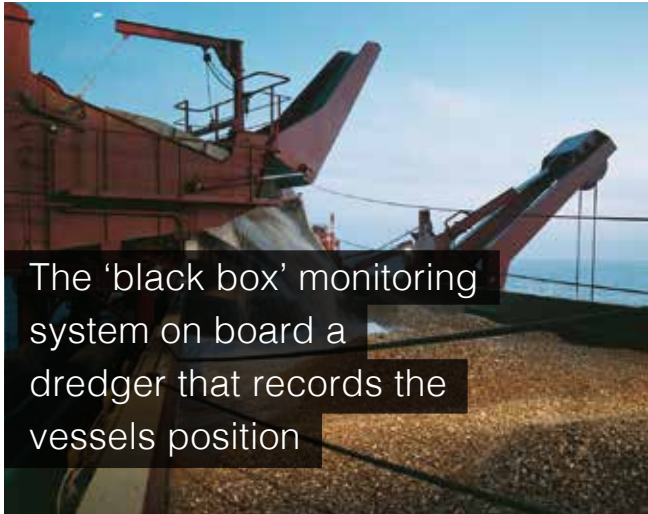
location of dredging from our licences in 2012, and will be releasing both the 15 Year Review (1998 to 2012) and the 16th annual brochure later this year

We have commissioned Ernst & Young to carry out a marine aggregates market study to provide an outlook on industry trends, constraints and opportunities. The output of the report will help shape our business model in a way that is designed to meet the future needs of the sector whilst ensuring a sustainable long term supply of viable resources.

In December 2013, together with BMAPA, we produced new best practice guidance for assessment, evaluation and monitoring of the possible effects of marine aggregate extraction on the coast.

We have also created a new website www.marineaggregates.info, which aims to provide a comprehensive source of information for the industry and general public about the sector and its products. It is managed on behalf of The Crown Estate and supported by the Marine Aggregate Industry.

During 2013, we also produced a *Capability and Portfolio* report, designed to give a national overview of the role played by marine aggregates, whilst also providing information at a regional level on mineral reserves and extraction trends. It is anticipated that this will assist mineral planning authorities in the development of their Local Aggregates Assessments, and help planning officers identify existing offshore resources or "land banks" and predict where future dredging may take place.



The 'black box' monitoring system on board a dredger that records the vessels position



Exploration of the seabed can often provide some very interesting archaeological material



We have undertaken a number of feasibility studies of the potential use of 'Sandscaping' in the UK

Electronic monitoring system

All dredging vessels working on our estate use a sophisticated Electronic Monitoring System that has been in place since 1993.

This is used to ensure that license conditions are adhered to. Information is provided to regulators for them to use as part of their regulatory compliance programme.

This year we are investigating options to upgrade the system, potentially taking advantage of improved communication and positioning technology, moving towards a real-time monitoring system. This project has been developed in collaboration with industry, and has included system sea-trials.

Archaeological finds

We support the industry in monitoring for finds relating to the historic environment. BMAPA has developed an industry protocol for the reporting of archaeological finds for the marine minerals sector that has been transposed to other industries including offshore wind energy.

Through careful monitoring, the industry has produced a massive array of archaeological finds, including Palaeolithic hand axes and mammoth teeth off the East coast of England and many other historical artefacts, such as cannon balls. We also have helped industry develop a protocol for managing unexploded ordinance discoveries.

Sandscaping

Sandscaping is an innovative concept using marine minerals to nourish beaches, creating new land to reduce coastal flooding and erosion, and to regenerate coastal communities.

The technique has already been successfully deployed in the Netherlands as a large scale pilot project and we believe it can potentially offer cost effective and sustainable long-term protection for the UK coastline. It can also deliver economic regeneration for coastal communities by creating new leisure opportunities and significantly improving the value of coastal towns.

We have been working with the Arup and Royal HaskoningDHV to examine the opportunities for sandscaping in a number of areas. We have also been engaging with the Environment Agency and local authorities and potential investors.

Sustainability

We work in partnership with industry and regulators to improve the sustainability performance of the sector through investment in the development of knowledge and best practice.

We have been working with the environmental buildings certification organisation BRE to develop a lifecycle analysis for marine aggregates and to understand how marine aggregates could fit into sustainability specifications such as BREEAM.

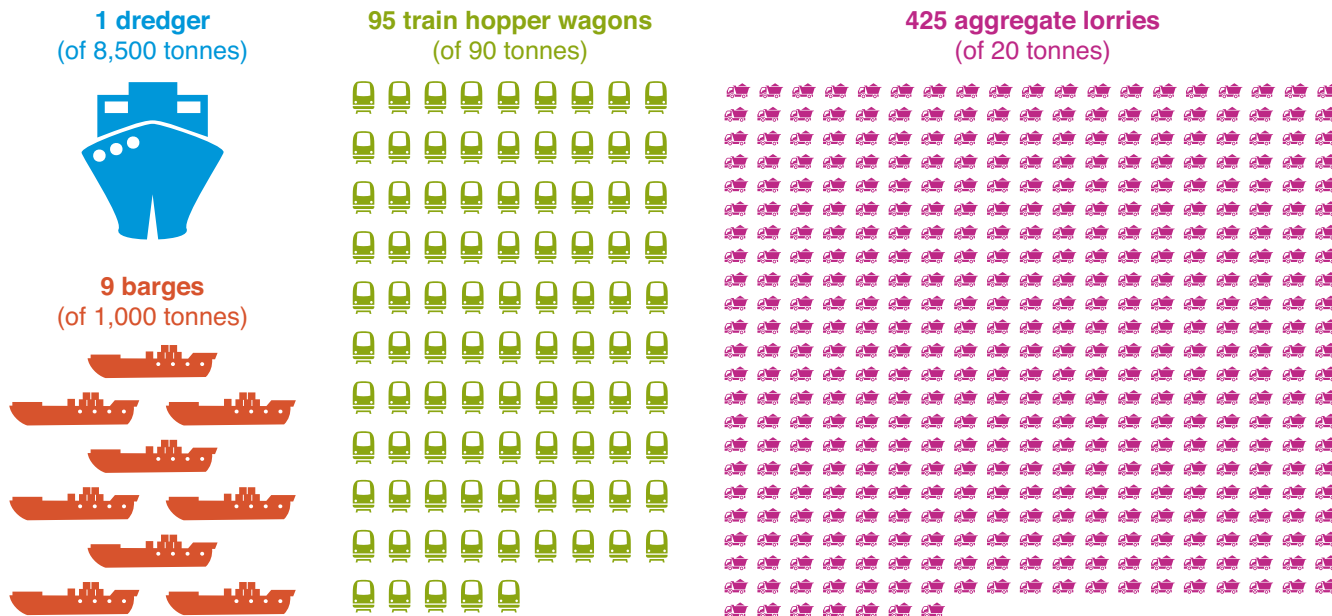
We continue to work with industry to assess the licensed areas and return areas which are no longer

needed to reduce the impact on the seabed by reducing the area dredged.

Despite the small dredged footprint, we recognise the potential impacts on the marine environment and are committed to understanding and minimising the effects of marine aggregate dredging and have contributed to industry led Marine Aggregate Regional Environmental Assessments (MAREAs).

Marine aggregates can help to reduce pollution and road congestion as they can be delivered directly to wharves in urban areas by ship, reducing the need for road transport.

To deliver 8,500 tonnes takes:



Capital projects

There are a number of large capital dredging schemes currently planned around the UK that have the potential to reshape landscapes, such as creating new harbours or berths or waterways.

For example, Associated British Ports (ABP) has a licence to dredge 11 million m³ for its Southampton Approach Channel Dredge project. ABP will deepen and widen the navigation channel at points within Southampton Water and the Solent in order to improve the tidal access window for larger vessels; which will improve the operational efficiency of the port; reduce congestion; and enhance navigational safety.

Additionally, the port of Liverpool is deepening the approach channel to the port to enable larger ships to access a new container terminal that is being created by reclaiming land from the seabed.

As part of our efforts to enhance the efficiency of the industry, we are examining how sand and gravel extracted from capital schemes could potentially be put to good use in other construction projects or habitat creation, such as mudflats and marshes, rather than putting it back into the sea. Wherever possible, we would like to see a sustainable use of these extracted materials.

98.67km²

The total area of seabed dredged in 2013 was 98.67km²

387km²

Between 1998 to 2012, the area of seabed covered by dredging licenses decreased by 748km²

314m

314 million tonnes of marine sand and gravel were dredged in those 15 years

Research

Reef-building worms

A new report published by The Crown Estate assesses impact on *Sabellaria spinulosa* – a type of sea worm that builds biogenic reefs that are protected by European legislation. Ensuring populations are not damaged by marine activity can be a significant issue in obtaining consent for any seabed user.

The study concluded that ecosystem services provided for the worm populations are not impacted by fishing or disturbances caused by dredging, except of course where they are irreparably damaged or removed.

We now understand that the reef-building worms are known to be ubiquitous in large areas of seabed

in the southern North Sea and east English Channel. This research has significantly developed our understanding and knowledge of *Sabellaria spinulosa* and biogenic reefs. The study also showed that a reef can recover quickly (less than 12 months) from physical damage.

Aggregate dredging and the marine environment

The Crown Estate has published a review of the research commissioned under the Marine Aggregates Levy Sustainability Fund (mALSF). The mALSF programme represents one of the most substantial investments in UK marine research in recent times and lasted from April 2002 to March 2011.

Potash mining

Around 90 per cent of the potash mined in the UK is used in fertilisers, while the remaining 10 per cent is used by the chemical and pharmaceutical industries. In the UK, Sylvinite is the primary potash mined in the UK – a mixture of potassium chloride and salt.

The Boulby potash mine, on the North Yorkshire coast, is the UK's only commercial mine of its kind and the most important non-hydrocarbon mineral operation in Britain.

The mine is more than forty years old and is managed

by Cleveland Potash, employing more than 800 people. Mining operations cover 13.5 km, reaching approximately 5 km offshore.

There are also plans for a second mine beneath the North York Moors National Park. In 2011, we signed an agreement with York Potash, part of Sirius Minerals, giving it the right to explore for potash and related minerals under the seabed off the coast of Hundale, situated to the south of Boulby.

York Potash are undertaking an Environmental Impact Assessment to support their planning application.

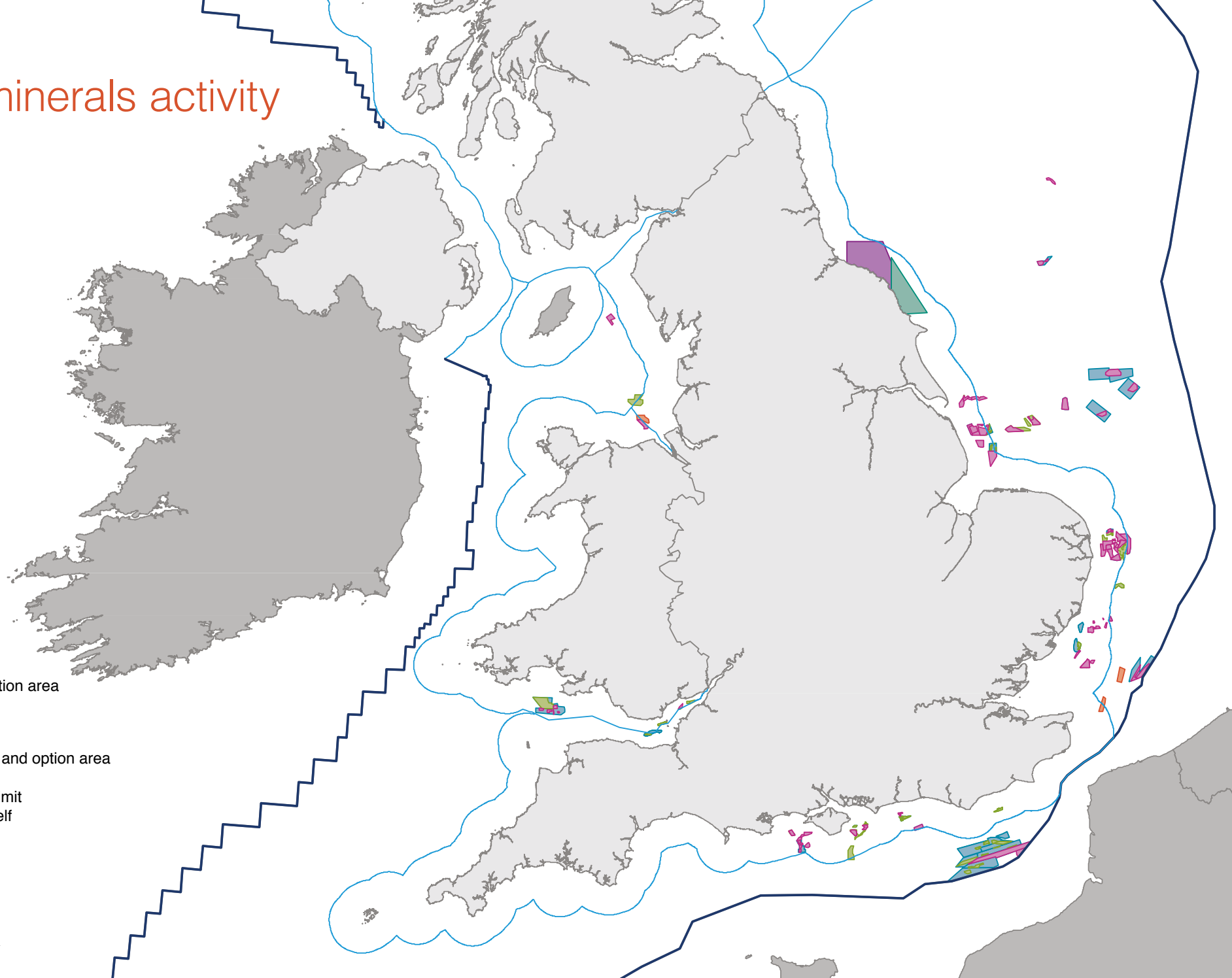
Marine minerals activity

- Production licence
- Application area
- Exploration and option area
- Option area
- Potash mine lease
- Potash exploration and option area

- Territorial Waters Limit
- UK Continental Shelf
- United Kingdom
- Rest of Europe

0 50 100
km

CORRECT AS OF APRIL 2014



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Correct as of May 2014

At The Crown Estate, we are landlords of the UK's seabed, managing it effectively and sustainably, balancing different interests and delivering the best value over the long-term.

This gives us a unique role to play in developing and helping sustain the UK's energy supply and infrastructure, by working in partnership with a wide range of organisations that have interests in the seabed.

These include wind, wave and tidal power, carbon capture and storage, gas storage, marine aggregates and minerals, cables and pipelines.

We are active asset managers, applying our experience, skills and understanding to deliver optimum returns, create opportunities for ourselves and our partners, and provide a quality service to our customers.

Aware of our monopoly position and the impact of our activities, we are careful to comply with competition laws, co-exist with the wider marine community, and be open and transparent in our dealings.

Because of who we are, we are able to see the bigger picture, making best use of the seabed, and supporting and investing in sustainable development for the long-term benefit of the whole of the UK, now and in the future.