



Strength from the depths

Eighth sustainable development report for the
British marine aggregate industry

November 2014

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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

Market conditions during 2013 remain challenging, although there were encouraging signs of recovery in London and the South East

A total of 16.03mt was dredged in 2013 – a 4.5% reduction on 2012

The area of seabed licensed for dredging increased by 3.9% to 739km², as new marine licences were issued for historic production areas

New best practice introduced to support resource management and compliance with licence conditions

Industry continues to provide high resolution data in support of the development of Marine Conservation Zones

Industry funds the development of a new Regional Seabed Monitoring Programme in partnership with Defra, MMO and The Crown Estate

Key facts and figures

Key areas

	2013	% change	2012	2011	2010	2009
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	739km ²	+3.9%	711km ²	1,274km ²	1,291km ²	1,286km ²
Area available to be worked	332km ²	-15.1%	391km ²	567km ²	552km ²	536km ²
Area dredged	98.67km ²	+2%	96.72km ²	114km ²	105.37km ²	123.63km ²

Market summary

	2013	% change	2012	2011	2010	2009
Total GB aggregates market	198mt	+6%	189mt	207mt	206mt	203mt
Land-based aggregates	132.5mt	+7.5%	125mt	136.5mt	148m	147mt
Recycled and secondary aggregates	55mt	+2%	54mt	60mt	58mt	57mt
Total marine aggregates production	16.03mt	-4.5%	16.79mt	19.12mt	15.95mt	20.10mt
Marine landings to GB aggregates market	10.63mt	+5.2%	10.1mt	11.5mt	9.94mt	10.03mt
Marine landings to European aggregates market	4.09mt	-9.1%	4.5mt	6.1mt	5.19mt	5.66mt
Beach replenishment/contract fill	1.31mt	-39.1%	2.15mt	1.49mt	0.86mt	4.50mt

Market contribution to GB sand and gravel market

	2013	% change	2012	2011	2010	2009
Total GB market	54mt	+6%	51mt	55mt	55mt	55mt
Total England & Wales market	48mt	+6%	44.5mt	48.6mt	47mt	49mt
Marine landings to England & Wales	10.63mt	+5.2%	10.1mt	11.52mt	9.94mt	10.03mt
Marine landings to South East England	8.70mt	+7.1%	8.12mt	9.56mt	7.81mt	7.97mt
Marine landings to London & Thames Corridor	6.06mt	+8.2%	5.6mt	6.9mt	5.38mt	5.85mt
Marine landings to Wales	0.68mt	-4.2%	0.71mt	0.61mt	0.61mt	0.65mt

mt = million tonnes





Chairman's introduction

Welcome to the marine aggregate sector's sustainable development report for 2013 – our eighth 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.

Although overall marine aggregate production during 2013 remained depressed, with a 4.7% reduction compared to 2012, there were signs of recovery in the home markets of England and Wales where marine landings increased by just over 5%. This was consistent with the performance of the wider GB aggregates market, and in the marine sectors key markets of London and South East England the performance was even more promising. Consequently, there is growing optimism that the economic tide in Britain may finally be turning. That being said the Continental market, which has traditionally accounted for around one third of the marine aggregate sectors total production, remains challenging.



John Miller, *Chairman*, British Marine Aggregate Producers Association



In the wake of one of the stormiest winters in recent memory, the damage and disruption to local communities, the environment, critical infrastructure and the economy only serve to highlight some of the practical challenges we all face from climate change. Looking forwards, the marine aggregate sector is uniquely placed to support the adaptation that is likely to be required. This is not only in terms of providing vital construction aggregate materials to support low-carbon energy infrastructure, but also by supplying large volumes of marine sand and gravel in support of beach nourishment projects to protect vulnerable locations.

... supplying large volumes of marine sand and gravel in support of beach nourishment projects to protect vulnerable locations.



The ongoing challenges posed by rapidly changing economic conditions on the one hand, and wider environmental change on the other, only serve to highlight how important it is for the marine aggregate sector to have firm foundations that allow it to plan over the short, medium and long-term. The industry has therefore welcomed the adoption of the first English marine plan for the East Inshore/Offshore region in April 2014 which has retained key policies to help safeguard and protect marine aggregate interests. We therefore remain optimistic that these principles can be applied to the marine plans being developed for other regions to provide the long-term certainty the sector requires.

John Miller
Chairman, BMAPA

Looking forwards, the marine aggregate sector is uniquely placed to support the adaptation that is likely to be required.



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

	2013	% change	2012	2011	2010	2009
Total (Crown Estate figures)	16.03mt	-4.5%	16.79mt	19.12mt	15.95mt	20.10mt
BMAPA reported production ¹	13.30mt	-4.7%	13.95mt	16.40mt	13.86mt	14.94mt

Key performance indicator: National/regional contribution to supply

	2013	% change	2012	2011	2010	2009
Landings to England & Wales	10.63mt	+5.2%	10.09mt	11.52mt	9.94mt	10.03mt
Landings to South East England	8.70mt	+7.1%	8.12mt	9.56mt	7.81mt	7.97mt
Landings to Wales	0.68mt	-4.2%	0.71mt	0.61mt	0.61mt	0.65mt
Beach replenishment/fill	1.31mt	-39.1%	2.15mt	1.49mt	0.86mt	4.49mt
Exports	4.09mt	-9.1%	4.55mt	6.10mt	5.19mt	5.66mt

Total marine aggregate production during 2013 reduced by 4.5% compared to 2012. Although landings to South East England – and the Thames river in particular – increased in 2013, other regional markets supplied by the sector showed reductions compared to the previous year.

Production reported by BMAPA members also reduced in 2013, aligning closely with the changes in total marine aggregate production.

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

	2013	2012	2011	2010	2009
Average age of dredging fleet (years)	19.59	21.13	20.13	21.39	20.39

22 vessels were operated by BMAPA members at the end of 2013, with an average age of 19.59 years.

The ongoing challenging market conditions saw three vessels laid up at the end of 2013, representing a combined loss of capacity of 14,171 tonnes.

A further two vessels were sold during the year (combined capacity of 5,552 tonnes), with a new vessel (10,000 tonne capacity) brought in under a long term charter arrangement.

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

2013 cap-ex investment in vessels (not including maintenance):

2013	% change	2012	2011	2010	2009
£3.29m	+350%	£0.94m	£2.60m	£4.16m	£4.20m

Rolling investment over previous five years

2013	% change	2012	2011	2010	2009
£15.19m	-30.3%	£21.78m	£24.21m	£24.83m	£25.24m

* Based on reported data from 21 out of 23 vessels operated by BMAPA members in UK waters.

OBJECTIVE 3 **Key performance indicator: Area dredged and hours dredged**

Make the most efficient use of available licensed resources

	2013	% change	2012	2011	2010	2009
Area of seabed licensed for dredging	739km ²	+3.9%	711km ²	1,274km ²	1,291km ²	1,286km ²
Area available to be worked	332km ²	-15.1%	391km ²	567km ²	552km ²	536km ²
Area dredged	98.67km ²	+2%	96.72km ²	114km ²	105.37km ²	123.63km ²
Hours dredged*	14,850 hrs	-11.87%	16,850 hrs	18,841 hrs	16,646 hrs	17,778 hrs

With a number of marine licences for existing marine aggregate production licence areas being renewed during 2013, the area of seabed licensed increased slightly as the restrictions which limited the extent of many licence areas to the historic dredged footprint were lifted. In parallel, the area of seabed available to be worked at any one time (the active dredge area) reduced, as operators introduced more detailed zoning arrangements for those areas which had been newly licensed.

OBJECTIVE 4 **Key performance indicator: Tonnes landed per hour dredged***

Minimise the screening activity in the production process

	2013	% change	2012	2011	2010	2009
Marine aggregate production	13.30mt	-4.7%	13.95mt	16.4mt	13.86mt	14.93mt
Hours dredged	14,850 hrs	-11.87%	16,850 hrs	18,841 hrs	16,646 hrs	17,778 hrs
Tonnes landed/hour dredged	895.3tph	+8.1%	827.9tph	870.2tph	832.4tph	840.14tph

The relative decrease in hours dredged (-11.87%) compared to the equivalent decrease in reported production (-4.7%) suggests that the overall level of screening activity has reduced slightly. As a consequence, the KPI metric for tonnes landed per hour dredged increased by 8.1% compared to the equivalent figure for 2012.

OBJECTIVE 5

Develop and promote best practice for resource management

The marine aggregate sector continues to employ the best practice guidance and methodologies that have been previously established 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 have been applied to the new marine licences that have been recently awarded, through the 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.

A newly developed best practice methodology for determining average bathymetric and resource depth change across extraction areas enables operators to consistently and robustly demonstrate compliance with several conditions routinely attached to marine licences issued for marine mineral extraction.

Collectively, these steps ensure that the area of seabed that is licensed for marine aggregate extraction is minimised, 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 21 out of 23 vessels operated by BMAPA members in UK waters.



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*

	2013	% change	2012	2011	2010	2009
Total Marine Gas Oil	32,558t	-2.5%	33,377t	40,562t	35,630t	37,873t
Marine aggregate production	13.30mt	-4.7%	13.95mt	16.4mt	13.86mt	14.94mt
Marine Gas Oil per tonne landed	2.45kg/t	+2.5%	2.39kg/t	2.47kg/t	2.57kg/t	2.54kg/t

Key performance indicator: CO₂ emissions*

	2013	% change	2012	2011	2010	2009
Total CO ₂ emissions (tonnes)	103,860t	-2.5%	106,473t	129,393t	113,660t	120,815t
Marine aggregate production	13.30mt	-4.7%	13.95mt	16.4mt	13.86mt	14.94mt
CO ₂ emissions per tonne landed	7.81 CO ₂ /t	+2.5%	7.63 CO ₂ /t	7.89kg CO ₂ /t	8.20kg CO ₂ /t	8.09kg CO ₂ /t

(The calculation from Marine Gas Oil (MGO) tonnes to CO₂ 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 decrease in total fuel oil consumption and CO₂ emissions during 2013 (2.5%) was less than the reduced production by BMAPA operators during the year (-4.7%). As a consequence, the metric for fuel and emissions per tonne landed has increased slightly (+2.5%).

OBJECTIVE 2

Maximise the efficient use of the dredging fleet

Key performance indicator: tonnes landed per kilometre travelled*

	2013	% change	2012	2011	2010	2009
Total kilometres steamed	1.04m km	-5.9%	1.11m km	1.27m km	1.20m km	1.08m km
Marine aggregate production	13.30mt	-4.7%	13.95mt	16.4mt	13.86mt	14.94mt
Tonnes landed per km travelled	12.73t/km	+1.3%	12.57t/km	12.88t/km	11.59t/km	13.82t/km

The reduction in total km steamed during 2013 (-5.9%) broadly corresponds to the reduction in members reported production (-4.7%), while the ratio between tonnes landed and distance steamed remained comparable to that in 2012. This would suggest that in overall terms, the dredging fleet was operating at a similar level of efficiency to the previous year.

* Based on reported data from 21 out of 23 vessels operated by BMAPA members in UK waters.

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

	2013	% change	2012	2011	2010	2009
Area of seabed licensed for dredging	739km ²	+3.9%	711km ²	1,274km ²	1,291km ²	1,286km ²
Active dredge area	332km ²	-15.1%	391km ²	567km ²	551km ²	536km ²
Area of seabed dredged	98.67km ²	+2%	96.72km ²	114km ²	105.37km ²	123.63km ²
Area of seabed where 90% of dredging occurs	39.20km ²	+7.6%	36.42km ²	43.26km ²	37.63km ²	43.45km ²
Area of seabed dredged for more than 1.25 hours	6.75km ²	-19.7%	8.41km ²	8.52km ²	6.83km ²	6.83km ²

With a number of marine licences for existing marine aggregate production licence areas being renewed during 2013, the area of seabed licensed increased slightly as the restrictions which limited the extent of many licence areas to the historic dredged footprint were lifted. In parallel, the area of seabed available to be worked at any one time (the active dredge area) reduced, as operators introduced more detailed zoning arrangements for those areas which had been newly licensed.





OBJECTIVE 2 **Regional Seabed Monitoring Programme**

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

A project being jointly funded by the marine aggregate industry, Defra, the Marine Management Organisation and The Crown Estate is developing a new approach to delivering the seabed monitoring required to fulfil the conditions attached to marine licences.

Regional Seabed Monitoring Plan's (RSMP) are being developed that cover all marine aggregate licence areas in a defined region. This data will allow the direct and indirect effects of marine aggregate extraction activity on seabed sediment type and the benthic communities they support, to be monitored over time. Further context and reference sample stations across the region will enable any local changes that may be associated with areas of marine aggregate activity to be considered against the wider natural environmental variability that may be occurring across the region. While this approach is being applied to the suite of marine licence renewals issued over the last 12 months, the marine aggregate industry has agreed to extend it to all their marine licences present within the regions being sampled.

The RSMP project is being developed by the Centre for Environment, Fisheries and Aquaculture Science (Cefas), and the concept builds on the findings of previous research funded through a range of sources, including the Marine Aggregate Levy Sustainability Fund. The evidence and understanding around the impacts associated with marine aggregate extraction from this wider research effort has allowed the compliance requirements to shift towards the conditions necessary for the marine environment to recover once production operations have ended. In turn, this has led to monitoring effort moving away from the traditional analysis of benthic communities, to instead focus more upon changes in seabed sediment type over time.

Five regional sampling arrays, totalling 3,500 stations, have been developed for the principle areas of marine aggregate interest in the Humber, Anglian, Outer Thames, East English Channel and Isle of Wight regions. The process of developing each regional array has included the collation of a huge quantity of historic seabed sampling data, including over 5,000 sample stations from previous marine aggregate surveys.

The baseline surveys will be taking place during the Summer 2014, and the RSMP approach is expected to allow compliance monitoring for regulator, advisors and operators to be more robust, more consistent and more straightforward throughout the term of marine licences (up to 15 years) issued for aggregate extraction.

Furthermore, the regional scale of the data being acquired offers the potential for significant added value, by contributing to other marine monitoring requirements associated with the network of marine protected areas, marine planning and the requirements of the Marine Strategy Framework Directive.

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 Kingmere Rocks site located off Littlehampton, West Sussex, was one of the first MCZs to be designated. The newly designated site lies adjacent to long-standing marine aggregate production licence areas and also contains two long-standing marine aggregate application areas. The high resolution survey data held by the operators helped to accurately define the site features, which include reef features and the spawning habitat of Black Bream (*Spondyliosom cantharus*).

Crucially, MCZ designations allow other marine activities to take place within them, so long as they do not adversely impact on the features for which the site has been designated. Consequently, ways to mitigate, manage and monitor any potential effects arising from aggregate extraction are currently being considered through the Environmental Impact Assessment process for this site, and this includes the operators voluntarily proposing a three month seasonal ban on dredging operations during the Black Bream spawning season.

Consideration of the second tranche of MCZ designations are also now underway, with three prospective sites East of the Isle of Wight lying adjacent to existing and long established marine aggregate interests. Once more, operators have contributed high resolution survey data to assist with the definition of site features.

Natural resources and environmental protection - continued

BMAPA and its member companies remain committed to working with Defra and the statutory nature conservation agencies to help support the successful outcome of this process – both in terms of the identification of potential new sites, but also the development of appropriate management measures 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.

OBJECTIVE 3
Maintain and develop industry contribution towards the understanding of Britain's marine historic environment

The archaeological reporting protocol which was developed by BMAPA and English Heritage 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, and 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 330 separate reports have been filed by marine aggregate industry staff (52 in 2012/13), covering over 1000 individual items (c.120 in 2012/13). Finds reported range from animal remains from the Palaeolithic period, through maritime artefacts, cannonballs and aircraft remains. 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 continues to be funded through a partnership approach between BMAPA, The Crown Estate and English Heritage. 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>

The operators of licences in the Anglian region continue to cooperate in delivering a Written Scheme of Investigation (WSI) intended to assess the potential for resource units within the catchment of the Palaeo-Yare river system to contain artefacts from our Palaeolithic ancestors. This follows the discovery of hand-axes and faunal remains believed to be recovered from an in-situ context, from sand and gravel deposits dredged from a licence in the Anglian block which were reported through the protocol. As a consequence of the WSI, dredged cargoes are surveyed by archaeologists at the wharves where they are delivered in an effort to identify artefacts of potential importance. The WSI, which was developed as part of the short term marine licensing process, allows this potential to be considered across the region as a whole, by pooling the results from individual licence areas. This approach is now being extended into the full-term marine licences for this region.

OBJECTIVE 4 **Key performance indicator: number of recorded pollution incidents***

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

	2013	2012	2011	2010	2009
	0	1 (minor hydraulic leak)	2 (both minor hydraulic leaks)	3	7

*Based on reported data from 21 out of 23 vessels operated by BMAPA members in UK waters.

Creating sustainable communities

Core values

Health & safety: our highest priority is the health & 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

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

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

	2013	2012	2011	2010	2009
Number of reportable accidents (Lost Time Injuries)	3	8	2	3	6
Days lost through work-related injury	112 (sea staff) 0 (office staff)	59 (sea staff) 0 (office staff)	26 0	219	391

Health and safety remains the marine aggregate sectors top priority. Our ultimate aim will always be "zero harm" to our workforce. In seeking to achieve this, a number of initiatives continue to take place including the monthly collation and reporting of Lost Time Injury and wider accident incidents and the sharing of experience via BMAPA Safety Alerts – 9 of which were issued in 2013, with a further 7 issued in the first half of 2014.

OBJECTIVE 2

Key performance indicator: Employment direct/indirect*

Improving employee development through vocational training

	2013	% change	2012	2011	2010	2009
Office staff	59.5	0%	59.5	59.4	57.8	57
Sea staff	335	-11.6%	379	405	375	427

Key performance indicator: Training days per employee*

	2013	% change	2012	2011	2010	2009
Training days per employee	4.12	+154.9%	2.66	2.34	1.9	8.02

* Based on reported data from 6 BMAPA member companies, operating 21 of the 23 vessels working in UK waters.

Creating sustainable communities - continued

OBJECTIVE 3 Kingfisher Fortnightly Bulletin service

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

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 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.

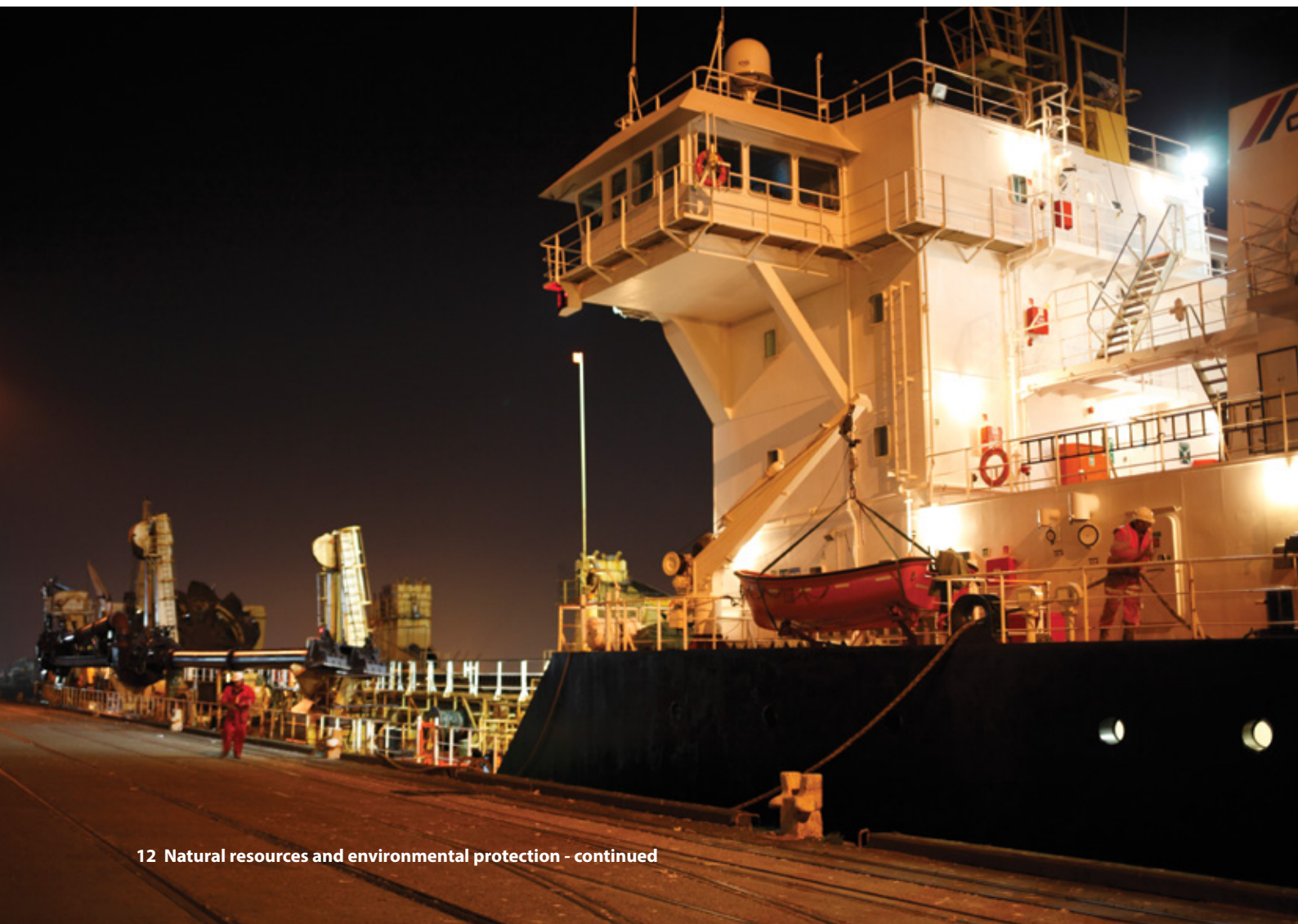
<http://www.seafish.org/fishermen/kingfisher/fortnightly-bulletin/>

Active dredge area charts

BMAPA continues to produce twice-yearly active dredge area charts in partnership with The Crown Estate. 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 Marine Management Organisation offices who widely circulate them 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 areas under their “Area Involved” initiative which commenced in 1999. The annual “Area Involved” report for activity in 2013 represents the 16th produced, and the spatial data generated by this ongoing initiative is becoming increasingly valuable to the marine protected area network and marine planning processes developing in English and Welsh waters, by clearly presenting the extent and intensity of marine aggregate operations and how these have changed over time.

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

BMAPA and The Crown Estate have also produced a 15 year review of the ‘area involved’ initiative. This provides more details on the trends in area licensed and dredged at both national and regional scales, and also presents information on the cumulative dredged footprint over this period. Over the period 1998 to 2012, the area of seabed licensed has reduced by 748km², with 1237km² relinquished and 489km² of new licence area permitted. Similarly the area of seabed dredged has reduced from a peak of 223km² in 1998 to 97km² in 2012, with a cumulative footprint over the 15 year period of 512km².



Economies of scale and the impact of the economic downturn

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 sectors greatest advantages.

The 21 vessels operated by BMAPA members for which data has been reported in 2013 range in size from 1,250 tonnes to 8,800 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 market place. 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 2013 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. (6 vessels/9,867t total hopper capacity – 10.4% of total 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. (15 vessels/84,193t total hopper capacity – 89.6% of total 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 that may occur over time in each class that would perhaps otherwise be masked in the summed dataset.





Sustainable production

OBJECTIVE 1

Key performance indicator: Annual marine production

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

	2013	% change	2012	2011	2010	2009
Production <3,000t capacity	2,658,242t (20% tot)	+10.9%	2,396,362t (15.8% tot)	2,583,052t (18.4% tot)	2,544,619t (16% tot)	2,409,769t
Production >3,000t capacity	10,636,959t (80% tot)	-7.9%	11,554,469t (84.2% tot)	13,812,539t (81.6% tot)	11,311,479t (84% tot)	12,526,171t

OBJECTIVE 3

Key performance indicator: Area dredged and hours dredged

Make the most efficient use of available licensed resources

	2013	% change	2012	2011	2010	2009
Hours dredged <3,000t	4,080 hrs (27.59% tot)	+1.2%	4,031 hrs (23.9% tot)	4,194 hrs (22.3% tot)	3,811 hrs (22.9% tot)	3,734 hrs (21% tot)
Hours dredged >3,000t	10,770 hrs (72.5% tot)	-16%	12,819 hrs (76.1% tot)	4,647 hrs (77.1% tot)	12,835 hrs (79% tot)	14,044 hrs (70.3% tot)

OBJECTIVE 4

Key performance indicator: Tonnes landed per hour dredged

Minimise the screening activity in the production process

	2013	% change	2012	2011	2010	2009
Tonnes landed /hour dredged (<3kt)	651.5tph	+9.6%	594.5tph	615.9tph	667.7tph	645.36tph
Tonnes landed /hour dredged (>3kt)	987.6ph	+9.6%	901.4tph	943.0tph	881.3tph	891.92tph

Climate change and energy

OBJECTIVE 1 Key performance indicator: Fuel oil consumed per tonne landed

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

	2013	% change	2012	2011	2010	2009
Fuel oil <3,000t capacity	3,814t (11.7% total)	+34.7%	2,831t (8.5% total)	3,681t (9.1% total)	3,685t (10.3% total)	3,593t (9.5% total)
Fuel oil >3,000t capacity	28,744t (88.3% total)	-5.9%	30,546t (91.5% total)	36,881t (90.9% total)	31,945t (90.7% total)	34,280t (90.5% total)
Kg fuel/tonne <3,000t capacity	1.43 kg/t	+21.2%	1.18 kg/t	1.43kg/t	1.45kg/t	1.49kg/t
>3kt kg MGO/tonne >3,000t capacity	2.70 kg/t	+2.3%	2.64 kg/t	2.67kg/t	2.82kg/t	2.74kg/t

Key performance indicator: CO₂ emissions

	2013	% change	2012	2011	2010	2009
<3kt carbon emissions	12,167t (11.7% total)	+34.7%	9,031t (8.5% total)	11,742t (9.1% total)	11,755t (10.3% total)	11,462t (13.6% total)
>3kt carbon emissions	91,693t (88.3% total)	-5.9%	97,442t (91.5% total)	117,650t (90.9% total)	101,905t (89.7% total)	109,353t (86.4% total)
<3kt kg CO ₂ /t landed	4.58kg CO ₂ /t	+21.5%	3.77kg CO ₂ /t	4.55kg CO ₂ /t	4.62kg CO ₂ /t	4.76kg CO ₂ /t
>3kt kg CO ₂ /t landed	8.62kg CO ₂ /t	+2.3%	8.43kg CO ₂ /t	8.52kg CO ₂ /t	9.0kg CO ₂ /t	8.73kg CO ₂ /t

(The calculation from Marine Gas Oil (MGO) tonnes to CO₂ 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 **Key performance indicator: Tonnes landed per kilometre travelled**

Maximise the efficient use of the dredging fleet

	2013	% change	2012	2011	2010	2009
Km steamed <3,000t capacity	224,771 km (21.5% total)	+45.3%	154,678 km (13.9% total)	184,341km (14.5% total)	200,780km (16.8% total)	159,074km (14.7% total)
Km steamed >3,000t capacity	819,296 km (78.5% total)	-14.2%	955,094 km (86.1% total)	1,088,224km (85.5% total)	994,912km (83.2% total)	921,905km (85.3% total)
<3kt t landed/km steamed	11.83 t/km steamed	-23.6%	15.49 t/km steamed	14.01t/km steamed	12.67t/km	15.15t/km
>3kt t landed/km steamed	12.98 t/km steamed	+7.3%	12.10 t/km steamed	12.69t/km steamed	11.37t/km	13.59t/km

Changes in demand influence efficiency

While the total marine aggregate production reported by BMAPA members in 2013 reduced slightly by 4.5% compared to the previous year, the statistics for the different classes of dredger show some interesting changes in production trends.

The overall production statistics for 2013 show that the export market, predominantly supplied by larger vessels, reduced by 9.1%. Meanwhile, landings to South East England (including London) increased by 7.1%.

Looking at the relative performance of the two classes of dredger in the dredging fleet, it can be seen that the relative contribution of smaller vessels (<3,000t capacity) increased by 10.9% compared to 2012. Despite this increase, the number of hours dredged by smaller vessels only increased by 1.2% compared to the previous year, which suggests that they were dredging more efficiently. By contrast, the equivalent figures for the larger class of vessels showed reductions in total production and hours dredged of -7.9% and -16% respectively.

However, the changes in fuel oil consumed and emissions for smaller vessels, both in terms of the total figures and per tonne landed, show significant increases. This would suggest that the overall efficiency of the production cycle has not replicated the improvements in dredging. Closer examination of the statistics shows a 45.3% increase in the total distance steamed by smaller vessels.

Given that the dredging process only represents around 10% of the total energy cost of the production cycle (dredging, transiting and discharging), the fact that smaller vessels had to travel 45% further to deliver 11% more tonnage, resulted in their metrics for overall efficiency per tonne landed reducing significantly, despite the improvements in dredging efficiency reported in 2013.

Appendices

GB market summary 1980 - 2013

	GDP Market prices chained volume measures	Construction output (GB) £m 2005 prices	Primary aggregates sales (GB) million tonnes	Crushed rock million tonnes	Sand and gravel (total) million tonnes
1980	797,251	72,528	199	103	96
1981	790,496	65,589	182	92	89
1982	806,903	68,097	194	103	91
1983	840,811	74,156	213	112	101
1984	859,797	76,637	211	111	100
1985	890,278	77,100	217	115	102
1986	918,415	80,021	228	123	106
1987	969,352	89,221	254	142	111
1988	1,026,874	97,741	291	162	130
1989	1,052,730	101,088	300	169	131
1990	1,058,384	100,424	278	162	116
1991	1,045,299	92,859	246	148	98
1992	1,049,971	89,146	233	144	89
1993	1,077,749	87,626	239	150	89
1994	1,121,128	87,206	259	162	98
1995	1,149,497	88,090	241	151	90
1996	1,180,151	90,797	215	133	82
1997	1,210,277	92,805	220	134	86
1998	1,252,767	94,398	218	132	86
1999	1,292,244	95,691	221	133	88
2000	1,340,947	96,668	219	130	89
2001	1,376,677	98,306	222	134	88
2002	1,410,437	103,731	210	127	83
2003	1,471,091	108,767	203	123	80
2004	1,507,191	114,464	214	128	86
2005	1,549,491	111,604	204	122	82
2006	1,596,628	112,400	207	127	80
2007	1,637,432	114,766	209	130	79
2008	1,631,995	111,658	187	115	72
2009	1,561,646	96,639	147	91	56
2010	1,591,494	104,288	148	93	55
2011	1,617,677	106,766	146	91	55
2012	1,628,338	98,907	133	83	50
2013	1,656,498	100,150	143	89	54

Source: MPA 2013 SD report.

Marine sand and gravel figures exclude beach nourishment/contract fill and exports.

Sand & gravel (marine) million tonnes	Recycling (est) million tonnes	Total Aggregates (GB) million tonnes	Asphalt (GB) million tonnes	Ready-mixed concrete (GB) million cu m
12.5	20	219	24	22.4
11.5	18	200	22	19.9
11.9	19	213	26	20.7
12.8	21	234	27.2	21.5
12.6	21	232	25.5	20.8
13.8	22	239	26.9	21.6
15.3	23	251	28.4	21.5
16.2	25	279	29.9	24.3
19.6	29	320	31.8	28.8
20.7	32.0	332	33.7	29.6
17.2	33.0	311	36.7	26.78
12.4	34.0	280	36.4	22.53
10.6	35.0	268	36.6	20.78
10.1	37.0	276	36.3	20.77
11.3	39.0	298	37.7	22.93
11.6	42.0	283	34.9	21.68
11.5	45.0	260	29.3	20.89
12.0	48.0	268	27.5	22.33
13.0	51.0	269	27.7	22.93
13.4	54.0	275	26	23.55
14.4	57.0	276	25.7	23
13.6	60.0	282	26.5	23
13	62.0	272	27.8	22.54
12	64.5	268	27.8	22.3
13.0	67.0	281	26.9	22.9
13.0	66.6	271	27.9	22.4
14.0	68.7	276	25.7	22.9
14.0	70.5	280	25.7	23.5
12.6	68.5	256	25	20
10.0	56.5	203	20.5	14.4
9.3	57.6	206	21.5	14.26
11.2	60.0	206.0	22.4	15.3
10.3	54.0	187	18.5	13.9
10.5	55.0	198	19.2	15.5

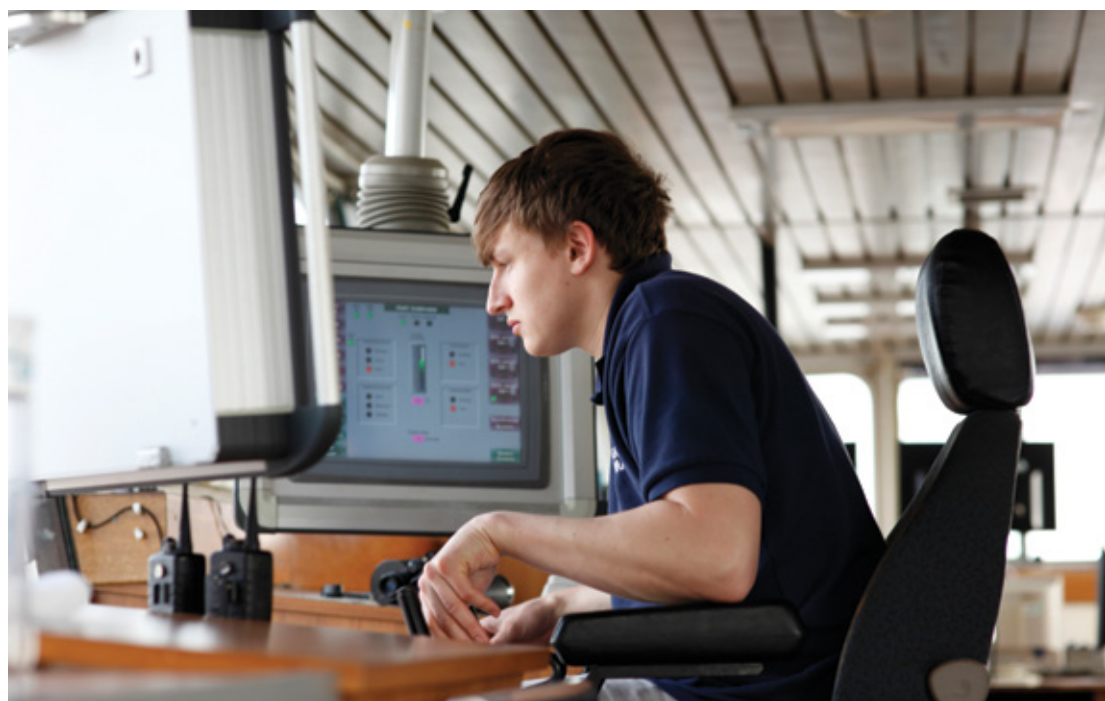
Appendices

Marine aggregate summary statistics 1998 - 2013

	Area of seabed licensed for dredging (km ²)*	Area available to be worked (km ²)*	Area dredged (km ²)*	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

* Taken from 'Marine Aggregate Dredging – The Area Involved' annual reports published by BMAPA and The Crown Estate between 1999 and 2014.

** Extracted from annual 'Marine Aggregates, Crown Estate Licences, Summary Statistics' reports published by The Crown Estate between 1998 and 2014. 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 2013 (years)
Britannia Aggregates	Britannia Beaver	1991	2,775	4,800	21
CEMEX UK Marine	Reimerswaal	2012	6,000	10,000	1
	Sand Falcon	1998	4,832	8,359	14
	Sand Fulmar	1998	4,000	6,290	14
	Sand Harrier	1990	2,700	4,671	22
	Sand Heron	1990	2,700	4,671	22
	Welsh Piper	1987	790	1,367	25
DEME Building Materials	Charlemagne	2002	5,000	8,650	10
	Victor Horta	2011	5,000	8,650	3
Hanson Aggregates Marine	Arco Adur	1988	2,890	5,000	24
	Arco Arun	1987	2,890	5,000	25
	Arco Avon	1986	2,890	5,000	26
	Arco Axe	1989	2,890	5,000	23
	Arco Beck	1989	2,600	4,500	23
	Arco Dart	1990	700	1,250	22
	Arco Dee	1990	700	1,250	22
	Arco Dijk	1992	5,100	8,800	20
	Arco Humber	1972	4,600	8,000	40
Lafarge Tarmac Marine	City of Cardiff	1997	1,418	2,300	15
	City of Chichester	1997	1,418	2,300	15
	City of London	1990	2,652	4,750	22
	City of Westminster	1990	3,000	5,200	22
			Total fleet capacity	Total fleet capacity	Average vessel age
			70,365m³	115,808t	19.59 years

Other BMAPA members who do not operate vessels: Aggregate Industries, Brett Group, Kendall Brothers (Portsmouth), Northwood (Fareham), Sea Aggregates, Volker Dredging.

Lafarge Tarmac Marine was previously known as Tarmac Marine Dredging.

Figures and members correct as of 31.12.13.



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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