mpa
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sustainable solutions

Strength from the depths

Tenth sustainable development report for the British marine aggregate industry

December 2016

bmapa british marine aggregate producers association

Mineral Products Association

Contents

Sustainable development

"The purpose of our strategy is to demonstrate the contribution and progress made by the British marine aggregate sector, through good governance and the use of sound science, in supporting the wider sustainable development objectives of achieving a sustainable economy, whilst at the same time ensuring a strong healthy and just society, and living within environmental limits for current and future generations."

Headlines

A total of 19.48mt was dredged in 2015 – a 12.9% increase on 2014

Over 4 million tonnes was delivered in support of beach nourishment and contract fill projects including the Liverpool2 port development

Continuing challenges for markets on the near Continent resulted in a 28% decrease in marine landings

While the area of seabed licensed for dredging increased by 28.4% the area actually dredged reduced by 3.5%

The latest Aggregate Minerals Survey for England and Wales (based on 2014 figures) shows that 10% of all primary aggregates now come from marine sources

BMAPA and the MPA are working to ensure that key minerals infrastructure such as wharves and rail depots are safeguarded from residential development

Key facts and figures

Key areas

	2015	% change	2014	2013	2012	2011
Area of UK seabed	867,000km^2	-	867,000km^2	867,000km^2	867,000km^2	867,000km^2
Area of seabed licensed for dredging	932km^2	+28.4%	726km^2	739km^2	711km^2	1,274km^2
Area available to be worked	337km^2	+1.5%	332km^2	332km^2	391km^2	567km^2
Area dredged	82.67km^2	-3.5%	85.66km^2	98.67km^2	96.72km^2	114km^2

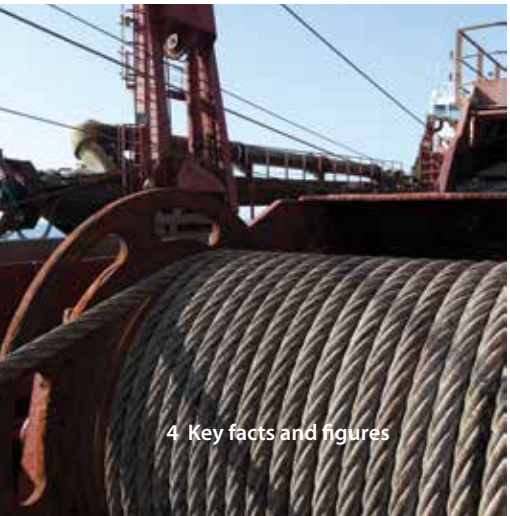
Market summary

	2015	% change	2014	2013	2012	2011
Total GB aggregates market	226.3mt	+4.6%	215.8mt	198mt	189mt	207mt
Land-based aggregates	150.3mt	+4.9%	143.3mt	132.5mt	125mt	136.5mt
Recycled and secondary aggregates	64.3mt	+4.9%	61.3mt	55mt	54mt	60mt
Total marine aggregates production	19.48mt	+12.9%	17.25mt	16.03mt	16.79mt	19.12mt
Marine landings to GB aggregates market	13.24mt	+12.1%	11.81mt	10.63mt	10.1mt	11.5mt
Marine landings to European aggregates market	2.15mt	-28.1%	2.99mt	4.09mt	4.5mt	6.1mt
Beach replenishment/contract fill	4.08mt	+67.2%	2.44mt	1.31mt	2.15mt	1.49mt

Market contribution to GB sand and gravel market

	2015	% change	2014	2013	2012	2011
Total GB market	57.9mt	+3.2%	56.1mt	54mt	51mt	55mt
Total England & Wales market	52.6mt	+3.1%	51.0mt	48mt	44.5mt	48.6mt
Marine landings to England & Wales	13.24mt	+12.1%	11.81mt	10.63mt	10.1mt	11.52mt
Marine landings to South East England	11.13mt	+12.4%	9.90mt	8.70mt	8.12mt	9.56mt
Marine landings to London & Thames Estuary	8.31mt	+13.4%	7.33mt	6.06mt	5.6mt	6.9mt
Marine landings to Wales	0.69mt	+3.0%	0.67mt	0.68mt	0.71mt	0.61mt

mt = million tonnes



Chairman's introduction

Nigel Reeve, *Chairman,* British Marine Aggregate Producers Association

In my capacity as the new Chairman of BMAPA, it gives me great pleasure to welcome you to the marine aggregate sector's sustainable development report for 2015 – our tenth such annual report. Under this initiative, we continue to publish a wide range of data to provide a comprehensive measure of the sustainable development performance of the sector as a whole.

The growing demand for our products reported in 2014 continued into 2015, with overall marine aggregate production increasing by nearly 13%. In London and the South East of England, where one third of Great Britain's construction activity takes place and where traditionally marine supplies provide one third of all primary construction aggregate demand, landings increased by a further 12%, building on the 13.8% increase reported for 2014. There was also a marked increase in the demand for marine aggregate in support of beach nourishment and contract fill projects, with over 4 million tonnes supporting a wide range of projects during the year, including 1.7 million tonnes delivered in support of the Liverpool2 port development. The exception remained on the near Continent, where a further 28% reduction in marine landings reflected the continuing challenges being experienced in these markets. Nevertheless, it is important to remember that pre-recession the market on the Continent took around one-third of our annual production. In this respect, we watch with interest any ramifications that may fall out of the decision to leave the European Union, given the UK is a net-exporter of construction aggregates.

Further evidence of the importance of our sector can be found in the latest Aggregate Minerals Survey for England and Wales, which is undertaken by the British Geological Survey under contract to the Department of Communities and Local Government. Aggregate Minerals (AM) surveys have traditionally been undertaken at four-yearly intervals since 1973 and are intended to provide a detailed analysis of national and sub-national sales and consumption of primary aggregates, allowing trends over time to be identified. The latest report, published in November 2016, reports data for 2014 and provides further evidence of the growing role and importance of marine aggregate supplies in England and Wales. Over 10% of all primary aggregates consumed in England and Wales now come from marine sources, and we are responsible for supplying 25% of the sand and gravel needs in England and 49% of the equivalent needs in Wales.

The importance of infrastructure in helping to promote growth in the national economy provides a further opportunity to make the link between the essential minerals that our sector provides, and the wider value and benefits realised by the projects we support. Our materials have played a key role in supporting the Crossrail development and there is clear potential to also support elements of the HS2 project.

There also appears to be growing interest in the opportunities for large scale renewable energy generation using tidal lagoons. The last major barrage built in the UK was at Cardiff Bay, which used 2.5 million tonnes of marine-dredged sand. The 1.2km long barrage cost £200m to build, but crucially provided the catalyst for over £2 billion of further regeneration activity, including housing, commerce, leisure and industrial development. Given the scale of some of the new projects currently being discussed, the ability of our sector to deliver large volumes of construction aggregate by sea would suggest a key role for marine aggregates not only in the construction of a new project, but also in supporting the long term regeneration activities that can be expected to follow.

Finally, although the reserve base for the sector has now been secured, the opportunities for the sustainable supply of construction materials to coastal locations, close to the point of demand, can only be realised if there are wharf facilities available to land and distribute these important materials. Essential minerals infrastructure, such as rail depots and wharves, are coming under increasing pressure from housing development which can severely compromise their ability to operate, and it is vital that they are safeguarded as set out in National Planning Policy. That is why we very much welcome the new policy that is being proposed in the South marine plan to recognise the importance of land-based infrastructure in being able to realise the social and economic benefits of activities that take place offshore.

Nigel Reeve, Chairman, BMAPA

Sustainable production

Core values

Sustainable products: we understand our role in sustainable construction and actively promote the most efficient use of our products

Resource conservation: we recognise that we must make the most efficient use of all resources

OBJECTIVE 1

Maintain and improve profitability in order to provide for continuing investment and employment

Key performance indicator: Annual marine production

	2015	% change	2014	2013	2012	2011
Total (Crown Estate figures)	19.48mt	+12.9%	17.25mt	16.03mt	16.79mt	19.12mt
BMAPA reported production*	13.20mt	+1.9%	12.96mt	13.30mt	13.95mt	16.40mt

Key performance indicator: National/regional contribution to supply

	2015	% change	2014	2013	2012	2011
Landings to England & Wales	13.24mt	+12.1%	11.81mt	10.63mt	10.09mt	11.52mt
Landings to South East England	11.13mt	+12.4%	9.90mt	8.70mt	8.12mt	9.56mt
Landings to Wales	0.69mt	+3.0%	0.67mt	0.68mt	0.71mt	0.61mt
Beach replenishment/fill	4.08mt	+67.2%	2.44mt	1.31mt	2.15mt	1.49mt
Exports	2.15mt	-28.1%	2.99mt	4.09mt	4.55mt	6.10mt

- Total marine aggregate production increased by 12.9% in 2015;
- Landings in England and Wales increased by 12%, as did landings to South East England;
- Demand for marine material in support of beach replenishment and major contract fill projects increased by 67%, with major projects including the Liverpool2 port development and coast defence works at Clacton and Lincshore;
- Exports of construction aggregate to the near Continent continue to be depressed in 2015, with a further 28% reduction on the equivalent figures for 2014.

* Based on reported data from 19 out of 21 vessels operated by BMAPA members in UK waters during 2015

OBJECTIVE 2

Maintain and increase investment in dredgers and dredging technology in order to improve efficiency and environmental performance

Key performance indicator: Profile of age/capability of dredging fleet*

	2015	2014	2013	2012	2011
Average age of dredging fleet (years)	20.45	19.62	19.59	21.13	20.13

20 vessels were operated by BMAPA members at the end of 2015, with an average age of 20.45 years.

Market conditions during the year saw one vessel continue to be laid up and one vessel sold, representing a lost capacity of 9,671 tonnes.

Key performance indicator: investment in vessels/technology over previous five years*

2015 cap-ex investment in vessels (not including maintenance):

2015	% change	2014	2013	2012	2011
£2.01m	109.4%	£0.96m	£3.29m	£0.94m	£2.60m

Rolling investment over previous five years

2015	% change	2014	2013	2012	2011
£9.8m	-18.0%	£11.95m	£15.19m	£21.78m	£24.21m

OBJECTIVE 3

Make the most efficient use of available licensed resources

Key performance indicator: Area dredged and hours dredged

	2015	% change	2014	2013	2012	2011
Area of seabed licensed for dredging	932km^2	+28.4%	726km^2	739km^2	711km^2	1,274km^2
Area available to be worked	337km^2	+1.5%	332km^2	332km^2	391km^2	567km^2
Area dredged	82.67km^2	-3.5%	85.66km^2	98.67km^2	96.72km^2	114km^2
Hours dredged*	12,916 hrs	-0.1%	12,924 hrs	14,850 hrs	16,850 hrs	18,841 hrs

- The completion of pre-dredge conditions associated with many of the new marine licences awarded during 2014 meant that the area of seabed licensed increased during 2015, as restrictions on historic dredge footprints were removed;
- Despite the increase in licensed area, both the area of seabed available to be dredged and the area of seabed actually dredged remained stable – reflecting a continuation of the detailed zoning arrangements introduced for newly licensed areas in 2014.

* Based on reported data from 19 out of 21 vessels operated by BMAPA members in UK waters during 2015

Sustainable production – continued

OBJECTIVE 4

Minimise the screening activity in the production process

Key performance indicator: Tonnes landed per hour dredged*

	2015	% change	2014	2013	2012	2011
Marine aggregate production	13.20mt	+1.9%	12.96mt	13.30mt	13.95mt	16.4mt
Hours dredged	12,916 hrs	-0.1%	12,924 hrs	14,850 hrs	16,850 hrs	18,841 hrs
Tonnes landed/hour dredged	1021.6tph	+1.9%	1002.4tph	895.3tph	827.9tph	870.2tph

- The relative stability in the relationship between hours dredged (-0.1%) compared to reported production (+1.9%) suggests that the overall level of screening activity has remained broadly stable.
- As a consequence, the KPI metric for tonnes landed per hour dredged only increased by 1.9% compared to the equivalent figure for 2014.

OBJECTIVE 5

Develop and promote best practice for resource management

The marine aggregate sector continues to employ the best practice guidance and methodologies to support resource management. This ensures that the sand and gravel resources being extracted meet the requirements of the markets and end-uses they are being supplied to, and that operations are in compliance with the regulatory licences that they are required to operate under.

These principles are applied to all marine licences, through a set of standard conditions that relate to marine aggregate extraction.

This includes a requirement for the marine licence area to correspond to the extent of the commercially viable resource that is being targeted, and for resource areas of veneer thickness (less than 0.5m) to be identified, and for suitable exclusion zones to be introduced to prevent them being dredged in order to enable the ecological recovery of the dredged area.

Collectively, these steps ensure that the area of seabed that is licensed for marine aggregate extraction continues to be minimised, in line with Government policy and the 'Area Involved' commitment, and that dredging operations only take place where the commercially viable sand and gravel resources are sufficiently thick so as not to expose underlying bedrock sediments.

* Based on reported data from 19 out of 21 vessels operated by BMAPA members in UK waters during 2015

Climate change and energy

Core values

Adaptation: we recognise the need to support future coastal and flood defence schemes through the provision of suitable resources to support local, regional and national beach replenishment requirements

Carbon management: we support the Government policy of reducing emissions of greenhouse gases

Transport: we are committed to reducing the impact of the transportation of aggregates and quarry products

OBJECTIVE 1

Reduce the impact of atmospheric emissions released through the production and transport processes

Key performance indicator: Marine Gas Oil consumed per tonne landed*

	2015	% change	2014	2013	2012	2011
Total Marine Gas Oil	29,899t	-1.3%	30,297t	32,558t	33,377t	40,562t
Marine aggregate production	13.20mt	+1.9%	12.96mt	13.30mt	13.95mt	16.4mt
Marine Gas Oil per tonne landed	2.27kg/t	-2.99%	2.34kg/t	2.45kg/t	2.39kg/t	2.47kg/t

Key performance indicator: CO_2 emissions*

	2015	% change	2014	2013	2012	2011
Total CO_2 emissions (tonnes)	95,378t	-1.3%	96,647t	103,860t	106,473t	129,393t
Marine aggregate production	13.20mt	+1.9%	12.96mt	13.30mt	13.95mt	16.4mt
CO_2 emissions per tonne landed	7.23kg CO_2/t	-3.1%	7.46kg CO_2/t	7.81kg CO_2/t	7.63kg CO_2/t	7.89kg CO_2/t

(The calculation from MGO tonnes to CO_2 tonnes has been made using a conversion factor taken from DEFRA (2008) Guidelines to DEFRA's Greenhouse Gas Conversion Factors for Company Reporting. Department for Environment, Food and Rural Affairs, London. Accessed from: http://www.defra.gov.uk/environment/business/reporting/conversion-factors.htm)

- The slight reduction in total fuel oil consumption and CO_2 emissions reported by BMAPA operators during 2015 (-1.3%) coupled with a slight increase in production (+1.9%) resulted in a reduction in the metrics for fuel and emissions per tonne landed (-3%).

OBJECTIVE 2

Maximise the efficient use of the dredging fleet

Key performance indicator: tonnes landed per kilometre travelled*

	2015	% change	2014	2013	2012	2011
Total kilometres steamed	952,334km	+1.1%	942,359km	1.04m km	1.11m km	1.27m km
Marine aggregate production	13.20mt	+1.9%	12.96mt	13.30mt	13.95mt	16.4mt
Tonnes landed per km travelled	13.86t/km	+0.7%	13.75t/km	12.73t/km	12.57t/km	12.88t/km

- With the changes in total distance steamed and reported production remaining broadly constant during 2015, this suggests the efficiencies observed in 2014 (an 8% improvement in the tonnes dredged per kilometre steamed) have been maintained.

* Based on reported data from 19 out of 21 vessels operated by BMAPA members in UK waters during 2015

Natural resources and environmental protection

Core values

Environmental protection: we recognise the potential of our operations to impact upon the marine environment and are committed to minimising and mitigating such effects

Biodiversity: we recognise the importance of marine biodiversity and the contribution we can make to better understanding and protection of marine species and habitats

Heritage: we recognise the historic significance of the seabed around the UK and believe that we can make a positive contribution to the understanding and protection of the marine historic environment

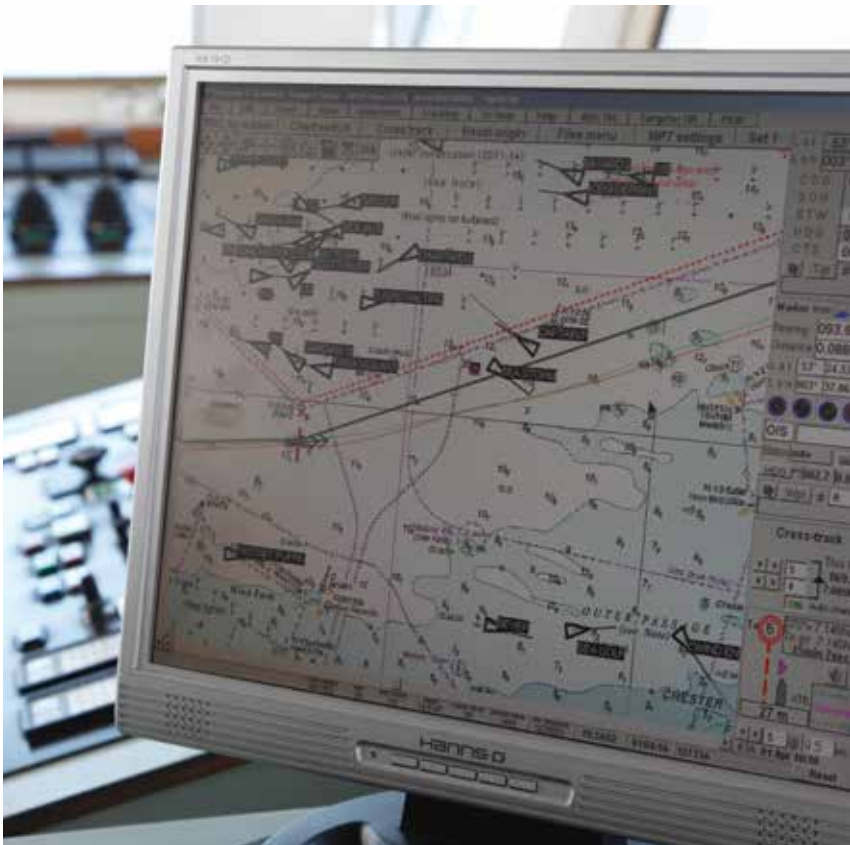
Marine stewardship: we have a responsibility to manage our operations in order to minimise the significance of our operations to stakeholders and the environment

OBJECTIVE 1

Minimise the spatial footprint of dredging operations through responsible and effective management

Key performance indicator: Area of seabed licensed for dredging

	2015	% change	2014	2013	2012	2011
Area of seabed licensed for dredging	932km^2	+28.4%	726km^2	739km^2	711km^2	1,274km^2
Active dredge area	337km^2	+1.5%	332km^2	332km^2	391km^2	567km^2
Area of seabed dredged	82.67km^2	-3.5%	85.66km^2	98.67km^2	96.72km^2	114km^2
Area of seabed where 90% of dredging occurs	31.58km^2	-15.2%	37.26km^2	39.20km^2	36.42km^2	43.26km^2
Area of seabed dredged for more than 1.25 hours	7.37km^2	+15.3%	6.39km^2	6.75km^2	8.41km^2	8.52km^2



Natural resources and environmental protection – continued

OBJECTIVE 2

Maintain and develop the industry contribution towards the understanding of marine sand and gravel habitats

Regional Monitoring & Management

The Regional Seabed Monitoring Plan (RSMP) project being jointly funded by the marine aggregate industry, Defra, the Marine Management Organisation, Welsh Government and The Crown Estate to develop an innovative new approach to delivering the seabed monitoring required to fulfil the conditions attached to all marine licences for marine mineral extraction continued during 2015.

Five regional baseline surveys across marine aggregate interests in the Southern North Sea and English Channel were commissioned by the marine aggregate industry in 2014. The work, which totalled over 3,500 individual sample stations, represented one of the largest seabed sampling surveys ever commissioned on the UK continental shelf. The fieldwork was successfully completed in November 2015, and the benthic and seabed sediment samples that were acquired have been processed during 2016.

As well as delivering a more consistent and scientifically robust approach to compliance monitoring, the RSMP process has also demonstrated opportunities for significant savings in time, effort and cost through the adoption of a more coordinated approach.

Following discussions with regulators and their advisors, the marine aggregate industry now plan to extend the coordinated, regional approach to the delivery of bathymetric and side scan sonar surveys that form part of the standard requirements for the compliance monitoring of licensed marine aggregate operations.

Marine Protected Area Network

BMAPA and its member companies have continued to play a full and constructive role in the development of a network of Marine Protected Areas in UK seas, including the Marine Conservation Zone process that has been taking place in English waters.

The marine aggregate sector remains committed to working with Defra and the nature conservation agencies to help support the successful conclusion of the process to define an effective network of Marine Protected Areas – both in terms of the identification of potential new sites, but also the development of appropriate management measures for marine development activity that may be associated with them. The location of potential sites relative to long-standing marine aggregate licence areas means that in certain cases, the monitoring work routinely undertaken to help manage marine aggregate operations has the potential to offer significant added-value to MCZ site management.

Natural resources and environmental protection – continued

OBJECTIVE 3

Maintain and develop industry contribution towards the understanding of Britain's marine historic environment

The archaeological reporting protocol that was originally developed by BMAPA and Historic England's predecessor organisation to enable archaeological finds encountered during marine aggregate operations (either on board dredgers or at the wharves) continues to be delivered through an implementation service provided by Wessex Archaeology, co-funded by BMAPA and The Crown Estate. The service allows finds recovered by industry staff to be identified and assessed for their significance by heritage experts, and where necessary for appropriate mitigation to be introduced on production licence areas to protect previously unknown sites of importance, for example aircraft crash sites.

Since the protocol was introduced in 2005, over 470 separate reports have been filed by marine aggregate industry staff (95 in 2015/16), covering over 1,200 individual items (c.119 in 2015/16). Finds reported ranged from Palaeolithic animal remains, through to cannon balls and fragments of airframe from WWII aircraft. The implementation service includes an annual report which details every find reported during the reporting year, and commenting on trends emerging over time.

http://www.wessexarch.co.uk/projects/marine/bmapa/docs.html

To support the practical delivery of the protocol, an awareness programme to encourage its use amongst industry staff working on both wharves and on the dredgers themselves has been in place since 2005. In 2015, the tenth anniversary of the reporting protocol being introduced, BMAPA agreed a new partnership arrangement with The Crown Estate and Historic England to continue co-funding the awareness programme to the end of 2016. The programme involves site visits by maritime archaeologists to provide industry staff with the knowledge and confidence to identify and report items of potential archaeological interest that may be found amongst dredged cargoes, as well as the production of twice-yearly 'Dredged Up' newsletters.

http://www.wessexarch.co.uk/projects/marine/bmapa/protocol-awareness.html

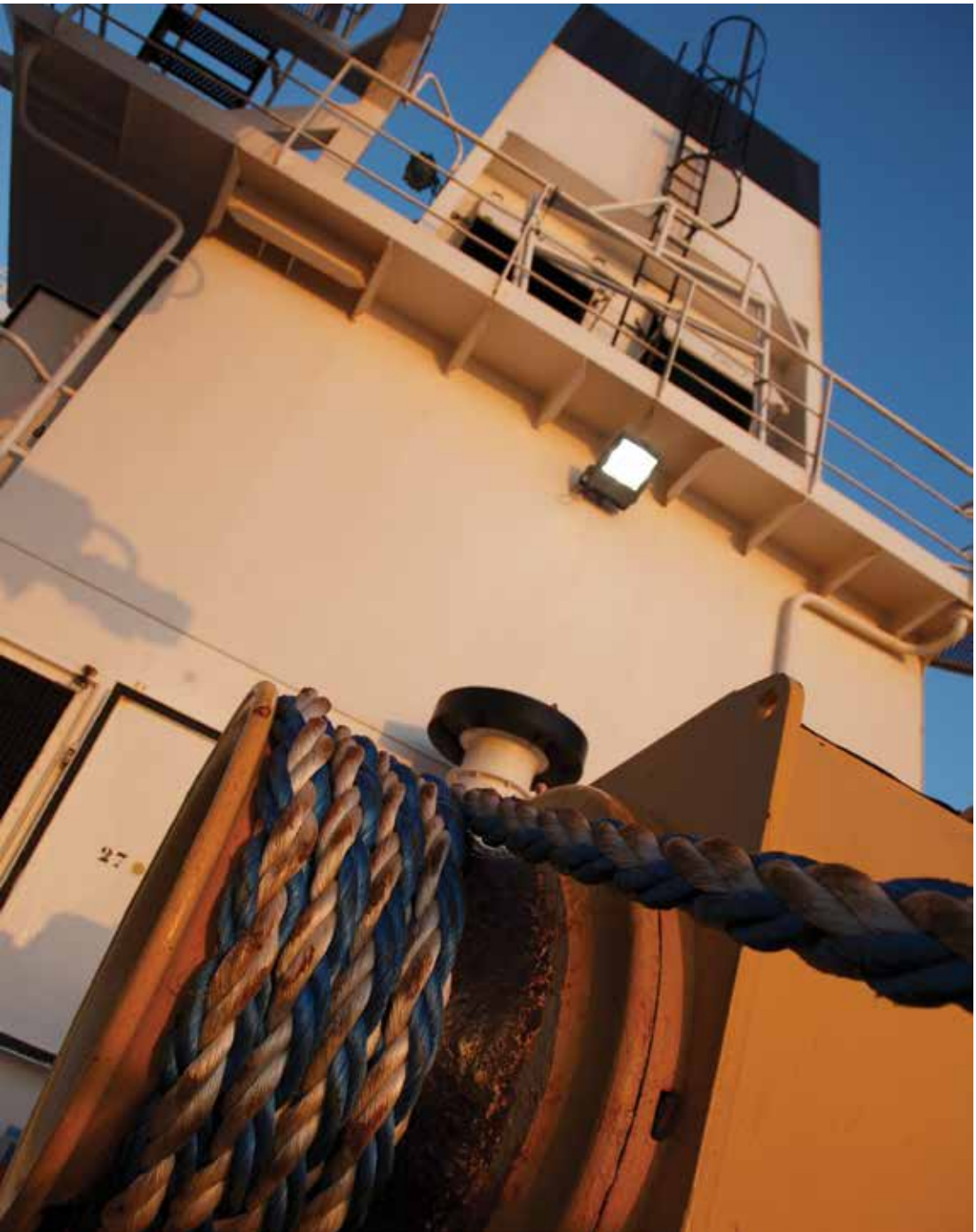
OBJECTIVE 4

Maintain effective controls to minimise the potential for pollution to the marine environment

Key performance indicator: number of recorded pollution incidents*

2015	2014	2013	2012	2011
1	0	0	1	2

* Based on reported data from 19 out of 21 vessels operated by BMAPA members in UK waters during 2015



Creating sustainable communities

Core values

Health & safety: our highest priority is the health and safety of employees, contractors and visitors

Employment: we recognise that our activities are an important source of employment and economic activity

Competence: we recognise the need to maintain and develop a competent workforce

Good neighbours: we engage with marine stakeholders, strive to be seen as good operators by other marine users and recognise the importance of partnerships in achieving both of these

Stakeholder accountability: we recognise the importance of operating as good corporate citizens

OBJECTIVE 1

Improve the occupational health and safety of the marine sector's employees

Key performance indicator: Working days lost through work-related injury*

	2015	2014	2013	2012	2011
Number of reportable accidents (Lost Time Injuries)	3	3	3	8	2
Days lost through work-related injury	75 (sea staff) 0 (office staff)	154 (sea staff) 0 (office staff)	112 (sea staff) 0 (office staff)	59 (sea staff) 0 (office staff)	26 (sea staff) 0 (office staff)

- Health and safety remains the marine aggregate sector's top priority. Our ultimate aim will always be "Zero Harm" to our workforce;
- The industry continues to collate and report Lost Time Injury and wider accident incidents on a monthly basis;
- Sharing practical experiences, whether of accidents or 'near-hits', via BMAPA Safety Alerts remains an ongoing commitment, with 12 being issued in 2015, and a further 25 issued during 2016;
- As part of their 'Safer by Competence' commitment, companies continue to roll-out two new National Vocational Qualifications specifically developed by the sector to allow the crew working on board marine aggregate dredgers to demonstrate their competence when carrying out dredging and discharge operations. This enhances and complements the Certificates of Competency already held by those working at sea.

Creating sustainable communities – continued

OBJECTIVE 2

Improving employee development through vocational training

Key performance indicator: Employment direct/indirect (office/ship crew)*

	2015	% change	2014	2013	2012	2011
Office staff	54.5	-5.2%	57.5	59.5	59.5	59.4
Sea staff	347	-1.14%	351	335	379	405

Figures correct as of 31.12.15

Key performance indicator: Training days per employee*

	2015	% change	2014	2013	2012	2011
Training days per employee	4.91	-26.7%	6.7	4.12	2.66	2.34

* Based on reported data from 5 BMAPA member companies, operating 19 of the 21 vessels working in UK waters during 2015

Nearly one million tonnes of sand and shingle was delivered to repair five kilometres of beach at Clacton in Essex and in doing so protect 3,000 homes and businesses for the next 100 years. Photo: Boskalis Westminster Limited

Creating sustainable communities – continued

OBJECTIVE 3

Increasing the transparency of activities, and maintaining and developing further liaison with other marine stakeholders

Marine Aggregate Extraction and the Fishing Industry – Operational Code of Practice

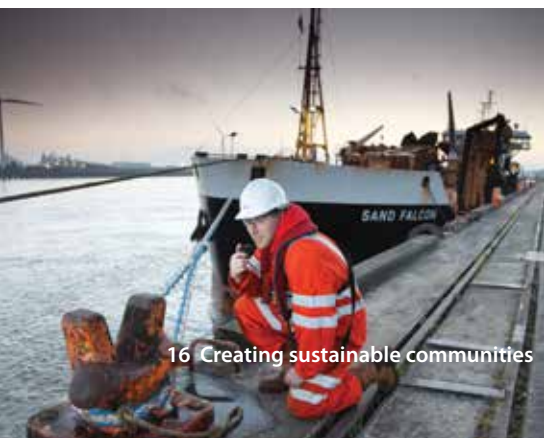
A code of practice developed by BMAPA, the Marine Management Organisation (MMO) and The Crown Estate for the marine aggregate industry, has been established to minimise operational conflicts between aggregate dredging vessels and fishing vessels/activity – particularly the loss of or damage to fishing gear. The code defines best practice for communication between marine aggregate operators and fisheries interests both in advance of dredging operations commencing and while dredging operations are taking place. It also includes the liaison required in advance of undertaking survey operations associated with marine aggregate interests, particularly where these may extend outside the boundaries of licensed areas or where the surveys are associated with a prospecting or application area that has yet to be licensed.

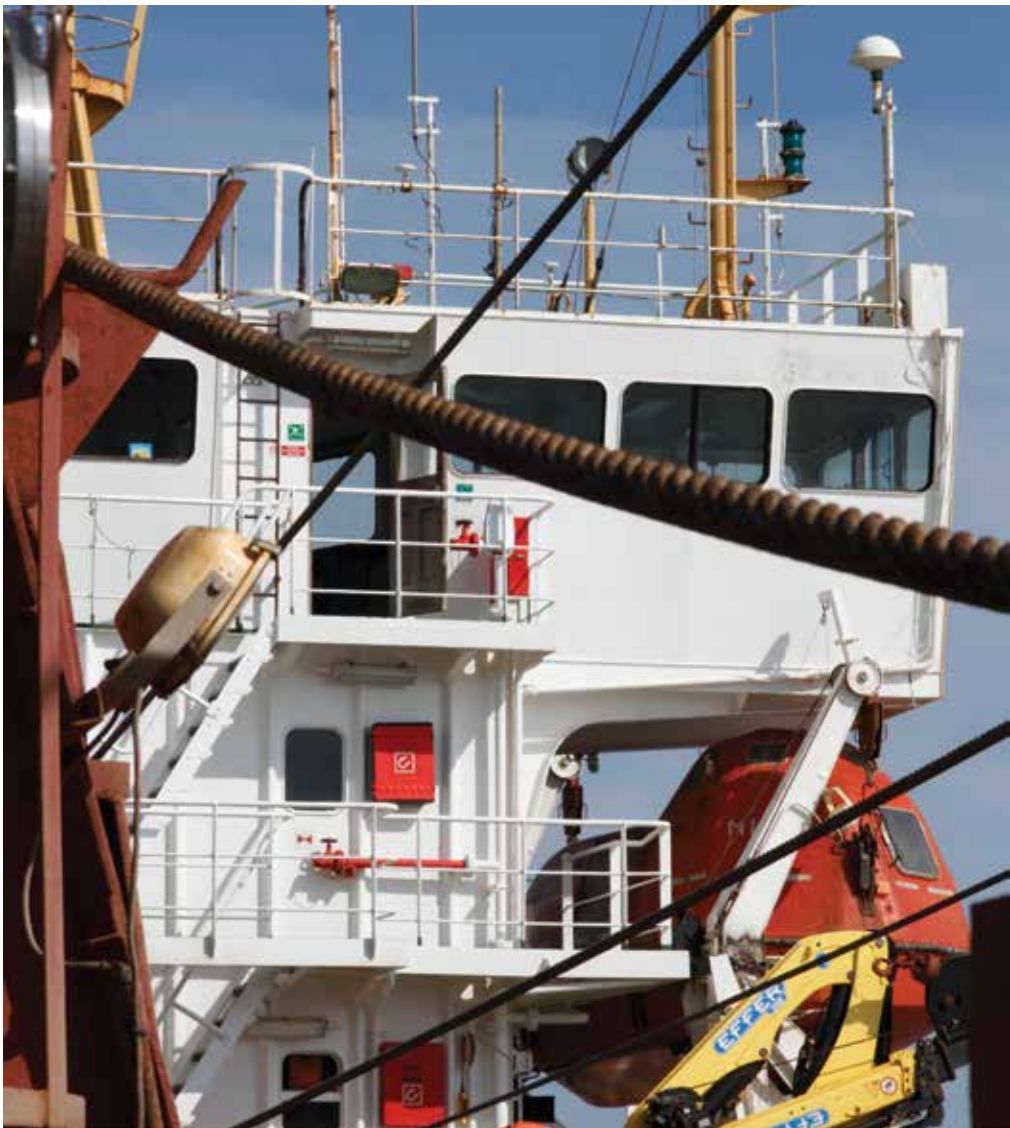
http://www.bmapa.org/issues/other_sea_users.php

Kingfisher Fortnightly Bulletin service

Working in partnership with The Crown Estate, BMAPA continue to fund an electronic reporting arrangement for marine aggregate specific issues through the Kingfisher Fortnightly Bulletin service, administered by Seafish. The service mirrors the equivalent arrangements already in place for the offshore oil & gas, renewable energy and offshore cables sectors, and allows information on changes to active dredging zones, commencement of works on new licence areas, notification of survey works and navigation obstructions to be electronically circulated to regional fisheries interests.

http://www.seafish.org/fishermen/kingfisher/fortnightly-bulletin/





Active dredge area charts

Since 2003, BMAPA has worked in partnership with The Crown Estate to produce twice-yearly active dredge area charts. These define the extent of the licence area within which dredging is permitted to take place, which are then enforced through analysis of the 'black box' Electronic Monitoring System data recorded by every marine aggregate dredger operating in UK waters.

Laminated versions of these charts are supplied to local offices of the Marine Management Organisation and Inshore Fisheries and Conservation Authorities and are also widely circulated to local fisheries interests. This ensures other marine users are provided with the most up to date information on the extent of marine aggregate operations.

http://www.bmapa.org/issues/other_sea_users.php

Area involved initiative

BMAPA and The Crown Estate continue to report summary information on the extent of licensed and dredged area under their area involved initiative which commenced in 1999. The annual 'area involved' report for activity in 2015 represents the 18th that has been produced, and the spatial data generated by this ongoing initiative continues to be a valuable reference for the extent and intensity of marine aggregate operations and how these have changed over time.

http://www.bmapa.org/issues/area_dredged.php

Economies of scale

By delivering large volumes of a low cost, bulk material close to the point of demand, economies of scale represent one of the marine aggregate sector's greatest advantages.

The 19 vessels operated by BMAPA members for which data has been reported in 2015 range in size from 1,250 tonnes to 10,000 tonnes capacity, with associated variations in vessel dimensions and engine power. However, all the vessels are highly specialised and fulfil particular roles in supplying essential marine sand and gravel supplies to the marketplace. This variation is effectively masked in the summing of overall key performance indicator information.

To assist analysis of key performance indicator data, the dredging fleet covered by data reported during 2015 can be separated into two categories.

i. Vessels with cargo capacities below 3,000 tonnes, which typically supply local wharves from nearshore licence areas, such as along the south coast, in the Bristol Channel and in the Irish Sea. Vessels will typically supply a cargo every 12-24 hours. (5 vessels/8,467t total hopper capacity – 7.9% of total reported fleet capacity)

ii. Vessels with cargo capacities greater than 3,000 tonnes which typically operate in more offshore licence areas supplying more distant wharves, such as those along the River Thames and on the Continent. Vessels will typically supply a cargo every 24-48 hours. (14 vessels/82,041t total hopper capacity – 92.1% of total reported fleet capacity)

The two classes of vessel generally supply very different markets, therefore by separating their operational data it is possible to better understand and present the differences between the two. Over time, this should also allow the identification of trends in each class that would perhaps otherwise be masked in the summed dataset.

Sustainable production

OBJECTIVE 1

Maintain and improve profitability in order to provide for continuing investment and employment

Key performance indicator: Annual marine production

	2015	% change	2014	2013	2012	2011
Production <3,000t capacity	2,453,314t (18.6% tot)	-1.9%	2,502,428t (19.3% tot)	2,658,242t (20% tot)	2,396,362t (15.8% tot)	2,583,052t (18.4% tot)
Production >3,000t capacity	10,742,179t (81.4% tot)	+2.8%	10,453,183t (80.7% tot)	10,636,959t (80% tot)	11,554,469t (84.2% tot)	13,812,539t (81.6% tot)

OBJECTIVE 3

Make the most efficient use of available licensed resources

Key performance indicator: Area dredged and hours dredged

	2015	% change	2014	2013	2012	2011
Hours dredged <3,000t	3,494 hrs (27.1% tot)	-6.2%	3,723 hrs (28.8% tot)	4,080 hrs (27.59% tot)	4,031 hrs (23.9% tot)	4,194 hrs (22.3% tot)
Hours dredged >3,000t	9,422 hrs (72.9% tot)	+2.6%	9,201 hrs (71.2% tot)	10,770 hrs (72.5% tot)	12,819 hrs (76.1% tot)	4,647 hrs (77.1% tot)

OBJECTIVE 4

Minimise the screening activity in the production process

Key performance indicator: Tonnes landed per hour dredged

	2015	% change	2014	2013	2012	2011
Tonnes landed /hour dredged (<3kt)	702.2tph	+4.5%	672.2tph	651.5tph	594.5tph	615.9tph
Tonnes landed /hour dredged (>3kt)	1140.1tph	+0.4%	1136.1tph	987.6ph	901.4tph	943.0tph

Climate change and energy

OBJECTIVE 1

Reduce the impact of atmospheric emissions released through the production and transport processes

Key performance indicator: Fuel oil consumed per tonne landed

	2015	% change	2014	2013	2012	2011
Fuel oil <3,000t capacity	3,508t (11.7% total)	-2.9%	3,616t (11.9% total)	3,814t (11.7% total)	2,831t (8.5% total)	3,681t (9.1% total)
Fuel oil >3,000t capacity	26,390t (88.3% total)	-1.1%	26,681t (88.1% total)	28,744t (88.3% total)	30,546t (91.5% total)	36,881t (90.9% total)
Kg fuel/tonne <3,000t capacity	1.43 kg/t	-1.4%	1.44 kg/t	1.43 kg/t	1.18 kg/t	1.43kg/t
Kg fuel/tonne >3,000t capacity	2.46 kg/t	-3.5%	2.55 kg/t	2.70 kg/t	2.64 kg/t	2.67kg/t

Key performance indicator: CO_2 emissions

	2015	% change	2014	2013	2012	2011
<3kt carbon emissions	11,193t (11.7% total)	-2.9%	11,535t (11.9% total)	12,167t (11.7% total)	9,031t (8.5% total)	11,742t (9.1% total)
>3kt carbon emissions	84,184t (88.3% total)	-1.1%	85,112t (88.1% total)	91,693t (88.3% total)	97,442t (91.5% total)	117,650t (90.9% total)
<3kt kg CO_2/t landed	4.56kg CO_2/t	-1.1%	4.61kg CO_2/t	4.58kg CO_2/t	3.77kg CO_2/t	4.55kg CO_2/t
>3kt kg CO_2/t landed	7.84kg CO_2/t	-3.7%	8.14kg CO_2/t	8.62kg CO_2/t	8.43kg CO_2/t	8.52kg CO_2/t

(The calculation from MGO tonnes to CO_2 tonnes has been made using a conversion factor taken from DEFRA (2008) Guidelines to DEFRA's Greenhouse Gas Conversion Factors for Company Reporting. Department for Environment, Food and Rural Affairs, London. Accessed from: http://www.defra.gov.uk/environment/business/reporting/conversion-factors.htm)

OBJECTIVE 2

Maximise the efficient use of the dredging fleet

Key performance indicator: Tonnes landed per kilometre travelled

	2015	% change	2014	2013	2012	2011
Km steamed <3,000t capacity	202,756km (21.3% total)	-1.2%	205,311km (21.7% total)	224,771km (21.5% total)	154,678km (13.9% total)	184,341km (14.5% total)
Km steamed >3,000t capacity	749,578km (78.7% total)	+1.7%	737,049km (78.3% total)	819,296km (78.5% total)	955,094km (86.1% total)	1,088,224km (85.5% total)
<3,000t landed/ km steamed	12.10t/km steamed	-0.8%	12.19t/km steamed	11.83t/km steamed	15.49t/km steamed	14.01t/km steamed
>3,000t landed/ km steamed	14.33t/km steamed	+1.1%	14.18t/km steamed	12.98t/km steamed	12.10t/km steamed	12.69t/km steamed

Appendix

Marine aggregate summary statistics 1998 - 2015

	Area of seabed licensed for dredging (km²)*	Area available to be worked (km²)*	Area dredged (km²)*	Quantity dredged (million tonnes)**
1998	1,458		222.6	
1999	1,455		220.3	20.47
2000	1,464		155.4	23.68
2001	1,408	972	150.6	20.68
2002	1,359	896	149.8	22.76
2003	1,264	890	143.8	21.93
2004	1,257	780	134.5	22.23
2005	1,179	596	137.6	21.45
2006	1,316	576	140.6	21.09
2007	1,344	556	134.7	24.18
2008	1,278	570	137.9	21.24
2009	1,286	536	123.6	20.10
2010	1,291	552	105.4	15.95
2011	1,274	567	114.0	19.12
2012	711	391	96.7	16.79
2013	739	332	98.7	16.03
2014	726	332	85.7	17.25
2015	932	337	82.7	19.48

* Taken from 'Marine Aggregate Dredging – The Area Involved' annual reports published by BMAPA and The Crown Estate between 1999 and 2016.

** Extracted from annual 'Marine Aggregates, Crown Estate Licences, Summary Statistics reports published by The Crown Estate between 1998 and 2016. Quantity dredged comprises GB landings of construction aggregates, export landings of construction aggregates and beach replenishment / contract fill.

BMAPA members & dredging fleet

BMAPA member	Vessel	Built	Capacity (cubic metres)	Capacity (tonnes)	Age in 2015 (years)
Britannia Aggregates	Britannia Beaver	1991	2,775	4,800	23
CEMEX UK Marine	Reimerswaal	2012	6,000	10,000	3
	Sand Falcon	1998	4,832	8,359	16
	Sand Fulmar	1998	4,000	6,290	16
	Sand Heron	1990	2,700	4,671	24
	Welsh Piper	1987	790	1,367	27
DEME Building Materials	Charlemagne	2002	5,000	8,650	12
	Victor Horta	2011	5,000	8,650	5
Hanson Aggregates Marine	Arco Adur	1988	2,890	5,000	26
	Arco Arun	1987	2,890	5,000	27
	Arco Avon	1986	2,890	5,000	28
	Arco Axe	1989	2,890	5,000	25
	Arco Beck	1989	2,600	4,500	25
	Arco Dart	1990	700	1,250	24
	Arco Dee	1990	700	1,250	24
	Arco Dijk	1992	5,100	8,800	22
Tarmac Marine	City of Cardiff	1997	1,418	2,300	17
	City of Chichester	1997	1,418	2,300	17
	City of London	1990	2,652	4,750	24
	City of Westminster	1990	3,000	5,200	24
			Total fleet capacity	**Total fleet capacity**	**Average vessel age**
			63,065m³	**103,137t**	**20.45 years**

Other BMAPA members who do not operate vessels: Aggregate Industries, Brett Group, Northwood (Fareham), Norwest Sand & Ballast Co., Sea Aggregates, Volker Dredging.

Figures and members correct as of 31.12.15.

make the link
to mineral products

Marine aggregates are playing a key role in the Crossrail project which will see first passenger trains through the centre of London within two years. Photo: Crossrail

The British Marine Aggregate Producers Association is part of the Mineral Products Association, the trade association for the aggregates, asphalt, cement, concrete, dimension stone, lime, mortar and silica sand industries.

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