

# Strength

from the depths

first sustainable development report  
for the British marine aggregate industry



British Marine Aggregate Producers Association November 2007



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# Introduction

The British Marine Aggregate Producers Association (BMAPA) is the trade association representing ten companies which together produce around 90 per cent of the 22 million tonnes of marine sand and gravel dredged each year from the seabed off England and Wales. BMAPA is a constituent body of the Quarry Products Association (QPA), the trade association for the UK construction aggregate industry.

This report is the second key stage in a process which began in 2006 with the publication of our sustainable development strategy. In that document, we set out a range of key performance indicators under each of the four recognised pillars of sustainable development. Now, we start to put real figures against those indicators and provide a baseline against which our progress can be measured in the future.

It is important to recognise that the industry extracts marine aggregates from a very small proportion of the UK's continental shelf – typically an area totalling some 140km<sup>2</sup> is dredged every year. While the footprint is small, we recognise that the environment in which we work is a sensitive one and we accept our responsibility to manage our operations accordingly. Measuring our impacts – both positive and negative – is an important part of the process.

## The timetable

2006

- Publish strategy ✓

2007

- Finalise objectives and key performance indicators ✓
- Undertake first survey of members to establish baseline data ✓
- Access survey outcomes ✓
- Produce first annual report setting the baseline figures ✓

2008

- Repeat member survey one year on
- Incorporate external stakeholder feedback
- Agree targets for improvement and action needed
- Publish second report to evaluate progress

# Foreword



With the publication of this report, BMAPA's sustainable development programme moves forward one more stage from initial strategy towards a point where we can measure our performance on an annual basis. The figures we have gathered from our members for this first report now provide us with an all-important baseline.

Sustainable development strategies for complete industries can be a very difficult prospect since it is often a problem to draw consistent data from members who have historically measured in different ways or do not have the systems to enable them to do so. We are, therefore, pleased to have gathered data which represents some 84 per cent of total UK marine aggregate production.

As with our original strategy, this report is built around the template that has so capably been provided by our colleagues at the QPA. The evolution of QPA's wider sustainable development programme for the whole of the aggregates and quarry products sector is exemplary and forms a very good backdrop. At the same time, the issues associated with marine aggregate extraction are, in some key ways, distinct and we have recognised the need for our own programme.

We should not underestimate the importance of this initiative. It comes at a particularly important point in the evolution of the industry, with the advent of the Marine Bill. We, along with all the other marine stakeholders, will have a much clearer duty of stewardship under the new legislation and our activities will come under ever closer scrutiny.

We also recognise the weight that is now being attached to carbon and the need to demonstrate that we understand our own footprint and are doing what we can to reduce it. That will certainly be a significant factor as this strategy moves forward.

As with our original strategy document (still available at [www.bmapa.org](http://www.bmapa.org)), we will welcome comments and suggestions on this programme. Some changes in course will certainly be necessary but I hope you will feel that we are well on the road.

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

# Facts and figures



## Key areas 2006

Area of UK seabed	867,000km <sup>2</sup>	100% of seabed
Area of seabed licenced for dredging	1,316.33km <sup>2</sup>	0.151% of seabed
Area available to be worked	576.10km <sup>2</sup>	0.066% of seabed 43.7% of area licenced
Area dredged	140.6km <sup>2</sup>	0.016% of seabed 10.68% of area licenced

## Market summary 2006

Total GB aggregates market	274mt
Land-based aggregates	190mt
Recycled and secondary aggregates	70mt
Total marine aggregates production	24.8mt
Marine landings to GB aggregates market	13.4mt
Marine landings to European aggregates market	6.7mt
Beach replenishment contract fill	4.15mt

## Marine contribution to GB sand & gravel market 2006

Total GB market	81mt
Total England and Wales market (2005)	73.6mt
Marine landings to England and Wales	13.4mt
Marine landings to South East England	9.6mt
Marine landings to London & Thames Corridor	6.7mt
Marine landings to Wales	0.9mt

Marine statistics from 'Marine Aggregate Crown Estate Licences Summary of Statistics 2006' and 'Marine Aggregate Dredging The Area Involved 2006 - 9th Annual Report (2007)'. General statistics from QPA Sustainable Development Report 2007.

# Our values

BMAPA members operate to a set of core values, the majority of which are common to the land-based industry.

## Social progress

### Health & safety

Our highest priority is the health and safety of employees, contractors and visitors.

### Competence

We aim to maintain and develop a competent workforce.

### Good neighbours

We engage with coastal communities and strive to be seen as good operators by other marine users.

### Partnerships with stakeholders

We value our partnerships with all our stakeholders.

## Environmental protection

### Natural environment

We recognise the potential of our operations to have impact upon the marine environment and are committed to minimising and mitigating such effects.

### Shared environment

We share the marine environment with a range of other users such as fishing, shipping, energy and recreation and have a responsibility to operate with due regard to their needs.

### 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 both stakeholders and the environment.

## Natural resources

### Resource management

We recognise our responsibility to make the most efficient and sustainable use of finite marine aggregate resources.

## Economic growth

### Providing essential materials

We recognise that the materials we supply are, and will continue to be, essential for the improvement of standards of living and the quality of life in the UK.

### Employment

We recognise that our operations are an important source of employment and economic activity.



# Social progress

Objectives	Key performance indicators	2006
1 Improve the occupational health and safety of the marine sector's employees	Working days lost through work-related injury	164
2 Improve employee development through vocational training	Training days per employee	2.53
3 Increase the transparency of activities, and maintain and develop further liaison with other marine stakeholders	Recognised qualifications achieved	92
		See 'Objective 3' page 7

Based on returns from seven of ten members, covering 24 out of 25 vessels.

In partnership with its land-based counterpart, Britain's marine aggregate industry plays a key role in everyday life as a supplier of essential materials for construction. It similarly contributes to the construction needs of our European neighbours and is the only viable source of material for large-scale beach repairs. The marine aggregate industry employs 600 people, of whom 453 man the fleet operated by BMAPA members.

#### Objective 1

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

The health and safety of its people is the industry's first priority. The marine sector has been actively involved in the QPA's successful drive to reduce lost-time accidents by half over the five years to March 2005. It now shares the commitment to a further 50 per cent cut over the next five years.



Marine aggregate dredgers are certificated and routinely audited under the International Safety Management code. The industry is highly specialised and relatively small, and enables BMAPA to

facilitate good communication between operators and allows "near hit" information to be readily shared for the benefit of all.

The fact that wartime munitions still remain on the seabed around our shores is a potential hazard for dredgers.

Working with The Crown Estate and QPA, BMAPA has produced guidance to

help its members deal safely and consistently with such situations. The initiative has the active support of the Maritime & Coastguard Agency, the Association of Chief Police Officers, and the Health and Safety Executive.



**Objective 2**  
**Improve employee development through vocational training**

A total of 1,167 training days were undertaken during 2006, across a workforce of 490 employees – equivalent to 2.53 days per employee. The majority of training was related to eight deck and engineering officer qualifications. A total of 92 qualifications were achieved, covering 20 disciplines relating to offshore marine operations and office-based activities.

**Objective 3**  
**Increase the transparency of activities, and maintain and develop further liaison with other marine stakeholders**

The industry is committed to increasing the transparency and awareness of its activities. This operates at a variety of levels and covers everyone with an interest in the industry – from other marine industries to Government policy makers and regulators, communities and schoolchildren.

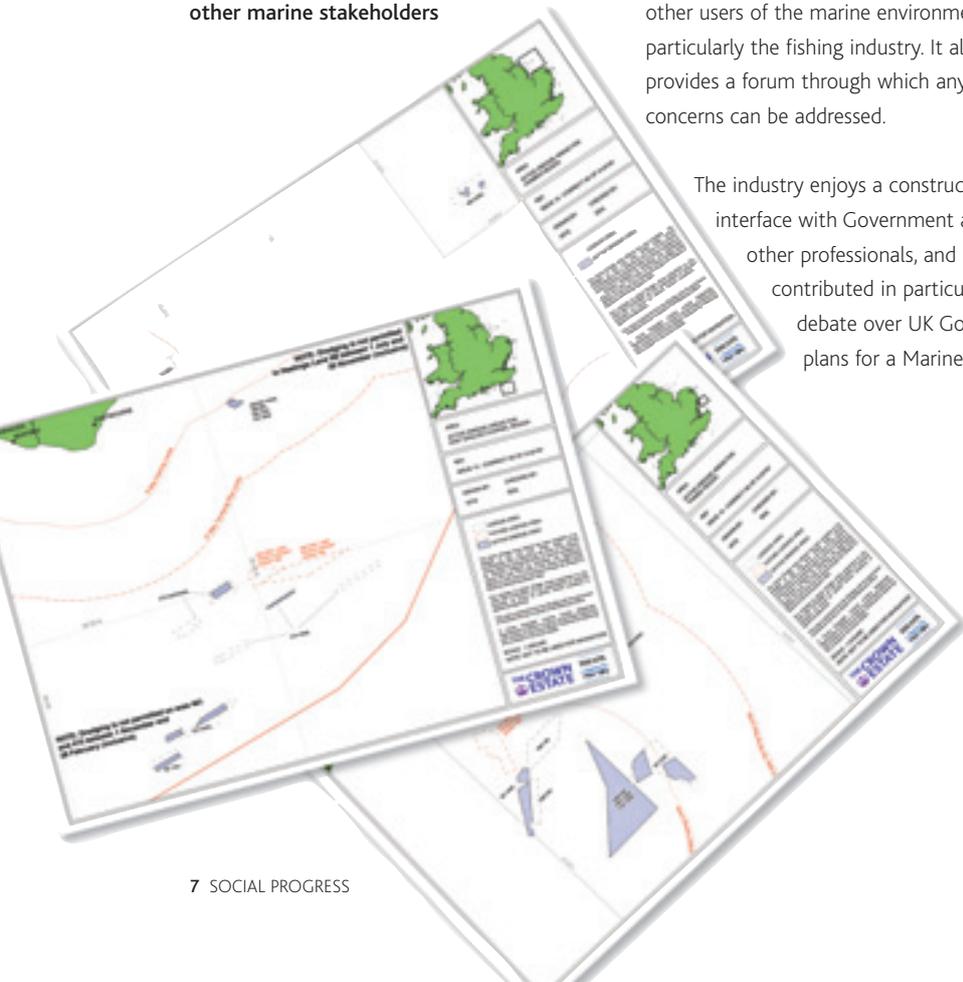
Routine publications such as the bi-annual *Active Dredge Area* charts and the annual *Area Involved* report (both produced in conjunction with The Crown Estate) provide valuable information on the scale and extent of marine aggregate extraction. This information, in conjunction with the routine fisheries liaison committees chaired by the Marine & Fisheries Agency, helps to ensure a good dialogue with other users of the marine environment – particularly the fishing industry. It also provides a forum through which any practical concerns can be addressed.

The industry enjoys a constructive interface with Government and with other professionals, and has contributed in particular to the debate over UK Government's plans for a Marine Bill.

In 2006, the marine aggregate industry presented ten papers at conferences with national and international audiences on a range of subject matters, including the Marine Bill, marine data and the marine historic environment. At a more local level, over 250 people visited marine aggregate wharves and dredgers as part of six organised visits, including four arranged by a local Wildlife Trust. Several presentations were given to local interest groups. Lectures were given by industry staff to three university courses in support of undergraduate and postgraduate degree courses.

Since its inception in 2002, the marine Aggregates Levy Sustainability Fund (ALSF) has channelled some £9m into research related to the impacts of dredging. BMAPA has played an active role in supporting both the marine ALSF process, and also the wide range of projects that have resulted from it.

BMAPA adopts a proactive approach to media engagement, including site and dredger visits. This has included providing information and supporting filming of a Channel 4 Time Team special entitled "Britain's drowned world", which was broadcast in April 2007.



# A life on the **ocean wave**



Aggregate dredgers are a fertile training ground for youngsters who yearn to earn their living at sea.

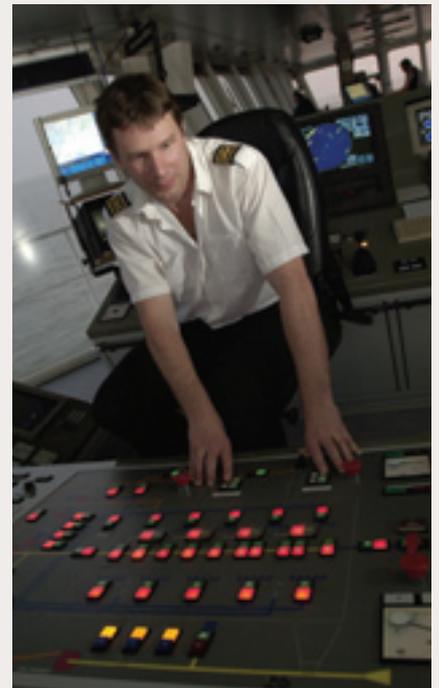
While 18-year-old officer cadets may ultimately aspire to be in command of much larger ocean-going ships, the special skills they will learn on a dredger are a valuable investment in the future – and many find long-term satisfaction in an industry whose away-from-home demands are not so great.

“On a dredger, you learn to be very precise in your navigation because your company will be penalised if you work outside your licence area”, says Ian Spreadborough, managing director of the Ship Safe Training Group, which recruits and trains cadets for its members. “And there are obviously financial consequences for the business if you are not able to dredge to the edge of your licence.

“There are also great skills required in loading a moving vessel at sea while ensuring its stability and safety.”

The initial stages of the cadet programme take three years (four years if opting for an honours degree) and are split between college and the dredgers of the sponsoring company. With a junior officer qualification, a candidate could find himself at the age of just 21 as officer-of-the-watch responsible for a vessel and the lives of a crew of 15. That level of responsibility deters some youngsters and there are usually more places than there are candidates.

A further three years of sea / shore training follows to achieve the level of chief mate



or second engineer and could well result in becoming a master or chief engineer within 10 years of starting a career.

“The aggregates industry certainly takes training very seriously,” says Ian. “Operators obviously have to meet the requirements of international regulations, on safety, fire and first-aid but they are also extending the range of professional skills learned by cadets and there is growing emphasis on refresher training.”

# Economic growth

Objectives	Key performance indicators	2006	
1 Maintain and improve profitability in order to provide for continuing investment and employment	Annual marine production*	24.29mt	
	National/regional marine contribution to supply*	England and Wales	13.4mt
		South East England	9.6mt
London & Thames Corridor		6.7mt	
	Wales	0.99mt	
2 Maintain and increase investment in dredgers and dredging technology in order to improve efficiency and environmental performance	Employment direct/indirect**	573/1354	
	Profile of age/capability of dredging fleet***	Average vessel age	17.3 years
	Investment in vessels/technology over previous five years***	£54.35m	

\* Marine statistics from Marine Aggregate Crown Estate Licences Summary of Statistics 2006.

\*\* Based on information from 9 of 10 member companies and covering 24 of 25 vessels. Indirect employment relates to staff employed at wharves or involved in haulage.

\*\*\* Based on information for the entire dredging fleet operated by BMAPA members (25 vessels).

Marine aggregates are part of a much bigger economic picture created by the wider UK quarry products industry and the construction sector, which it feeds with essential raw materials. Sales of quarry products in the UK total over £4 billion a year and, in doing so, provide over 36,000 direct jobs. Downstream of that are many hundreds of construction jobs in a dependent industry which makes a £100 billion annual contribution to the economy.

**Objective 1**  
**Maintain and improve profitability in order to provide for continuing investment and employment**



Production data reported for marine aggregate dredgers operated by BMAPA members during 2006 totalled 20.29 million tonnes. Over the same period, the marine aggregate production from Crown Estate production licence areas around the British coastline totalled 24.29 million tonnes. Reported production by BMAPA members represented 83.5 per cent of

the total UK production, with the balance comprising unreported production from BMAPA members, output from non-BMAPA members and material dredged from BMAPA members licence areas by third party vessels.



During 2006, 55 per cent of marine aggregate production was delivered for construction purposes in Britain, 27 per cent for construction on the continent and 17 per cent for beach replenishment and contract fill. There are different drivers for each, with the end-use projects depending upon a range of public and private investment.

From reported data, BMAPA companies employ a total of 573 people – 453 of them as sea-going crew.

Marine aggregate is delivered to 68 wharves in England and Wales, and a further 17 wharves on continental Europe. While not directly covered by the scope of this report, employment numbers for both wharves and

for hauliers were gathered for 26 wharves operated by five companies. Extrapolation of this data across all sites that receive marine aggregate from BMAPA members suggests that 640 staff support wharf operations and a further 714 staff are involved with onward distribution.



## Objective 2

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

BMAPA members operate 25 purpose-built marine aggregate dredgers, with a combined hopper capacity of over 106,000 tonnes (see table page 24). The vessels range in age between four and 36 years, with an average of 17.3 years.

Vessels can be classified by their hopper capacity: small (up to 3,000t) vessels designed to supply local ports from near-shore licence areas; and large (over 3,000t) which supply more distant markets from offshore licence areas. Nine near-shore vessels have a combined hopper capacity of 14,217t and an average age of 21.9 years. There are 16



offshore vessels, with a combined hopper capacity of 92,084t and an average age of 16.9 years.

Dredgers represent large-scale capital investment, without which the industry could not continue. The current fleet represents £500m worth of investment. Vessels are expected to have a minimum working life of 25 years, and the cost of replacing them at 2007 prices would be between £25m and £40m each.

Maintaining fleet capacity and capability is essential if the sector is to sustain its contribution to the nation's needs. The age profile of the dredging fleet (see page 24) provides an indication of the scale of investment in new vessels, which in turn indicates the health of the sector. Another indication comes from the investment in updating older vessels.

In recent years, the focus for investment has been to improve existing vessels. This has included extending their operational life (eg installing new main engines), increasing capacity (eg adding to hold capacity) and increasing their capability to dredge at greater depths by extending vessels dredge pipes or by adding submerged pumps.

Only one new vessel has been launched by a BMAPA member in the four years to 2006 – DEME Building Materials' trailer suction hopper dredger *Charlemagne*. It was launched in 2002 with a capacity of 10,200 tonnes and represented investment of £32m.



The total capital investment (excluding ongoing maintenance and repair costs) across the fleet of dredgers operated by BMAPA members for which information was reported over the five-year period 2002-2006 amounted to £54.35m.

# New licences trigger **investment**



The up-graded *Sand Fulmar*, and inset, the *Sand Falcon* prior to being "stretched" from its original 99.9-metre length to 120 metres. This has increased its hopper capacity from 6,920 tonnes to 8,500 tonnes.

CEMEX UK Marine Limited is one of the companies which will consider new vessels. It has already spent over £3 million on equipping its two frontline vessels, the *Sand Falcon* and *Sand Fulmar*, with more powerful pumps capable of working in the deeper waters of the eastern Channel. It has also "stretched" the *Sand Falcon* at a cost of over £1 million to increase its capacity. Meanwhile, on the shore side, CEMEX has invested over £5 million on

rebuilding its Angerstein Wharf at Greenwich; installing new plants at Northfleet in Kent and Jarrow on the Tyne and on upgrading Leamouth Wharf at Southampton.

Within the UK market, CEMEX considers that operators are generally struggling to find the ship capacity to cope with demand, and investment is required to meet the needs of customers in a busy market.

# Environmental protection

## Objectives

- 1** Minimise the spatial footprint of dredging operations through responsible and effective management\*

## Key performance indicators

Area of seabed licensed for dredging 1,316.33km<sup>2</sup>

Area available to be worked (active dredge area) 576.10km<sup>2</sup>

Area of seabed actually dredged 140.6km<sup>2</sup>

Area of seabed where 90% of dredging occurs 49.19km<sup>2</sup>

Area of seabed dredged for more than 1 hour 15 minutes 8.66km<sup>2</sup>

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

See 'Objective 2' page 14

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

See 'Objective 3' page 15

- 4** Reduce the impact of atmospheric emissions released through the production and transport processes\*\*

Total marine gas oil 49,593.6 tonnes

Marine gas oil use per tonne landed 2.44kg/tonne

Total CO<sub>2</sub> emissions 158,203.584 tonnes

CO<sub>2</sub> emissions per tonne landed 7.796kg

Sulphur dioxide emission See 'Objective 4' pages 15 and 16

Nitrogen dioxide emission See 'Objective 4' pages 15 and 16

- 5** Maintain effective controls to minimise the potential of pollution to the marine environment\*\*

Number of recorded incidents 6

\* From 'Marine Aggregate Dredging The Area Involved 2006 - 9th Annual Report (2007)' - providing 100 per cent coverage of operations on Crown Estate Licensed areas.

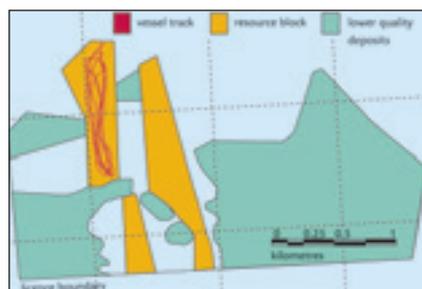
\*\* Based on returns from 24 of 25 vessels.

The marine environment – like its terrestrial equivalent – is potentially sensitive. Those who work in it have a responsibility to manage their activities in order to minimise potential impacts. Operations are licensed by The Crown Estate as the “landowner”, and controlled by British Government and the devolved administrations. During 2007, a series of new statutory regulatory procedures were introduced for the management and control of marine minerals dredging in UK waters.

**Objective 1**

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

Monitoring of the industry’s spatial footprint is achieved through the *Area Involved* initiative, which was set up in March 1999 in partnership with The Crown Estate. It involves the annual reporting of a range of information relating to the area of seabed covered. This shows that the area licensed and dredged has reduced over a nine- year period. More recently, it has included monitoring of the “active dredge area” – the area of a production licence within which dredging may take place in any year.



National policy guidance for marine minerals dredging (Marine Minerals Guidance Note 1, Guidance on the Extraction by Dredging of Sand, Gravel and Other Minerals from the English Seabed, Office of the Deputy Prime Minister, July 2002) requires the industry to minimise the area of seabed licensed and dredged. While this is partly delivered through the permissions for new production licence areas and their associated operating conditions, many of the practical reductions in both licensed area and dredged area have arisen through voluntary actions by the operating companies. Licensed areas that have become exhausted or which contain no commercially viable sand and gravel deposits have been relinquished, while dredging operations are being increasingly tightly managed by operators for the purposes of resource management.

**Objective 2**

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

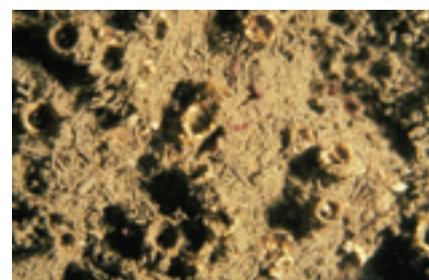
The management of licenced areas and the

development of new application areas through the regulatory regime necessitate the industry acquiring high quality marine environmental data. In many cases, the data collected represents the only source of environmental information for a location, and is often specifically collected to develop a better understanding of marine environmental features, such as the distribution of particular habitats and features. While this data is specifically collected for its own interests, the industry recognises that it can also make a significant contribution to wider scientific knowledge. To this end, companies often make the data available to research projects.

Through the marine Aggregates Levy Sustainability Fund (ALSF), a wide range of research projects have been undertaken during 2006, which have been supported by data collected by BMAPA members.

These have included:

- Investigations into the identification and characterisation of biogenic reefs resulting from *Sabellaria spinulosa*.



Elizabeth Wood @ JNCC

Research funded by the industry, Crown Estate and the marine Aggregates Levy Sustainability Fund has revealed initial evidence that the reef-building worm (*Sabellaria spinulosa*) could potentially benefit from the supply of sand moving across the seabed as a result of dredging activity. The finding challenges previous thinking that dredging is always destructive to seabed habitats.

- A study into the use of shell fragments for habitat recovery following dredging.
- Technical support for projects looking at broad scale sand and gravel habitats in the eastern English Channel and western Bristol Channel.

Individual operators have also developed biodiversity action plans for new dredging permissions. Using survey data, these define key species and habitats present in and around dredging areas and commit to continuing to develop understanding of these features throughout the lifetime of dredging operations.

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

BMAPA members recognise the importance and value of the marine historic environment, and have worked with English Heritage to develop comprehensive guidance to ensure that heritage issues are considered at every stage of development. As part of this commitment, the industry has developed a standard protocol, again in partnership with English Heritage, for reporting finds of archaeological interest which has been voluntarily applied to all dredgers and wharves.

The protocol is coordinated on behalf of BMAPA by a specialist archaeological consultancy, Wessex Archaeology, which liaises with English Heritage and the Receiver of Wrecks to ensure that all finds are assessed for significance. Where necessary, exclusion zones can be established to protect sites pending

further investigation by the industry. All finds are publicised on the protocol's website [www.wessexarch.co.uk/projects/marine/bmapa/index.html](http://www.wessexarch.co.uk/projects/marine/bmapa/index.html)

The first annual report of the protocol was published in 2006. It detailed 19 reports of finds by members, involving over 80 items ranging from prehistoric bones and teeth to cannon balls and aircraft remains.



Through the marine ALSF, a project has been funded to raise awareness amongst industry staff and the wider heritage community of marine archaeological issues and the industry's reporting protocol. This includes site visits, advice and feedback to staff on individual finds, and regular newsletter updates.

The guidance note and reporting protocol represent world leading initiatives for proactively addressing marine heritage issues as part of the development process. As a leading player in this issue, BMAPA contributed to the revision to the *Joint Nautical Archaeology Policy Committee (JNAPC) Code of*

*Practice for Seabed Development*, which was published in June 2006.

**Objective 4**  
**Reduce the impact of atmospheric emissions released through the production and transport processes**

Production includes not only the winning of sand and gravel, but also transportation to the point of delivery. As most wharves are in coastal towns and cities, this means large volumes of material are delivered close to where they are used. In 2006, 6.7 million tonnes of sand and gravel were delivered to wharves along the Thames estuary – equivalent to over 900 20-tonne lorry loads being delivered to the region every day. However, the extraction and transport of marine sand and gravel consumes fuel and generates emissions.



Production and operation data was provided by BMAPA companies for 24 of the 25 vessels operated by members. In production terms, this represents 83.5 per cent of total production from Crown Estate licence areas during 2006. A total of 49,593.6 tonnes of marine gas oil were used by dredgers to load and deliver 20,292,733 tonnes of marine

# Seabed treasure



Photographs courtesy Wessex Archaeology Ltd.

sand and gravel during 2006. This is equivalent to 2.44kg of fuel per tonne landed.

Using guidelines for company reporting on greenhouse gas emissions published by the Department for Environment, Food and Rural Affairs (Defra) in July 2005, the overall carbon emission from marine aggregate operations reported during 2006 has been calculated (158,203.584 tonnes of CO<sub>2</sub>) along with the emission per tonne landed (7.796kg of CO<sub>2</sub>).

The development of emission data (sulphur dioxide/nitrogen dioxide) from the dredging fleet has proved more complex than anticipated as a result of the wide range of vessels – particularly the variety of ages and engine types. BMAPA intends that further work will be undertaken to develop this understanding during 2007/8.

## Objective 5 Maintain effective controls to minimise the potential of pollution to the marine environment

Through the International Safety Management Code, all vessels must have management systems in place to prevent marine pollution incidents from occurring. Each plan is informed by vessel-specific risk assessments, and is subject to external audit and certification. While the plans focus on management plans to prevent incidents from occurring, response plans are in place to minimise and control the potential effects of any that do. From the 25 vessels operated by BMAPA members, six incidents were recorded during 2006.

The seabed around the UK's shores is a potential treasure trove of information about our history – from fossils of ancient creatures to wrecks. Marine aggregate development and extraction has unique potential to locate and, in some cases, recover features of marine historic importance. In doing so, it can add to knowledge of our past while ensuring significant sites can be protected from further disturbance.

Success is heavily dependent upon the alertness of those in the front line – employees who monitor cargoes as they are loaded and off-loaded on dredgers and on wharves.

Recognising the importance of this role, BMAPA has introduced an award scheme which recognises the vigilance underlying important finds. The awards arrive in the wake of a new protocol which has guided marine aggregate dredging companies in reporting archaeological finds and ensure that they go to the organisations that can make the most of the discoveries. Developed in partnership with English Heritage, the protocol has helped the 800 staff amongst the sector's operating companies and their wharf-based

customers to identify over 80 significant finds in just one year.

Judged by English Heritage's head of maritime archaeology, Ian Oxley, the top award for the past year went to Purfleet Aggregates in Essex and involved a 44,000-year-old mammoth tusk found within a cargo of marine sand and gravel loaded 100km east of the River Humber. It represents one of the most northerly dated examples of mammoth remains ever recovered from an accurately known position on the seabed, and may have significant implications for understanding the distribution of the species during the last Ice Age.

Ian Oxley commented: "The marine aggregate sector has effectively defined the standards for all other marine development activities to aspire to. This is something of which everyone in the industry can be incredibly proud."

# Natural resources

Objectives	Key performance indicators	2006
<b>1</b> Make the most efficient use of available licensed resources		See 'Objective 1' page 18
<b>2</b> Minimise the screening activity in the production process	Total hours dredged*	28,686 hours
	Tonnes landed per hour dredged*	707.41
<b>3</b> Maximise the efficient use of the dredging fleet	Total kilometres steamed*	1,474,438
	Tonnes landed per kilometre travelled*	13.76
<b>4</b> Develop and promote best practice for resource management		See 'Objective 4' page 19

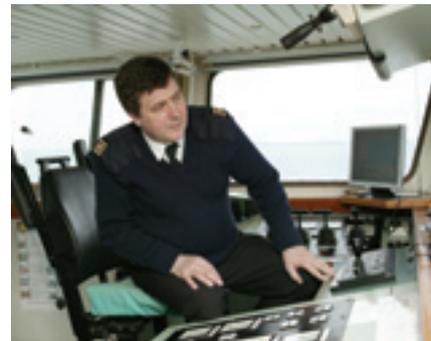
\* Based on returns from 24 out of 25 vessels operated by BMAPA members.

Marine aggregate dredging provides us with resources that make modern life possible. Like all primary minerals, however, sand and gravel is ultimately finite and it is important that its use is managed responsibly. Dredging, subsequent processing and delivery are all processes that require the use of another vital resource – energy. The production and transit phases of marine aggregate operations can, therefore, provide a useful indicator of the energy requirements of the industry.

#### Objective 1

##### **Make the most efficient use of available licensed resources**

Management of licensed marine aggregate resources is essential to maximise the potential reserve while minimising the potential environmental impact. This is informed by high quality geological information. The active dredge area and the area of seabed dredged provide an indication



of this management process, but do not necessarily reflect the licence-specific resource management plans that are introduced by individual operators. This can include the use of zones and lanes within individual licensed areas, themselves informed by detailed survey data, to manage production operations into tightly controlled areas. While this minimises the spatial footprint of the industry's activity, it also ensures that resources can be extracted in the most efficient way possible, and that customers are able to receive a consistent high quality end-product.

## Objective 2

### Minimise screening activity in the production process

The time spent dredging also provides an indication as to how efficiently available licensed resources are being utilised. In some cases, the in-situ composition of the sand and gravel resources being dredged may not match the end-use requirements of the customer. Marine aggregate dredgers have the capability to modify the composition of the sand and gravel retained in the hold through a process known as “screening”.



Because of the environmental consequences of returning unwanted sediment to the sea, the use of screening may be restricted or even prohibited on environmental grounds.

Screening can significantly increase the time taken for cargoes to be loaded as not all the

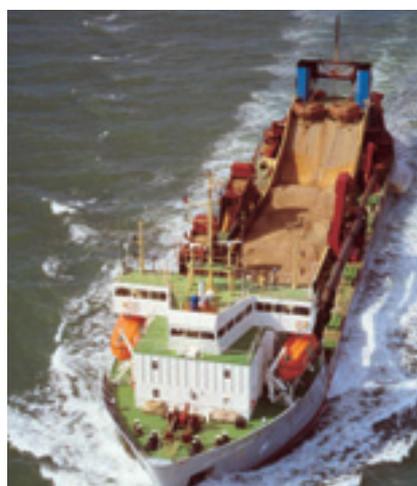
sand and gravel raised from the seabed is retained on board the vessel. Depending upon the individual circumstances, this can result in the time spent loading a cargo doubling or even trebling, with knock-on implications for productivity and energy consumption. However, the ability to screen cargoes represents a valuable option for operators – particularly where licence areas may be reaching the end of their commercial lives.

The time spent dredging therefore provides a useful indication of the state of the industry’s reserve base, the energy efficiency of dredging operations and the potential effects of extraction operations upon the environment.

## Objective 3

### Maximise the efficient use of the dredging fleet

One of the major advantages of marine aggregate supply lies in its ability to transport large volumes of sand and gravel over large distances in order to deliver them close to the

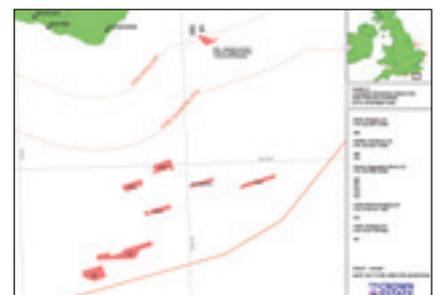


point of demand. The total distance steamed for 2006 incorporates all dredging operations and two-way travel distances between licence area and wharf for 24 vessels. In terms of tonnes landed per km travelled, this provides a value of 13.76t. As a comparison, a lorry travelling 20km (40km round-trip) to deliver 20t of sand and gravel would result in 0.5t being delivered per km travelled.

## Objective 4

### Develop and promote best practice for resource management

Marine sand and gravel is a finite resource, and operators have a responsibility to ensure that licensed resources are used responsibly. Individual operators manage their licensed assets to ensure that they operate as efficiently as possible, taking into account the wide range of pressures and influences that exist. However, regional management plans have been introduced by the industry to manage the operational and environmental aspects of multiple marine aggregate licence areas – the first being in the East Channel Region of the English Channel. These rely upon the cooperation of a number of individual marine aggregate operators to ensure that regional operations are managed to the highest possible standard.





In 2006, BMAPA, in conjunction with The Crown Estate, developed a standard protocol for reporting licensed reserves of sand and gravel, based upon principles defined by the Institute of Mining, Metallurgy and Minerals. The industry is committed to annual public reporting of licensed reserve figures through The Crown Estate.

In a wider sense, a range of marine aggregate research projects has been supported by BMAPA members which have the potential to influence resource management techniques by defining new approaches to site management that minimise environmental impacts and encourage the recovery of species and habitats.

## Setting the standard

Britain's marine aggregate operators are setting new standards in their management of the extensive new sand and gravel resource now available in the eastern English Channel. The first permissions to dredge in the region came through in 2006, marking an important new chapter for the industry as it sought to replenish dwindling supplies of quality aggregate.

The permissions have been made possible by a firm commitment to one of the most comprehensive monitoring programmes ever developed for a marine development. It is also significant in that it represents close cooperation by six companies in the sharing of knowledge and disciplines across the whole of the region.

Recognising the need to measure cumulative impacts, the operators came together as the East Channel Association to produce a Regional Environmental Assessment in 2003. It was followed two years later by baseline monitoring surveys. The monitoring programme is now progressing, and in April 2007 the ECA published an interim Regional Environmental Monitoring and Management Report which can be

accessed at [www.eastchannel.info](http://www.eastchannel.info). This will be followed after four years of dredging by a second Regional Environmental Assessment.

The industry's commitment to the process is enshrined in a charter which promises to reduce the dredged area to a minimum, to zone working areas in order to reduce the area in use at any time and to minimise the onboard screening process.

The ECA's regional development manager, Stuart Lowe, says operators have learned much from the process. "We accepted that we could only achieve the necessary permissions by implementing a rigorous monitoring programme in order to prove beyond doubt that the impacts of our work are understood and controlled," he said. "I believe the regional environmental assessment process is one that other marine industries working over wide areas will follow and that it will certainly help in the renewal of other dredging licences."

# Appendices

## GB market summary 1980 - 2006

	<b>GDP</b> chained volume measures £m	<b>Construction output (GB)</b> £m 2000 prices	<b>Primary aggregate sales (GB)</b> million tonnes	<b>Crushed rock</b> million tonnes	<b>Sand &amp; gravel (total)</b> million tonnes
<b>1980</b>	607,787	50,728	199	103	96
	599,011	45,829	182	92	89
	610,489	47,487	194	103	91
	632,065	51,576	213	112	101
	648,325	53,627	211	111	100
<b>1985</b>	671,375	54,219	217	115	102
	697,894	56,178	228	123	106
	729,638	62,580	254	142	111
	765,932	68,616	291	162	130
	782,429	71,857	300	169	131
<b>1990</b>	788,152	72,085	278	162	116
	777,403	66,841	246	148	98
	779,563	64,033	233	144	89
	798,489	62,823	239	150	89
	833,681	62,589	259	162	98
<b>1995</b>	857,522	63,381	241	151	90
	880,854	65,776	215	133	82
	908,655	67,369	220	134	86
	938,101	68,411	218	132	86
	966,551	69,294	221	133	88
<b>2000</b>	1,005,542	69,676	219	130	89
<b>2001</b>	1,027,906	71,087	222	134	88
<b>2002</b>	1,048,456	74,090	210	127	83
<b>2003</b>	1,074,858	77,852	203	123	80
<b>2004</b>	1,108,890	80,254	214	128	86
<b>2005</b>	1,127,741	79,540	204	122	82
<b>2006</b>	1,157,062	80,569	204	123	81

\* Marine sand and gravel volumes include only GB landings for construction purposes.

<b>Sand &amp; gravel (marine)*</b> million tonnes	<b>Recycled/ secondary (GB)</b> million tonnes (est)	<b>Total aggregates (GB)</b> million tonnes	<b>Asphalt (GB)</b> million tonnes	<b>Ready-mixed concrete (GB)</b> 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	48	268	27.5	22.33
13	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	67	281	26.9	23
13	68.3	272	27.9	22.4
13	70	274	25.7	22.9

# Appendices

## Marine aggregate summary statistics 1998 - 2006

	<b>Area of seabed licensed for dredging (km<sup>2</sup>) *</b>	<b>Area available to be worked (km<sup>2</sup>) *</b>	<b>Area dredged (km<sup>2</sup>) *</b>	<b>Quantity dredged (m tonnes) **</b>
<b>1998</b>	1,458		222.6	20.47
<b>1999</b>	1,455		220.3	23.68
<b>2000</b>	1,464		155.4	20.68
<b>2001</b>	1,408	972	150.6	22.76
<b>2002</b>	1,359	896	149.8	21.93
<b>2003</b>	1,264	890	143.8	22.23
<b>2004</b>	1,257	780	134.5	21.45
<b>2005</b>	1,179	596	137.6	21.09
<b>2006</b>	1,316	576	140.6	24.18

\* Extracted from 'Marine Aggregate Dredging - The Area Involved' annual reports published by BMAPA and The Crown Estate between 1998 and 2006 and 'Marine Aggregate Dredging Five Year Review - The Area Involved 1998 - 2007' published by BMAPA and The Crown Estate in 2005.

\*\* Extracted from annual 'Marine Aggregates, Crown Estate Licences, Summary Statistics' reports published by The Crown Estate between 1998 and 2007. Overall production comprises GB landings of construction aggregates, export landings of construction aggregates and beach replenishment/contract fill.

# BMAPA members and dredging fleet

BMAPA member	Vessel	Built	Capacity (cubic metres)	Capacity (tonnes)	Age (years) (at 2006)
<b>Brittania Aggregates</b>	<i>Britannia Beaver</i>	1991	2775	4800	15
<b>CEMEX UK Marine</b>	<i>Sand Falcon</i>	1998	4000	6920	8
	<i>Sand Fulmar</i>	1998	4000	6920	8
	<i>Sand Harrier</i>	1990	2700	4671	16
	<i>Sand Heron</i>	1990	2700	4671	16
	<i>Sand Serin</i>	1974	900	1557	32
	<i>Sand Weaver</i>	1974	2400	4152	32
	<i>Welsh Piper</i>	1987	790	1367	19
<b>DEME Building Materials</b>	<i>Charlemagne</i>	2002	5000	8650	4
<b>Hanson Aggregates Marine</b>	<i>Arco Adur</i>	1988	2890	5000	18
	<i>Arco Arun</i>	1987	2890	5000	19
	<i>Arco Avon</i>	1986	2890	5000	20
	<i>Arco Axe</i>	1989	2890	5000	17
	<i>Arco Beck</i>	1989	2600	4500	17
	<i>Arco Dart</i>	1990	700	1250	16
	<i>Arco Dee</i>	1990	700	1250	16
	<i>Arco Dijk</i>	1992	5100	8800	14
	<i>Arco Humber</i>	1972	4800	8000	34
<b>Norwest Sand &amp; Ballast</b>	<i>Sand Swan</i>	1970	840	1453	36
<b>Northwood (Fareham)</b>	<i>Donald Redford</i>	1981	510	880	25
	<i>Norstone</i>	1971	1075	1860	35
<b>United Marine Aggregates</b>	<i>City of Cardiff</i>	1997	1300	2300	9
	<i>City of Chichester</i>	1997	1300	2300	9
	<i>City of London</i>	1990	2775	4800	16
	<i>City of Westminster</i>	1990	3000	5200	16
			61525	106301	17.296
			Total Fleet Capacity	Total Fleet Capacity	Average Vessel Age

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



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BMAPA is one of the constituent bodies  
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The trade association for all aggregates, asphalt,  
ready-mixed concrete, mortar, silica sand and lime