



Strength from the depths

Ninth sustainable development report for the
British marine aggregate industry

December 2015

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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

UK market conditions during 2014 were generally more positive, although demand on the Continent remained depressed.

A total of 17.25mt was dredged in 2014 – a 7.6% increase on 2013.

The re-licensing programme for historic marine aggregate production licence areas was successfully completed during 2014.

Despite overall production increasing, the area of seabed actually dredged during 2014 reduced as operators introduced more detailed zoning arrangements for newly licensed areas.

The industry successfully completed baseline surveys for a new Regional Seabed Monitoring Programme across five regions, with over 3,500 seabed sediment samples collected.

New NVQ qualifications introduced to apply the Mineral Products Association's 'Safer by Competence' commitment to marine aggregate operations.

Key facts and figures

Key areas

	2014	% change	2013	2012	2011	2010
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	726km ²	-1.8%	739km ²	711km ²	1,274km ²	1,291km ²
Area available to be worked	332km ²	-	332km ²	391km ²	567km ²	552km ²
Area dredged	85.66km ²	-13.2%	98.67km ²	96.72km ²	114km ²	105.37km ²

Market summary

	2014	% change	2013	2012	2011	2010
Total GB aggregates market	219mt	+10.6%	198mt	189mt	207mt	206mt
Land-based aggregates	147.2mt	+11.1%	132.5mt	125mt	136.5mt	148m
Recycled and secondary aggregates	58.9mt	+7.1%	55mt	54mt	60mt	58mt
Total marine aggregates production	17.25mt	+7.6%	16.03mt	16.79mt	19.12mt	15.95mt
Marine landings to GB aggregates market	11.81mt	+11.1%	10.63mt	10.1mt	11.5mt	9.94mt
Marine landings to European aggregates market	2.99mt	-26.9%	4.09mt	4.5mt	6.1mt	5.19mt
Beach replenishment/contract fill	2.44mt	+86.3%	1.31mt	2.15mt	1.49mt	0.86mt

Market contribution to GB sand and gravel market

	2014	% change	2013	2012	2011	2010
Total GB market	57.8mt	+7%	54mt	51mt	55mt	55mt
Total England & Wales market	52mt	+8.3%	48mt	44.5mt	48.6mt	47mt
Marine landings to England & Wales	11.81mt	+11.1%	10.63mt	10.1mt	11.52mt	9.94mt
Marine landings to South East England	9.90mt	+13.8%	8.70mt	8.12mt	9.56mt	7.81mt
Marine landings to London & Thames Corridor	7.33mt	+21.0%	6.06mt	5.6mt	6.9mt	5.38mt
Marine landings to Wales	0.67mt	-1.5%	0.68mt	0.71mt	0.61mt	0.61mt

mt = million tonnes





Chairman's introduction

Welcome to the marine aggregate sector's sustainable development report for 2014 – our ninth 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 encouraging signs of recovery observed during 2013 were maintained into 2014, with total marine aggregate production increasing by 7.6%. In London and the South East of England, where one third of GB construction activity takes place and where traditionally marine supplies provide one third of all primary construction aggregate demand, landings increased by a healthy 13.8%. Along the Thames river, marine landings increased by 21%, reflecting the scale of growth and development that is currently taking place in our capital city. But even in the regional economies, there appears to be a more positive atmosphere. The exception remains on the near Continent, where a 26.9% reduction in marine landings reflects the ongoing challenges in these markets.



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



Looking forward, the drive to deliver more from less is affecting everyone. This places even greater emphasis on the need to find smarter ways to deliver outcomes. Government is rightly focussing on its own services, with the ongoing Comprehensive Spending Review highlighting the magnitude of savings that still need to be realised with the associated challenges that are likely to result as a consequence. The Red Tape Challenge and Better Regulation agendas are also focussing on a more effective relationship between Government and industry. However, it is important to remember that similar pressures will apply to industry. Therefore, in the majority of cases the end objective will often be the same – delivering an equivalent or better outcome for both parties in a more efficient and effective way.

More often than not, the best way to achieve these win-win outcomes is to work in partnership with others, particularly where there are shared interests in the issues or outcomes. Through BMAPA, the marine aggregate sector has traditionally embraced partnerships as a means to deliver more with less. This year sees the 10th anniversary of the marine archaeological reporting protocol that was developed by BMAPA in partnership with English Heritage, and which is now delivered through partnership arrangements with Historic England and The Crown Estate. The reporting protocol, and the guidance note that preceded it, were the first of their kind in the world and they defined a new approach to practically address marine heritage issues that has now been replicated by a range of other marine development sectors, both in the UK and overseas.

The marine aggregate sector is now participating in another partnership approach, working with Defra, the Marine Management Organisation, Welsh Government and The Crown Estate to develop a more effective means of delivering the compliance monitoring for marine aggregate extraction. This has seen the industry commission broad scale regional baseline sampling surveys on an almost unprecedented scale – with over 3,500 stations being sampled. While the principal driver behind this approach is to deliver a more scientifically robust means of monitoring the effects of marine aggregate extraction, the potential savings in time, effort and cost for everyone involved – industry, regulator and advisor – mean that this represents another exemplar of better regulation being delivered in practice through partnership working.

John Miller
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

	2014	% change	2013	2012	2011	2010
Total (Crown Estate figures)	17.25mt	+7.6%	16.03mt	16.79mt	19.12mt	15.95mt
BMAPA reported production*	12.96mt	-2.6%	13.30mt	13.95mt	16.40mt	13.86mt

Key performance indicator: National/regional contribution to supply

	2014	% change	2013	2012	2011	2010
Landings to England & Wales	11.81mt	+11.1%	10.63mt	10.09mt	11.52mt	9.94mt
Landings to South East England	9.90mt	+13.8%	8.70mt	8.12mt	9.56mt	7.81mt
Landings to Wales	0.67mt	-1.5%	0.68mt	0.71mt	0.61mt	0.61mt
Beach replenishment/fill	2.44mt	+86.3%	1.31mt	2.15mt	1.49mt	0.86mt
Exports	2.99mt	-26.9%	4.09mt	4.55mt	6.10mt	5.19mt

Total marine aggregate production during 2014 increased by 7.6% compared to 2013. This change was reflected in increased landings to the majority of traditional markets supplied by the sector, with deliveries to South East England – and the Thames river in particular – showing significant increases in 2014. There was also a greater demand for material to support coast defence and construction fill projects. However, exports of construction aggregate to the near Continent continued to reduce – reflecting the depressed market conditions that currently exist.

Production reported by BMAPA members actually reduced slightly in 2014. This can partly be explained by the significant reduction in demand for construction aggregate in Europe, and also by the fact that the majority of beach and fill projects were delivered by contract vessels operated by third parties.

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

	2014	2013	2012	2011	2010
Average age of dredging fleet (years)	19.62	19.59	21.13	20.13	21.39

21 vessels were operated by BMAPA members at the end of 2014, with an average age of 19.62 years.

The market conditions saw one vessel continue to be laid up and one vessel sold during 2014, representing a combined capacity of 13,000 tonnes.

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

2014 cap-ex investment in vessels (not including maintenance):

2014	% change	2013	2012	2011	2010
£0.96m	-70.8%	£3.29m	£0.94m	£2.60m	£4.16m

Rolling investment over previous five years

2014	% change	2013	2012	2011	2010
£11.95m	-21.3%	£15.19m	£21.78m	£24.21m	£24.83m

* Based on reported data from 19 out of 21 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

	2014	% change	2013	2012	2011	2010
Area of seabed licensed for dredging	726km ²	-1.8%	739km ²	711km ²	1,274km ²	1,291km ²
Area available to be worked	332km ²	0%	332km ²	391km ²	567km ²	552km ²
Area dredged	85.66km ²	-13.2%	98.67km ²	96.72km ²	114km ²	105.37km ²
Hours dredged*	12,924 hrs	-13.0%	14,850 hrs	16,850 hrs	18,841 hrs	16,646 hrs

The programme to re-license a number of historic marine aggregate production licence areas was completed during 2014, with areas being issued new marine licences from the Marine Management Organisation. The re-licensed areas were generally smaller than the original permission areas, and this has resulted in the total area licensed for marine aggregate extraction reducing by 43% (548km²) since the end of 2011. Despite overall production increasing, the area of seabed actually dredged during 2014 reduced as operators introduced more detailed zoning arrangements for newly licensed areas.

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

Minimise the screening activity in the production process

	2014	% change	2013	2012	2011	2010
Marine aggregate production	12.96mt	-2.6%	13.30mt	13.95mt	16.4mt	13.86mt
Hours dredged	12,924 hrs	-13.0%	14,850 hrs	16,850 hrs	18,841 hrs	16,646 hrs
Tonnes landed/hour dredged	1002.4tph	+12.0%	895.3tph	827.9tph	870.2tph	832.4tph

The relative decrease in hours dredged (-13.0%) compared to the equivalent decrease in reported production (-2.6%) suggests that the overall level of screening activity has continued to reduce. As a consequence, the KPI metric for tonnes landed per hour dredged increased by 12.0% compared to the equivalent figure for 2013. This suggests that the dredging fleet was operating more efficiently compared to the previous year.

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-users 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 recently been 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 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 continues to be 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. In turn, these measures enable the ecological recovery of the dredged area once extraction activities cease.

* Based on reported data from 19 out of 21 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*

	2014	% change	2013	2012	2011	2010
Total Marine Gas Oil	30,297t	-6.9%	32,558t	33,377t	40,562t	35,630t
Marine aggregate production	12.96mt	-2.6%	13.30mt	13.95mt	16.4mt	13.86mt
Marine Gas Oil per tonne landed	2.34kg/t	-4.5%	2.45kg/t	2.39kg/t	2.47kg/t	2.57kg/t

Key performance indicator: CO₂ emissions*

	2014	% change	2013	2012	2011	2010
Total CO ₂ emissions (tonnes)	96,647t	-6.9%	103,860t	106,473t	129,393t	113,660t
Marine aggregate production	12.96mt	-2.6%	13.30mt	13.95mt	16.4mt	13.86mt
CO ₂ emissions per tonne landed	7.46kg CO ₂ /t	-4.5%	7.81kg CO ₂ /t	7.63kg CO ₂ /t	7.89kg CO ₂ /t	8.20kg 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 reduction in total fuel oil consumption and CO₂ emissions reported by BMAPA operators during 2014 (-6.9%) was greater than the decline in reported production (-2.6%). As a consequence, the metrics for fuel and emissions per tonne landed reduced slightly (-4.5%).

OBJECTIVE 2

Maximise the efficient use of the dredging fleet

Key performance indicator: tonnes landed per kilometre travelled*

	2014	% change	2013	2012	2011	2010
Total kilometres steamed	942,359km	-9.7%	1.04m km	1.11m km	1.27m km	1.20m km
Marine aggregate production	12.96mt	-2.6%	13.30mt	13.95mt	16.4mt	13.86mt
Tonnes landed per km travelled	13.75t/km	+8.0%	12.73t/km	12.57t/km	12.88t/km	11.59t/km

The reduction in total km steamed during 2014 (-9.7%) was greater than the corresponding reduction in members' reported production (-2.6%). This resulted in the ratio between tonnes landed and distance steamed increasing relative to that reported in 2013. In turn, this suggests that the dredging fleet was operating more efficiently compared to the previous year.

* Based on reported data from 19 out of 21 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

	2014	% change	2013	2012	2011	2010
Area of seabed licensed for dredging	726km ²	-1.8%	739km ²	711km ²	1,274km ²	1,291km ²
Active dredge area	332km ²	0%	332km ²	391km ²	567km ²	551km ²
Area of seabed dredged	85.66km ²	-13.2%	98.67km ²	96.72km ²	114km ²	105.37km ²
Area of seabed where 90% of dredging occurs	37.26km ²	-4.9%	39.20km ²	36.42km ²	43.26km ²	37.63km ²
Area of seabed dredged for more than 1.25 hours	6.39km ²	-5.3%	6.75km ²	8.41km ²	8.52km ²	6.83km ²

The programme to re-license a number of historic marine aggregate production licence areas was completed during 2014, with areas being issued new marine licences from the Marine Management Organisation. The re-licensed areas were generally smaller than the original permission areas, and this has resulted in the total area licensed for marine aggregate extraction reducing by 43% (548km²) since the end of 2011. Despite overall production increasing, all of the key performance indicators for the area of seabed dredged during 2014 reduced, reflecting the introduction of more detailed zoning arrangements for newly licensed areas.

OBJECTIVE 2

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

Regional Monitoring & Management

A project being jointly funded by the marine aggregate industry, Defra, the Marine Management Organisation, Welsh Government and The Crown Estate is developing an innovative new approach to delivering the seabed monitoring required to fulfil the conditions attached to all marine licences for marine mineral extraction.

Regional Seabed Monitoring Plan's (RSMP) have been developed that cover all marine aggregate licence areas across five defined regions: the Humber; Anglian; Outer Thames; East English Channel; and the South Coast. In addition, background data is being collated to potentially allow this approach to be extended to the Irish Sea and the Bristol Channel. The approach 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 each 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 occurring across the region.

The RSMP project is being led by the Centre for Environment, Fisheries and Aquaculture Science (Cefas). 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 seabed 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 focus instead on changes in seabed sediment type over time.

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 totals over 3,500 individual sample stations, represents one of the largest seabed sampling surveys ever commissioned on the UK continental shelf. The surveys commenced in August 2014 and were successfully completed in November 2015. This data is now being processed and is expected to be reported to regulators and statutory advisors in the first half of 2016.

The RSMP approach will allow compliance monitoring for regulators, 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. Consequently, regulators and advisors are increasingly referring to the approach as an example of best practice to the wider marine development community.

The RSMP process has helped to demonstrate the time, effort and cost savings that could be realised through a more coordinated approach to the delivery of standard compliance requirements in the marine environment. Discussions are now underway between industry, regulators and advisors to see whether the nature and timing of all standard compliance monitoring and reporting requirements associated with marine mineral extraction can be aligned so that they can be delivered more effectively at a regional scale.

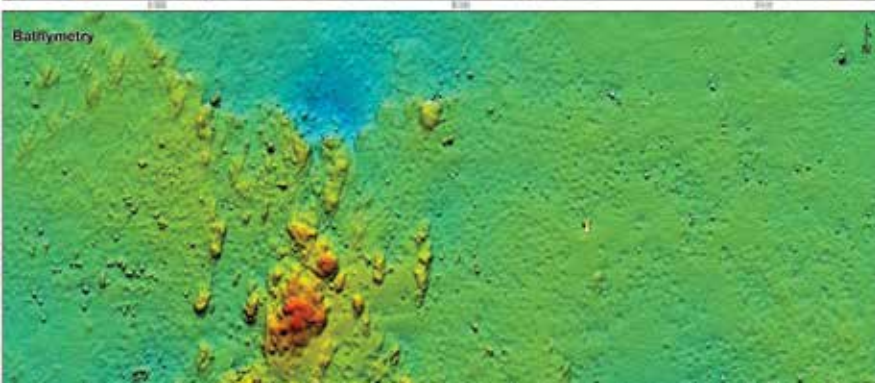
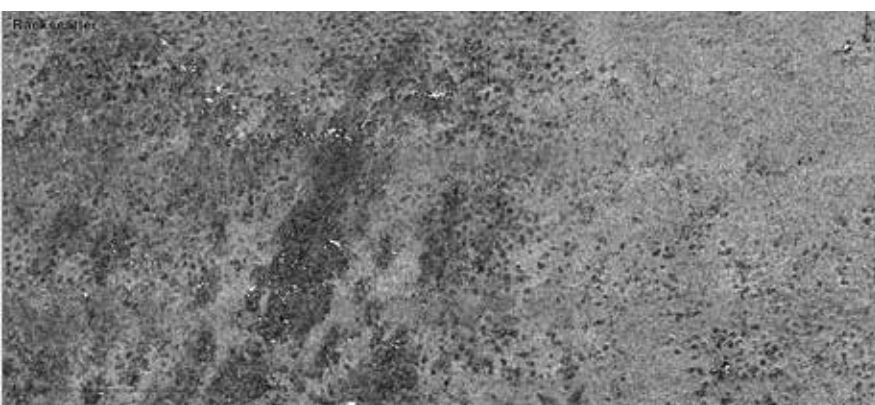
Marine Protected Area Network

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 (*Spondyliosoma 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 have had to be considered through the Environmental Impact Assessment process for the new applications. This has included extensive dialogue with local fisheries and nature conservation interests in order to understand and respond to their concerns. The formal application has now been submitted for consideration by the Marine Management Organisation, with the submission including the operators voluntarily proposing a three-month seasonal ban on dredging operations during the Black Bream spawning season.

Below: Multibeam bathymetry and backscatter data collected by marine aggregate operators off the coast of West Sussex identified the nests of Black Bream (*Spondyliosoma cantharus*) which are now being protected by a Marine Conservation Zone.



BMAPA contributed to the public consultation for the second tranche of MCZ designations that took place in 2015, with two 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 and MCZ boundaries.

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 – 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 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, 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 380 separate reports have been filed by marine aggregate industry staff (53 in 2013/14), covering over 1,100 individual items (c.79 in 2013/14). Finds reported ranged from mammoth teeth through to airframe and machine gun parts from WWII aircraft. The implementation service includes an annual report which details every find reported during the reporting year, and comments 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>

Below: Examples of finds reported by industry staff using the archaeological reporting protocol
Photo: Wessex Archaeology Ltd

The operators of licences in the Anglian region continue to cooperate in delivering a Written Scheme of Investigation (WSI) to assess the potential for seabed sediment units within the catchment of the submerged Palaeo-Yare river system, located off Great Yarmouth, 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. The development of the WSI was informed by a regional research project commissioned by industry and The Crown Estate that mapped the offshore Palaeo-Yare catchment area using a range of data sources, including industry resource surveys. The WSI, which was originally 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 has now been extended into the full-term marine licences for this region, and dredged cargoes continue to be surveyed by archaeologists at the wharves where they are delivered in an effort to identify artefacts of potential importance.



OBJECTIVE 4

Key performance indicator: number of recorded pollution incidents*

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

2014	2013	2012	2011	2010
0	0	1 (minor hydraulic leak)	2 (both minor hydraulic leaks)	3

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

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*

	2014	2013	2012	2011	2010
Number of reportable accidents (Lost Time Injuries)	3	3	8	2	3
Days lost through work-related injury	154 (sea staff) 0 (office staff)	112 (sea staff) 0 (office staff)	59 (sea staff) 0 (office staff)	26 0	219

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 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 – 13 of which were issued in 2014, with a further seven issued in the first half of 2015.

Safer by Competence

In response to a wider initiative introduced by BMAPA's parent organisation, the Mineral Products Association, the marine aggregate sector has developed two new National Occupational Standards focussed on the dredging and discharging activities associated with their operations. These new standards have allowed two new National Vocational Qualifications to be introduced which will allow the relevant crew working on board marine aggregate dredgers to demonstrate their competence when carrying out dredging and discharge operations, enhancing and complementing the Certificates of Competency already held by those working at sea. The first NVQ's were awarded to industry staff in 2015, and these qualifications are now in the process of being rolled out across the wider industry by member companies.

OBJECTIVE 2

Improving employee development through vocational training

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

	2014	% change	2013	2012	2011	2010
Office staff	57.5	-3.4%	59.5	59.5	59.4	57.8
Sea staff	351	+4.8%	335	379	405	375

Key performance indicator: Training days per employee*

	2014	% change	2013	2012	2011	2010
Training days per employee	6.7	+62.6%	4.12	2.66	2.34	1.9

* 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
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 the British Marine Aggregate Producers Association (BMAPA), the Marine Management Organisation (MMO) and The Crown Estate for the marine aggregate industry is in place to minimise operational conflicts between aggregate dredging vessels and fishing vessels/activity – particularly the loss 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 they are taking place. During 2015, the code was updated to include the notifications and 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 continues 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

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 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



Case study

The first woman Master in the UK marine aggregate dredging sector, Georgina Carlo-Paat, has taken command of the MV Sand Heron, operated by BMAPA member CEMEX UK Marine.

Georgina's career at sea started in 1990 when she was the ship's cook on the USS Gopher State. She loved being at sea so much that she decided to gain the necessary qualifications and join the UK Merchant Navy as an officer. In 2005, Georgina gained her Master Mariner's Certificate and is qualified to command any ship anywhere in the world.

The Sand Heron typically operates off the south coast in a busy shipping area with both commercial and leisure vessels. Georgina is not only responsible for the overall safe operation of the vessel and the wellbeing of her 12 crew members but also for ensuring that company wharfs are supplied with the right material to meet the requirements of the market.



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 report for activity in 2014 represents the 17th 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

Aggregate dredging and the coastline

With the growing influence of climate change and increased storminess, the profile and awareness of local coastal change has never been greater. This can sometimes lead to the view that such changes are being influenced by the extraction of marine sand and gravel, despite the fact that dredging takes place in licensed areas well offshore and that there are no physical processes that link it to the natural erosion of the coastline that has been occurring since prehistory.

In response to these perceptions, BMAPA and The Crown Estate have worked in partnership to produce a series of regional brochures covering the Humber and Lincolnshire, Norfolk, and Suffolk coastlines. Each describes the geological evolution of the local coastline, the geological origins of the offshore sand and gravel resources that are being dredged and the influence of the modern day waves and tides on both these deposits and the coastline. Information is also provided about the scale of marine aggregate dredging that is taking place, how the activity is assessed, regulated and monitored and how similar activities are controlled in other European countries.

In preparing these brochures, BMAPA and The Crown Estate liaised closely with representatives of the Local Government Association's Coastal Special Interest Group.

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

Economies of scale & the influence of changing market conditions

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 2014 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 2014 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 across each class that would perhaps otherwise be masked in the summed dataset.





Photo: Crossrail Ltd

Marine aggregates delivered to Thameside wharves are playing a key role in the Crossrail project which is on schedule to open in 2017. With 42km of tunnels now completed and 50km of new tracks now following, Europe's largest current construction project will generate at least £42bn for the UK economy.



Photo: Wessex Archaeology

Sustainable production

OBJECTIVE 1

Key performance indicator: Annual marine production

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

	2014	% change	2013	2012	2011	2010
Production <3,000t capacity	2,502,428t (19.3% tot)	-5.9%	2,658,242t (20% tot)	2,396,362t (15.8% tot)	2,583,052t (18.4% tot)	2,544,619t (16% tot)
Production >3,000t capacity	10,453,183t (80.7% tot)	-1.7%	10,636,959t (80% tot)	11,554,469t (84.2% tot)	13,812,539t (81.6% tot)	11,311,479t (84% tot)

OBJECTIVE 3

Key performance indicator: Area dredged and hours dredged

Make the most efficient use of available licensed resources

	2014	% change	2013	2012	2011	2010
Hours dredged <3,000t	3,723 hrs (28.8% tot)	-8.75%	4,080 hrs (27.59% tot)	4,031 hrs (23.9% tot)	4,194 hrs (22.3% tot)	3,811 hrs (22.9% tot)
Hours dredged >3,000t	9,201 hrs (71.2% tot)	-14.6%	10,770 hrs (72.5% tot)	12,819 hrs (76.1% tot)	4,647 hrs (77.1% tot)	12,835 hrs (79% tot)

OBJECTIVE 4

Key performance indicator: Tonnes landed per hour dredged

Minimise the screening activity in the production process

	2014	% change	2013	2012	2011	2010
Tonnes landed /hour dredged (<3kt)	672.2tph	+3.2%	651.5tph	594.5tph	615.9tph	667.7tph
Tonnes landed /hour dredged (>3kt)	1136.1tph	+15.0%	987.6ph	901.4tph	943.0tph	881.3tph

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

	2014	% change	2013	2012	2011	2010
Fuel oil <3,000t capacity	3,616t (11.9% total)	-5.2%	3,814t (11.7% total)	2,831t (8.5% total)	3,681t (9.1% total)	3,685t (10.3% total)
Fuel oil >3,000t capacity	26,681t (88.1% total)	-7.2%	28,744t (88.3% total)	30,546t (91.5% total)	36,881t (90.9% total)	31,945t (90.7% total)
Kg fuel/tonne <3,000t capacity	1.44 kg/t	+0.7%	1.43 kg/t	1.18 kg/t	1.43kg/t	1.45kg/t
>3kt kg MGO/tonne >3,000t capacity	2.55 kg/t	-5.6%	2.70 kg/t	2.64 kg/t	2.67kg/t	2.82kg/t

Key performance indicator: CO₂ emissions

	2014	% change	2013	2012	2011	2010
<3kt carbon emissions	11,535t (11.9% total)	-5.2%	12,167t (11.7% total)	9,031t (8.5% total)	11,742t (9.1% total)	11,755t (10.3% total)
>3kt carbon emissions	85,112t (88.1% total)	-7.2%	91,693t (88.3% total)	97,442t (91.5% total)	117,650t (90.9% total)	101,905t (89.7% total)
<3kt kg CO ₂ /t landed	4.61 kg CO ₂ /t	+0.7%	4.58 kg CO ₂ /t	3.77 kg CO ₂ /t	4.55 kg CO ₂ /t	4.62 kg CO ₂ /t
>3kt kg CO ₂ /t landed	8.14 kg CO ₂ /t	-5.6%	8.62 kg CO ₂ /t	8.43 kg CO ₂ /t	8.52 kg CO ₂ /t	9.0 kg 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>)



Prime Minister David Cameron has been one of the visitors to the £36m sea defence project between Clacton and Holland-on-Sea in Essex. Now completed and using nearly 1m tonnes of marine aggregate from BMAPA member company licences, the project will enhance beaches and protect over 3,000 homes and businesses for the next 100 years.



OBJECTIVE 2 Key performance indicator: Tonnes landed per kilometre travelled

Maximise the efficient use of the dredging fleet

	2014	% change	2013	2012	2011	2010
Km steamed <3,000t capacity	205,311km (21.7% total)	-8.7%	224,771km (21.5% total)	154,678km (13.9% total)	184,341km (14.5% total)	200,780km (16.8% total)
Km steamed >3,000t capacity	737,049km (78.3% total)	-10.0%	819,296km (78.5% total)	955,094km (86.1% total)	1,088,224km (85.5% total)	994,912km (83.2% total)
<3kt t landed/km steamed	12.19t/km steamed	+3.0%	11.83t/km steamed	15.49t/km steamed	14.01t/km steamed	12.67t/km steamed
>3kt t landed/km steamed	14.18t/km steamed	+9.2%	12.98t/km steamed	12.10t/km steamed	12.69t/km steamed	11.37t/km steamed

Appendices

GB market summary 1980 - 2014

	GDP Market prices chained volume measures	Construction output (GB) £m 2005 prices	Primary aggregates (GB) million tonnes	Crushed rock (GB) million tonnes	Sand and gravel (GB) million tonnes
1980	811,490	72,528	199.0	103.0	96.0
1981	804,618	65,589	181.0	92.0	89.0
1982	821,317	68,097	194.0	103.0	91.0
1983	855,827	74,156	213.0	112.0	101.0
1984	875,172	76,637	211.0	111.0	100.0
1985	911,170	77,100	217.0	115.0	102.0
1986	940,039	80,021	229.0	123.0	106.0
1987	992,306	89,221	253.0	142.0	111.0
1988	1,051,051	97,741	292.0	162.0	130.0
1989	1,077,528	101,088	300.0	169.0	131.0
1990	1,083,493	100,424	278.0	162.0	116.0
1991	1,069,873	92,859	246.0	148.0	98.0
1992	1,074,649	89,146	233.0	144.0	89.0
1993	1,102,966	87,626	239.0	150.0	89.0
1994	1,147,349	87,206	260.0	162.0	98.0
1995	1,176,282	88,090	241.0	151.0	90.0
1996	1,207,663	90,797	215.0	133.0	82.0
1997	1,245,088	108,110	220.0	134.0	86.0
1998	1,287,128	109,715	218.0	132.0	86.0
1999	1,327,193	111,095	221.0	133.0	88.0
2000	1,377,611	112,070	219.0	130.0	89.0
2001	1,415,605	114,061	222.0	134.0	88.0
2002	1,450,910	120,602	210.0	127.0	83.0
2003	1,499,322	126,402	203.1	123.0	80.1
2004	1,536,631	133,118	214.0	128.0	86.0
2005	1,582,675	129,877	204.0	122.0	82.0
2006	1,624,802	130,882	207.1	126.9	80.2
2007	1,666,821	133,707	209.0	130.0	79.0
2008	1,659,039	130,210	187.0	115.0	72.0
2009	1,589,493	113,028	146.8	91.1	55.7
2010	1,613,974	122,787	148.1	92.7	55.5
2011	1,645,808	125,483	148.0	90.0	58.0
2012	1,665,213	116,014	132.9	82.9	50.0
2013	1,701,180	117,858	134.4	82.4	51.9
2014	1,751,198	127,426	145.6	93.6	52.1

Source: MPA 2014 SD report.

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

Sand & gravel (marine) million tonnes	Recycled & secondary materials (est) million tonnes	Total aggregates (GB) million tonnes	Asphalt (GB) million tonnes	Ready-mixed concrete (GB) million cu m	Cementitious (GB) million tonnes
12.5	19.9	218.9	24.0	22.4	–
11.1	18.2	199.2	22.0	19.9	–
11.8	19.4	213.4	26.0	20.7	–
12.1	21.3	234.3	27.2	21.5	–
12.8	21.1	232.1	25.5	20.8	–
13.7	21.7	238.7	26.9	21.6	–
14.1	22.8	251.8	28.4	21.5	–
15.6	25.4	278.4	29.9	24.3	–
18.4	29.1	321.1	31.8	28.8	–
21.1	32.0	332.0	33.7	29.6	–
19.5	33.0	311.0	36.7	26.8	–
13.9	34.0	280.0	36.4	22.5	–
13.0	35.0	268.0	36.6	20.8	–
12.1	37.0	276.0	36.3	20.8	–
14.1	39.0	299.0	37.7	22.9	–
14.1	42.0	283.0	34.9	21.7	–
12.7	45.0	260.0	29.3	20.9	–
12.8	48.0	268.0	27.5	22.3	–
13.1	51.0	269.0	27.7	22.9	–
13.4	54.0	275.0	26.0	23.6	–
13.5	57.0	276.0	25.7	23.0	–
14.2	60.0	282.0	26.5	23.0	14.3
14.3	62.0	272.0	27.8	22.5	14.4
14.0	64.5	267.6	27.8	22.3	14.6
13.1	67.0	281.0	26.1	22.7	15.0
13.5	66.6	270.6	27.0	22.2	14.7
13.5	68.7	275.8	24.9	22.8	15.1
14.5	70.5	279.5	25.0	23.5	15.8
13.2	68.5	255.5	24.0	20.2	13.7
10.1	56.5	203.3	19.8	14.5	10.3
10.1	57.6	205.7	21.0	14.3	10.5
11.9	60.0	208.0	21.9	15.7	11.3
10.3	55.5	188.4	18.2	14.2	10.5
10.6	55.7	190.1	18.9	15.9	11.5
11.8	60.2	205.9	20.6	16.4	12.4

Appendices

Marine aggregate summary statistics 1998 - 2014

	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
2014	726	332	85.7	17.25

* Taken from 'Marine Aggregate Dredging – The Area Involved' annual reports published by BMAPA and The Crown Estate between 1999 and 2015.

** Extracted from annual 'Marine Aggregates, Crown Estate Licences, Summary Statistics reports published by The Crown Estate between 1998 and 2015. 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 2014 (years)
Britannia Aggregates	Britannia Beaver	1991	2,775	4,800	22
CEMEX UK Marine	Reimerswaal	2012	6,000	10,000	2
	Sand Falcon	1998	4,832	8,359	15
	Sand Fulmar	1998	4,000	6,290	15
	Sand Harrier	1990	2,700	4,671	23
	Sand Heron	1990	2,700	4,671	23
	Welsh Piper	1987	790	1,367	26
DEME Building Materials	Charlemagne	2002	5,000	8,650	11
	Victor Horta	2011	5,000	8,650	4
Hanson Aggregates Marine	Arco Adur	1988	2,890	5,000	25
	Arco Arun	1987	2,890	5,000	26
	Arco Avon	1986	2,890	5,000	27
	Arco Axe	1989	2,890	5,000	24
	Arco Beck	1989	2,600	4,500	24
	Arco Dart	1990	700	1,250	23
	Arco Dee	1990	700	1,250	23
	Arco Dijk	1992	5,100	8,800	21
Tarmac Marine (from August 2015)	City of Cardiff	1997	1,418	2,300	16
	City of Chichester	1997	1,418	2,300	16
	City of London	1990	2,652	4,750	23
	City of Westminster	1990	3,000	5,200	23
			Total fleet capacity	Total fleet capacity	Average vessel age
			65,765m³	107,808t	19.62 years

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

Figures and members correct as of 31.12.14.



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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