



Strength from the depths

Sixth sustainable development report for the
British marine aggregate industry

December 2012

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Sustainable development

This report charts the progress of the sustainability programme that we initiated six years ago. The challenge we have set ourselves is to maintain our sector's important contribution to the UK economy and to a strong, healthy and just society while living within environmental limits that do not compromise the quality of life of future generations. We believe we can do that through good governance and the application of sound science.





Headlines

The industry bucked the economic downturn with a 20% increase in production, partly due to a rise in demand in London and the South East

A 73.3% increase in one-off contract fill and beach nourishment work also contributed

Production capacity of the fleet increased, with fewer vessels laid up or working part-time

The area of seabed licensed for dredging reduced by 1.3% to 1,274km². Hours dredged increased by 13.2% to 18,841 hours

Regional environmental assessments now completed in four regions in support of a licence renewal programme

While total CO₂ emissions increased by 13.8%, emissions per tonne landed decreased by 3.8%

BMAPA produced 14 electronic member alerts as part of an extensive health and safety programme

Key facts and figures

Key areas

	2011	% change	2010	2009	2008	2007
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	1,274km ²	-1.3%	1,291km ²	1,286km ²	1,278km ²	1,343.83km ²
Area available to be worked	567km ²	+2.7%	552km ²	536km ²	570km ²	556km ²
Area dredged	114km ²	+8.2%	105.37km ²	123.63km ²	137.9km ²	134.67km ²

Market summary

	2011	% change	2010	2009	2008	2007
Total GB aggregates market	208mt*	+1%	206mt	203mt	256mt	280mt
Land-based aggregates	136.5mt	-7.8%	148m	147mt	187mt	195mt
Recycled and secondary aggregates	60mt	+3.4%	58mt	57mt	69mt	70mt
Total marine aggregates production	19.12mt	+19.9%	15.95mt	20.10mt	21.24mt	23.20mt
Marine landings to GB aggregates market	11.5mt	+15.9%	9.94mt	10.03mt	13.12mt	14.45mt
Marine landings to European aggregates market	6.1mt	+17.5%	5.19mt	5.66mt	6.21mt	6.65mt
Beach replenishment contract fill	1.49mt	+73.2%	0.86mt	4.50mt	2.21mt	2.10mt

Market contribution to GB sand and gravel market

	2011	% change	2010	2009	2008	2007
Total GB market	58mt	+5.5%	55mt	55mt	72mt	79mt
Total England & Wales market	50mt	+6.4%	47mt	49mt	64mt	73mt
Marine landings to England & Wales	11.52mt	+15.9%	9.94mt	10.03mt	13.12mt	14.45mt
Marine landings to South East England	9.56mt	+22.4%	7.81mt	7.97mt	9.61mt	10.56mt
Marine landings to London & Thames Corridor	6.9mt	+28.3%	5.38mt	5.85mt	7.18mt	7.36mt
Marine landings to Wales	0.61mt	-%	0.61mt	0.65mt	0.9mt	1.12mt

* mt = million tonnes





Photo: David Baginski



Chairman's introduction

Welcome to the marine aggregate sector's sustainable development report for 2011 – our sixth 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.

While the impact of the economic downturn continues to be felt across the wider construction industry in the UK, the marine aggregate sector's performance during 2011 showed a welcome upturn – with overall production increasing by nearly 20%. Much of this increased production was landed at wharves in London and along the Thames river. Here, landings increased by over 28%, reflecting the key role that the marine aggregate sector plays in providing large volumes of bulk construction materials close to the markets where they are required. That being said, production figures for 2012 suggest that this upturn has not been sustained, which is disappointing.

Major national construction projects such as the 2012 Olympic Park, Crossrail and the Thames Tideway Tunnel serve to demonstrate the crucial role that marine aggregates play in our everyday modern life – even in these straitened times. In supporting these demands, the marine aggregate sector needs the ability to access economically viable marine sand and gravel deposits. As on land, the location of such deposits offshore is extremely localised, reflecting the geological processes that created them.

It is, therefore, with a sense of great anticipation that the sector awaits the publication of the first marine plan for the East Inshore/Offshore regions, which is being prepared by the Marine Management Organisation. Licensed areas within these regions provide nearly 50% of the UK's total marine aggregate production. Consequently the long-term vision provided by these plans for sustainable marine use should provide a solid foundation upon which the British marine aggregate sector can build to ensure supplies for the next 25 years and beyond.

Kevin Seaman, *Chairman*, British Marine Aggregate Producers Association



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... the 2012 Olympic Park, Crossrail and the Thames Tideway Tunnel serve to demonstrate the crucial role that marine aggregates play in our everyday modern life – even in these straitened times.



Photo: London 2012

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

	2011	% change	2010	2009	2008	2007
Total (Crown Estate figures)	19.12mt	+19.9%	15.95mt	20.10mt	21.54mt	23.20mt
BMAPA reported production ¹	16.40mt	+18.3%	13.86mt	14.94mt	19.75mt	20.64mt

Key performance indicator: National/regional contribution to supply

	2011	% change	2010	2009	2008	2007
Landings to England & Wales	11.52mt	+15.9%	9.94mt	10.03mt	13.12mt	14.45mt
Landings to South East England	9.56mt	+22.4%	7.81mt	7.97mt	7.18mt	7.35mt
Landings to Wales	0.61mt	-%	0.61mt	0.65mt	0.90mt	1.12mt
Beach replenishment/fill	1.49mt	+73.3%	0.86mt	4.49mt	2.21mt	2.10mt
Exports	6.10mt	+17.5%	5.19mt	5.66mt	6.21mt	6.65mt

Total marine aggregate production during 2011 increased by just under 20% against 2010. This reflected a combination of an increase in construction aggregate demand, particularly in London and the South East of England, coupled with an increase in one-off contract fill/beach nourishment tonnage. These changes were against the background of overall GB construction aggregate demand remaining relatively flat compared to 2010.

The production reported by BMAPA members also increased during 2011, reflecting the increased demand for marine aggregates across all three elements of the business – UK construction aggregates, UK beach replenishment/fill and exports for construction aggregate. These changes in market demand across the sector as a whole meant that the BMAPA contribution to overall UK marine aggregate production remained relatively stable at 86% of the total during 2011 (87% in 2010).

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

	2011	2010	2009	2008	2007
Average age of dredging fleet (years)	21.09	21.39	20.39	20	19.68

23 vessels operated by members at the end of 2011.

An increase in construction aggregate demand during 2011, saw the production capacity of the dredger fleet increase during the year, with a reduced number of vessels either laid up or only working part time by the year end (2) compared to 2010 (4).

One vessel was sold during 2011 (the 775 tonne capacity 'Donald Redford'). However, this lost capacity was offset by the new build 'Victor Horta' (8,650 tonne capacity) entering into service during the year. Furthermore, the inclusion of this new vessel also had the effect of reducing the average age of vessels operated by BMAPA members to 21.09 years (21.39 years in 2010).

Key performance indicator: investment in vessels/technology over previous five years¹

2011 cap-ex investment in vessels (not including maintenance):

2011	% change	2010	2009	2008	2007
£2.60m	-37.5%	£4.16m	£4.20m	£9.92m	£3.67m

Rolling investment over previous five years

2011	% change	2010	2009	2008	2007
£24.21m	-2.5%	£24.83m	£25.24m	£29.44m	£24.67m

¹ Based on reported data from 21 out of 23 vessels operated by BMAPA members in UK waters.



OBJECTIVE 3

Make the most efficient use of available licensed resources

Key performance indicator: Area dredged and hours dredged

	2011	% change	2010	2009	2008	2007
Area of seabed licensed for dredging	1,274km ²	-1.3%	1,291km ²	1,286km ²	1,278km ²	1,344km ²
Area available to be worked	567km ²	+2.7%	552km ²	536km ²	570km ²	556km ²
Area dredged	114km ²	+8.2%	105.37km ²	123.63km ²	137.90km ²	134.67km ²
Hours dredged ¹	18,841 hrs	+13.2%	16,646 hrs	17,778 hrs	22,985 hrs	26,340 hrs

OBJECTIVE 4

Minimise the screening activity in the production process

Key performance indicator: Tonnes landed per hour dredged¹

	2011	% change	2010	2009	2008	2007
Marine aggregate production	16.4mt	+18.3%	13.86mt	14.93mt	19.75mt	20.64mt
Hours dredged	18,841 hrs	+13.2%	16,646 hrs	17,778 hrs	22,985 hrs	26,340 hrs
Tonnes landed/hour dredged	870.2tph	+4.5%	832.4tph	840.14tph	859.12tph	783.57tph

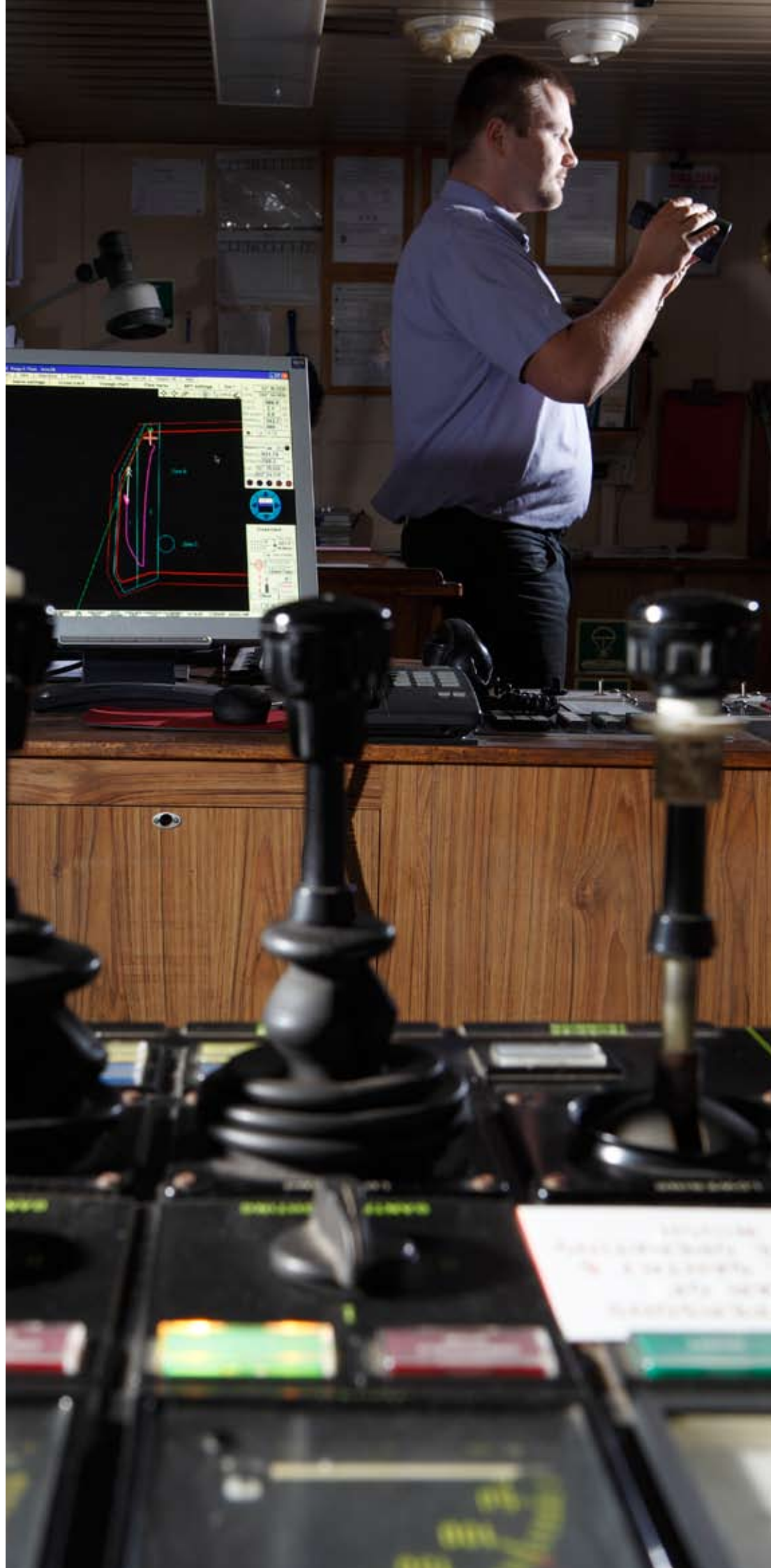
The relative increase in hours dredged (+13.2%) compared to the equivalent increase in reported production (+18.3%) suggests that the overall level of screening activity has reduced slightly. As a consequence, the metric for tonnes landed per hour dredged has increased by 4.5% compared to the equivalent figure for 2010.

OBJECTIVE 5

Develop and promote best practice for resource management

Marine Aggregate Regional Environmental Assessments (MAREA's) have now been completed by the industry in four regions (South coast, Thames, East coast and Humber) in support of a programme to renew a large number of existing production licence areas by the end of 2013/14. The MAREAs, which have been instigated and led by the industry with support from The Crown Estate, provide regional-scale context to marine aggregate operations, reviewing potential cumulative and in-combination impacts and identifying areas of potential sensitivity. The outputs of the MAREA process will inform the site-specific environmental impact process that will be required to inform decisions over licence renewals. The first MAREA (for the Outer Thames Estuary region) was completed in 2011, and the remaining three regional studies were completed during 2012.

¹ 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

Key performance indicator: marine gas oil consumed per tonne landed¹

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

	2011	% change	2010	2009	2008	2007
Total marine gas oil	40,562t	+13.8%	35,630t	37,873t	42,206t	49,262.3t
Marine aggregate production	16.4mt	+18.3%	13.86mt	14.94mt	19.75mt	20.64mt
Marine gas oil per tonne landed	2.47kg/t	-3.9%	2.57kg/t	2.54kg/t	2.14kg/t	2.39kg/t

Key performance indicator: CO₂ emissions¹

	2011	% change	2010	2009	2008	2007
Total CO ₂ emissions (tonnes)	129,393t	+13.8%	113,660t	120,815t	134,637t	157,147t
Marine aggregate production	16.4mt	+18.3%	13.86mt	14.94mt	19.75mt	20.64mt
CO ₂ emissions per tonne landed	7.89kg CO ₂ /t	-3.8%	8.20kg CO ₂ /t	8.09kg CO ₂ /t	6.82kg CO ₂ /t	7.61kg CO ₂ /t

(The calculation from 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 increase in total marine gas oil consumption and CO₂ emissions during 2011 (13.8%) broadly reflects the changes in reported production, which increased by over 18% compared to the equivalent figure for 2010. However, because there was not a linear relationship between the year-on-year changes in fuel/carbon and the reported production, the metrics for fuel and carbon cost per tonne landed actually reduced slightly.

OBJECTIVE 2

Key performance indicator: tonnes landed per kilometre travelled¹

Maximise the efficient use of the dredging fleet

	2011	% change	2010	2009	2008	2007
Total kilometres steamed	1.27m km	+6.4%	1.20m km	1.08m km	1.46m km	1.77m km
Marine aggregate production	16.4mt	+18.3%	13.86mt	14.94mt	19.75mt	20.64mt
Total landed per km travelled	12.88t/km	+11.1%	11.59t/km	13.82t/km	13.54t/km	11.63t/km

While the total distance steamed by the dredging fleet during 2011 increased slightly compared to the previous year (+6.4%), because the equivalent increase in total production was greater (+18.3%) the metric for tonnes landed per kilometre travelled actually reduced. These indicators suggest that the dredging fleet was operating more efficiently during 2011 compared to the equivalent performance in 2010.

¹ 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

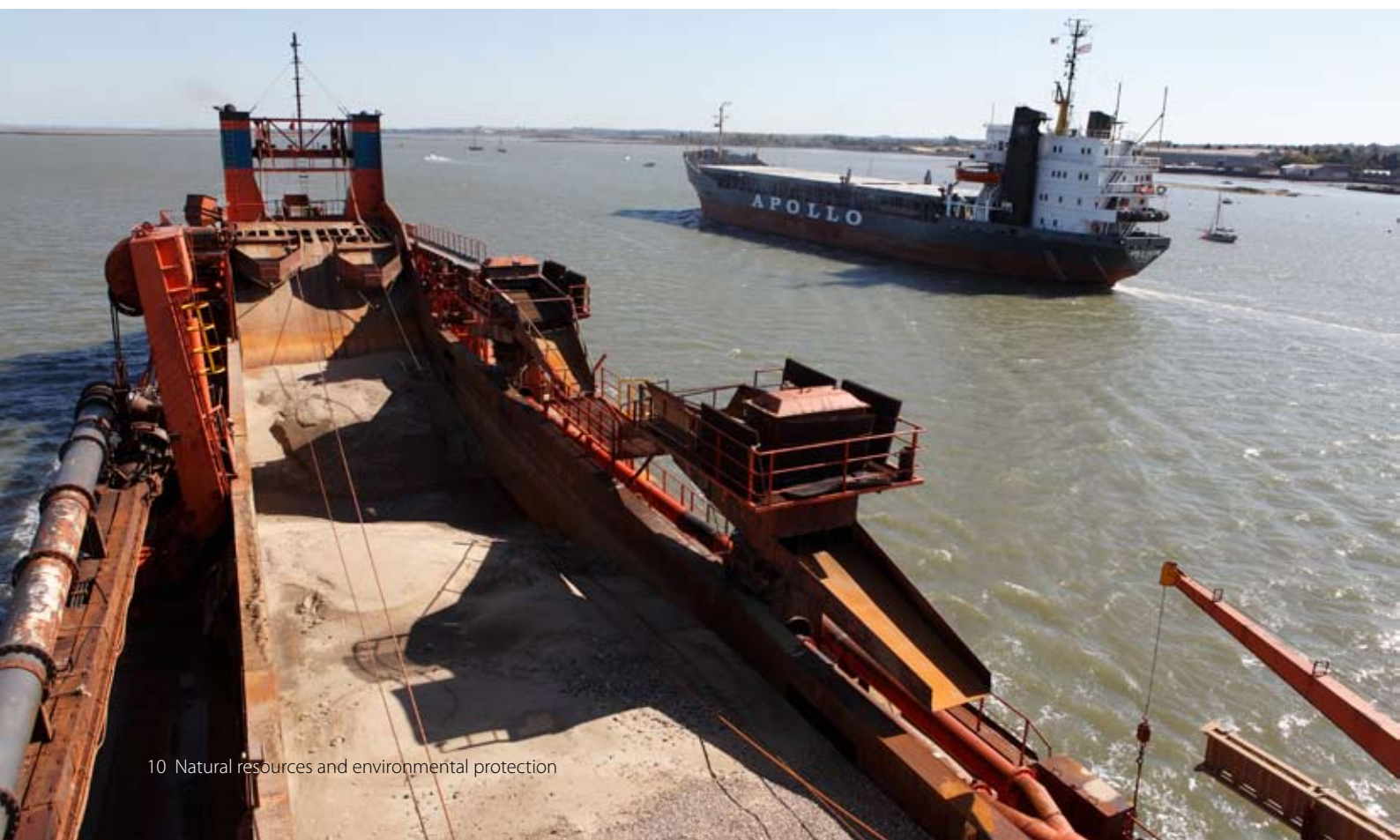
Marine stewardship: we have a responsibility to manage our operations in order to minimise the significance of our operations to stakeholders and the environment

OBJECTIVE 1

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

Key performance indicator: Area of seabed licensed for dredging

	2011	% change	2010	2009	2008	2007
Area of seabed licensed for dredging	1274km ²	-1.3%	1,291km ²	1,286km ²	1,278km ²	1,344km ²
Active dredge area	567km ²	+2.7%	551km ²	536km ²	570km ²	556km ²
Area of seabed dredged	114km ²	+8.2%	105.37km ²	123.63km ²	137.9km ²	134.7km ²
Area of seabed where 90% of dredging occurs	43.26km ²	+15.0%	37.63km ²	43.45km ²	48.22km ²	49.95km ²
Area of seabed dredged for more than 1.25 hours	8.52km ²	+24.7%	6.83km ²	6.83km ²	9.28km ²	10.16km ²





OBJECTIVE 2 Biodiversity Action Plan

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

Recognising the important role that marine aggregate operators can play in developing the understanding of broad-scale sand and gravel habitats and their associated features, both in their own right and as part of the wider Marine Protected Area network, BMAPA published a Biodiversity Action Plan (BAP) strategy and implementation plan during 2011, developed with input from Natural England and the Countryside Council for Wales.

As part of the sector's wider commitment to sustainable development, the approach defines a single strategy and reporting process for the marine aggregate sector which should in turn enable a more coherent, consistent and robust approach to addressing this important issue for operators, regulators and advisors.

The guiding principles that underpin the strategy include:

- Ensuring that BMAPA members work to a common biodiversity framework
- Describing the potential effects of marine aggregate dredging on biodiversity
- Defining priority species and habitats that may be affected
- Identifying operational best practice for mitigation and promoting benefits
- Formalising a reporting and review process

A regional baseline report for the marine aggregate sector BAP is being produced during Q4 2012 focussing on the status in 2011. This will be followed by an annual review process that will begin in 2013.

The BAP strategy and regional baseline report can be downloaded from:
http://www.bmapa.org/issues_biodiversity01.php

Natural resources and environmental protection - continued

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.

While the work associated with the four regional Marine Conservation Zone projects ended in Q3 2011, BMAPA has continued to contribute to the ongoing Impact Assessment process. This has considered the social and economic costs and benefits of each of the 127 individual sites identified.

Marine Aggregate Levy Sustainability Fund

The Marine Aggregate Levy Sustainability Fund programme unfortunately came to an end in March 2011. Since its introduction in April 2002, nearly £25m of research had been commissioned to improve the way in which marine aggregate operations are planned, assessed, managed and monitored. The wide range of outputs have also provided a considerable 'added-value' resource that can be applied and related to more general marine management issues.

A further 'state of knowledge' review has been commissioned by The Crown Estate, with support from BMAPA. This will outline how the research outputs from the Marine ALSF programme have directly influenced and shaped current best practice in the way in which marine aggregate operations are managed. The final version of this report is expected to be published in early 2013.

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 for 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 280 separate reports have been filed by marine aggregate industry staff (36 in 2011/12), covering over 880 individual items (58 in 2011/12). The implementation service includes an annual report which details every find reported during the reporting year, and comments on trends emerging over time.

To support the practical delivery of the protocol, an awareness programme is funded through a partnership approach between BMAPA, The Crown Estate and English Heritage to encourage its use amongst industry staff working on both wharves and on the dredgers themselves. The programme involves site visits 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.

OBJECTIVE 4

Key performance indicator: number of recorded pollution incidents¹

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

2011	2010	2009	2008	2007
2 (all minor hydraulic leaks)	3	7	6	0

¹ 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 injury¹

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

	2011	2010	2009	2008	2007
Number of reportable accidents (Lost Time Injuries)	2	3	6	3	5
Days lost through work-related injury	59 (sea staff) 0 (office staff)	26 0	219	391	251.5

Health and safety remains the marine aggregate sector's top priority. Our ultimate aim will always be "zero harm" to our workforce. In seeking to achieve this, a number of initiatives are currently underway.

Lost Time Injury reporting

During 2010, BMAPA members generated a baseline historic record of Lost Time Injury incidents for the sector dating back to the beginning of 2009 for both office and sea staff. These incidents relate to any occupational accident or injury that results in an employee being incapacitated for three consecutive days or more.

BMAPA continues to collate and update this information every month to generate a rolling 12-month Lost Time Injury Frequency Rate. This allows the frequency of incidents per million hours worked to be calculated, and normalises the accident rate to allow trends over time to be identified.

In turn, this information feeds into the wider "Hard Target" initiative coordinated by BMAPA's parent organisation, the Mineral Products Association (MPA). In 2009, MPA members achieved the five-year "Hard Target" of halving the number of reportable injuries amongst employees. MPA has now set a further target – to again halve the rate of lost time injuries by 2014.

¹ Based on reported data from 21 out of 23 vessels operated by BMAPA members in UK waters.



Creating sustainable communities - continued

Wider accident reporting

As well as recording Lost Time Injuries, during 2012 BMAPA members widened their monthly reporting commitment to also include all Non-Reportable Accidents – any accident or injury where an employee receives first-aid, but returns to work within 48 hours.

This extended commitment includes a requirement to provide more information on the nature of all incidents reported, including the accident type, its cause, the nature of injury sustained and the treatment received.

Information of this nature has now been collated for all incidents across the marine aggregate sector from 1st January 2011 to date, and this extended level of detail will allow the industry to reflect on any wider trends that may be emerging. In turn, this should enable more targeted action to be taken where necessary.

BMAPA Safety Alerts

With the health and safety of all those involved with the marine aggregate industry being of prime importance to all companies within BMAPA, there is considerable value to be gained by individual members sharing their practical experiences with the sector as a whole. This allows the industry to collectively learn from others' experiences, allowing preventative steps to be taken in order to prevent similar incidents from occurring.

To assist in this exchange of often hard-earned knowledge, BMAPA continues to produce electronic Safety Alerts based on information provided by individual members – with 14 Alerts being produced during 2011. These are then able to be circulated to all marine aggregate vessels and wharves for information.

The main points of experience and lessons learned are presented in such a way that others may benefit from this information, while at the same time protecting the anonymity of the provider.

OBJECTIVE 2

Improving employee development through vocational training

Key performance indicator: Direct employment¹

	2011	% change	2010	2009	2008	2007
Office staff	59.4	+2.8%	57.8	57	64.6	80
Sea staff	405	+8.0%	375	427	429	467

Key performance indicator: Training days per employee¹

	2011	% change	2010	2009	2008	2007
Training days per employee	2.34	+23.2%	1.9	8.02	2.21	4.02

¹ Based on reported data from 21 out of 23 vessels operated by BMAPA members in UK waters.

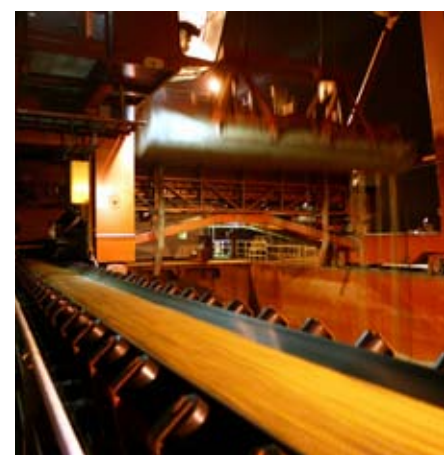




Photo: Alan Hunton



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 has established a new electronic reporting arrangement for marine aggregate specific issues through the Kingfisher Fortnightly Bulletin service, administered by Seafish. The service commenced on 5th July 2012, and mirrors the equivalent arrangements already in place for the oil & gas, renewable energy and offshore cables sectors. The bulletins allow 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 area within which dredging is permitted to take place, which are then enforced by analysis of Electronic Monitoring Data. The charts are widely circulated by local Marine Management Organisation offices to provide fisheries interests with the most up-to-date information on the extent of marine aggregate operations.

Updated Fisheries Liaison Code of Practice

Marine aggregate operations have taken place under a voluntary operational Code of Practice developed by the industry during the 1990s. This provides a structure for communications between dredging operators and fishing interests in advance of dredging operations commencing on an area, and while extraction operations are underway. The intention is to minimise any operational conflicts between the two sectors, particularly the loss or damage of fishing gear.

With the transition to statutory Marine Licences, the existing Code of Practice was updated during 2012 by BMAPA, the Marine Management Organisation and The Crown Estate. It now reflects the developments in liaison arrangements that have taken place in recent years – most notably the establishment of the Kingfisher Fortnightly Bulletin service and the production of Active Dredge Area charts, while at the same time reaffirming the sector's commitment to liaison with the fishing sector.

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 2011 represented the 14th produced, and the spatial data generated by this ongoing initiative is becoming increasingly important as the marine protected area network and marine planning processes evolve in English and Welsh waters.

Archaeology reporting initiative

The annual report for the BMAPA/English Heritage archaeology reporting protocol is widely circulated to regulators, heritage advisors and curators, as well as to all marine aggregate wharves and vessels. During the reporting period October 2011 to September 2012, a total of 36 reports were made by industry staff, encompassing 58 individual finds.

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 sector's greatest advantages.

The 21 vessels operated by BMAPA members for which data has been reported in 2011 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 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 – 9.5% 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/93,743t total hopper capacity – 90.5% 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 in each class that would perhaps otherwise be masked in the summed dataset.





Photo: John Quayle



Sustainable production

OBJECTIVE 1 Key performance indicator: Annual marine production

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

	2011	% change	2010	2009	2008
Production <3,000t capacity	2,583,052t (15.8% total)	+1.5%	2,544,619t (18.4% total)	2,409,769t (16% total)	3,949,263t (20% total)
Production >3,000t capacity	13,812,539t (84.2% total)	+18%	11,311,479t (81.6% total)	12,526,171t (84% total)	15,797,665t (80% total)

OBJECTIVE 3 Key performance indicator: Area dredged and hours dredged

Make the most efficient use of available licensed resources

	2011	% change	2010	2009	2008
Hours dredged <3,000t	4,194 hours (22.3% total)	+10.1%	3,811 hours, (22.9% total)	3,734 hours (21% total)	6,831 hours (29.7% total)
Hours dredged >3,000t	14,647 hours (77.7% total)	+14.1%	12,835 hours (77.1% total)	14,044 hours (79% total)	16,154 hours (70.3% total)

OBJECTIVE 4 Key performance indicator: Tonnes landed per hour dredged

Minimise the screening activity in the production process

	2011	% change	2010	2009	2008
Tonnes landed/hour dredged (<3kt)	615.9tph	-7.8%	667.7tph	645.36tph	578.14tph
Tonnes landed/hour dredged (>3kt)	943.0tph	+7.0%	881.3tph	891.92tph	977.94tph

Climate change and energy

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

	2011	% change	2010	2009	2008
Marine gas oil <3,000t capacity	3,681t (9.1% total)	-0.1%	3,685t (10.3% total)	3,593t (9.5% total)	5,742t (13.6% total)
Marine gas oil >3,000t capacity	36,881t (90.9% total)	+15.5%	31,945t (90.7% total)	34,280t (90.5% total)	36,464t (86.4% total)
<3kt kg MGO/tonne	1.43kg/t	-1.38%	1.45kg/t	1.49kg/t	1.45kg/t
>3kt kg MGO/tonne	2.67kg/t	-5.32%	2.82kg/t	2.74kg/t	2.31kg/t

Key performance indicator: CO₂ emissions

	2011	% change	2010	2009	2008
<3kt carbon emissions	11,742t (9.1% total)	-0.1%	11,755t (10.3% total)	11,462t (13.6% total)	18,317t (13.6% total)
>3kt carbon emissions	117,650t (90.9% total)	+15.4%	101,905t (89.7% total)	109,353t (86.4% total)	116,320t (86.4% total)
<3kg CO ₂ /t landed	4.55kg CO ₂ /t	-1.5%	4.62kg CO ₂ /t	4.76kg CO ₂ /t	4.64kg CO ₂ /t
>3kg CO ₂ /t landed	8.52kg CO ₂ /t	-5.3%	9.0kg CO ₂ /t	8.73kg CO ₂ /t	7.36kg CO ₂ /t

(The calculation from 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
Maximise the efficient use of the dredging fleet

Key performance indicator: Tonnes landed per kilometre travelled

	2011	% change	2010	2009	2008
Km steamed <3,000t capacity	184,341km (14.5% total)	-8.2%	200,780km (16.8% total)	159,074km (14.7% total)	322,990km (22.2% total)
Km steamed >3,000t capacity	1,088,224km (85.5% total)	+9.4%	994,912km (83.2% total)	921,905km (85.3% total)	1,135,517km (77.9% total)
<3kt t landed/km steamed	14.01t/km steamed	+10.5%	12.67t/km	15.15t/km	12.23t/km
>3kt t landed/km steamed	12.69t/km steamed	+11.6%	11.37t/km	13.59t/km	13.91t/km

Changes in demand influence efficiency

The year 2011 showed a significant increase in production reported by BMAPA members, with an overall increase of 18.3% compared to the equivalent production reported in 2010. Analysis of the different classes of vessel in the dredging fleet show that the vast majority of this increase was met by larger vessels whose annual production increased by 18% compared to a more modest 1.5% increase for the smaller vessels.

While the figures for 2010 indicated that both classes of vessel had to travel further for every tonne they produced, the data for 2011 suggests that all the vessels were being used more efficiently to meet the increased production demand that arose during the year. This is demonstrated by the year-on-year reductions in the annual metrics for both fuel and carbon cost per tonne landed during 2011, and an increase in the reported metric for tonnes landed per km steamed.



Photo: John Quayle



Photo: Alan Hunton



Appendices

GB market summary 1980 - 2011

	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	698,528	72,539	199	103	96
1981	689,289	65,558	182	92	89
1982	703,711	68,084	194	103	91
1983	729,215	74,151	213	112	101
1984	748,691	76,596	211	111	100
1985	775,643	77,014	217	115	102
1986	806,765	79,968	228	123	106
1987	843,572	89,111	254	142	111
1988	886,020	97,610	291	162	130
1989	906,236	101,010	300	169	131
1990	913,299	100,423	278	162	116
1991	900,580	92,854	246	148	98
1992	901,901	89,129	233	144	89
1993	921,945	87,588	239	150	89
1994	961,407	87,168	259	162	98
1995	990,751	88,045	241	151	90
1996	1,019,337	90,864	215	133	82
1997	1,054,232	92,763	220	134	86
1998	1,094,704	94,387	218	132	86
1999	1,134,723	95,637	221	133	88
2000	1,185,305	96,613	219	130	89
2001	1,222,650	98,267	222	134	88
2002	1,255,142	103,684	210	127	83
2003	1,299,381	108,664	203	123	80
2004	1,337,782	114,320	214	128	86
2005	1,365,685	111,494	204	122	82
2006	1,401,290	112,339	207	127	80
2007	1,449,861	114,780	209	130	79
2008	1,433,871	111,630	187	115	72
2009	1,371,163	96,583	147	91	56
2010	1,399,850	104,571	148	93	55
2011	1,410,882	107,485	148	90	58

Source: MPA 2011 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	332	33.7	29.6
17.2	33	311	36.7	26.78
12.4	34	280	36.4	22.53
10.6	35	268	36.6	20.78
10.1	37	276	36.3	20.77
11.3	39	298	37.7	22.93
11.6	42	283	34.9	21.68
11.5	45	260	29.3	20.89
12.0	48	268	27.5	22.33
13.0	51	269	27.7	22.93
13.4	54	275	26	23.55
14.4	57	276	25.7	23
13.6	60	282	26.5	23
13	62	272	27.8	22.54
12	64.5	268	27.8	22.3
13.0	67	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
10.0	57.6	206	21.5	14.26
11.5	60.0	208	22.4	15.3

Appendices

Marine aggregate summary statistics 1998 - 2011

	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

* Taken from 'Marine Aggregate Dredging – The Area Involved' annual reports published by BMAPA and The Crown Estate between 1999 and 2012.

** Extracted from annual 'Marine Aggregates, Crown Estate Licences, Summary Statistics reports published by The Crown Estate between 1998 and 2012. 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 2011 (years)
Britannia Aggregates	Britannia Beaver	1991	2,775	4,800	19
CEMEX UK Marine	Sand Falcon	1998	4,832	8,359	12
	Sand Fulmar	1998	4,000	6,290	12
	Sand Harrier	1990	2,700	4,671	20
	Sand Heron	1990	2,700	4,671	20
	Sand Weaver	1974	2,400	4,152	36
	Welsh Piper	1987	790	1,367	23
DEME Building Materials	Charlemagne	2002	5,000	8,650	8
	Victor Horta	2011	5,000	8,650	1
Hanson Aggregates Marine	Arco Adur	1988	2,890	5,000	22
	Arco Arun	1987	2,890	5,000	23
	Arco Avon	1986	2,890	5,000	24
	Arco Axe	1989	2,890	5,000	21
	Arco Beck	1989	2,600	4,500	21
	Arco Dart	1990	700	1,250	20
	Arco Dee	1990	700	1,250	20
	Arco Dijk	1992	5,100	8,800	18
	Arco Humber	1972	4,600	8,000	38
Northwood (Fareham)	Norstone	1971	800	1,400	39
Tarmac Marine Dredging	City of Cardiff	1997	1,418	2,300	13
	City of Chichester	1997	1,418	2,300	13
	City of London	1990	2,652	4,750	20
	City of Westminster	1990	3,000	5,200	20
			Total fleet capacity	Total fleet capacity	Average vessel age
			67,565m³	111,360t	21.09 years

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

Tarmac Marine Dredging was previously known as United Marine Dredging.

Figures as of 31.12.11.



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