

# Marine aggregate dredging 1998-2007

## A TEN-YEAR REVIEW

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### Images on pages 11, 13, 15, 17, 19, 21 and 23:

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N.B. i) - Dredging intensity is based on variable grid cells of 50m by 50m.

ii) Licensed dredging areas 2007 are depicted as of 31/12/2007.

iii) 6nm and 12nm as at 1/1/2007.

## Executive summary

This report takes a ten-year overview of an initiative launched in 1999 as a means of reporting the dredging footprint of the UK marine aggregate industry. It reflects the commitment by both the industry and The Crown Estate to review on an annual basis both dredging activity and licence areas and to surrender those areas no longer containing economic sand and gravel resources.

Over ten years, the 'Area Involved' initiative has generated high-quality, high-resolution data, analysis of which provides valuable environmental performance indicators for the marine aggregate sector. The reporting of dredging activity is made possible by an Electronic Monitoring System, developed by The Crown Estate and industry, and required on all vessels dredging in licensed areas.

The review provides figures, and demonstrates trends, across three key indicators:

- **Area of seabed licensed** – focusing not just on changes to the area but also on distance offshore.
- **Area of seabed dredged** – again, distance offshore provides a useful guide to the trends over time.
- **Cumulative dredge footprint** – the overall footprint over time has implications for the extent and intensity of the sector's potential for environmental impact. Intensity can also be gauged from averaged extraction depths across the cumulative footprint.

New technology and better understanding of its licensed resources has enabled the industry's operations to become more focused and so reduce its footprint. The overall decrease in areas licensed and dredged over ten years reduces the potential for impact on other marine activities ranging from nature conservation features to fishing and offshore energy.

The industry and The Crown Estate remain committed to maintaining the 'Area Involved' reporting initiative. In addition to reviewing all licences over a rolling five-year period, they will be utilising new longer-time series data provided by the ten-year cumulative footprint to undertake a comprehensive review of all licence areas.

## Key figures 1998-2007

### Area licensed

- The area of seabed licensed decreased by a net 387.09km<sup>2</sup>, with the greatest reductions occurring within 12nm of the coast.
- 749.84km<sup>2</sup> of licensed area was surrendered.
- 362.44km<sup>2</sup> of new area was licensed, the majority of which was beyond 12nm.



### Area dredged

- The area of seabed dredged in a single year ranged from 222.60km<sup>2</sup> in 1998 to 134.51km<sup>2</sup> in 2004.

### Cumulative footprint

- The total area of seabed dredged between 1998 and 2007 amounted to 463.71km<sup>2</sup>, of which 54.52 km<sup>2</sup> (11.76 per cent) is no longer licensed.
- The area of new seabed dredged annually has reduced from 75.44km<sup>2</sup> in 1999 (34 per cent of the total area<sup>1</sup>) to 11.79km<sup>2</sup> in 2007 (8.76 per cent of the total area).
- Over the full ten-year period (1998-2007), the average area of new seabed dredged each year was 26.79km<sup>2</sup>, however during the most recent five-year period (2003-2007) this figure has reduced to 16.73km<sup>2</sup>/year.
- A total of 221.215 million tonnes of marine sand and gravel was dredged from Crown Estate licence areas between 1998 and 2007. Averaged across the cumulative footprint, this represents 29cm of sediment being removed across the entire area dredged – equivalent to a single pass of a drag head.

<sup>1</sup> For the purposes of this review, a 1998 baseline was adopted from which point onwards all area dredged was assumed to be newly dredged. The majority of licence areas will have been dredged for a number of years prior to this date.

## Introduction

In 1999, the British Marine Aggregate Producers Association (BMAPA) and The Crown Estate made a public statement of intent which committed both parties to reviewing all dredging licences over a rolling five-year period, surrendering areas no longer containing useful resources of sand and gravel and publishing an annual report detailing the extent of dredging within licensed areas.

In delivering this commitment, annual 'Area Involved' reports have been produced and widely disseminated in both electronic and hard copy form. The eleventh report is now available (2009) covering data from 2008.

In 2005, a five-year review was produced summarising the changes to the area of seabed licensed and dredged that had occurred between 1998 and 2002. This report also introduced the concept of the cumulative dredge footprint, applied to data collected between 1998 and 2002 at both national and regional levels.

This report builds on the original five-year review by updating the principle changes that have taken place in the area of seabed licensed and dredged over a ten-year period between 1998 and 2007. Further information on the cumulative dredge footprint over the same period is also presented at both a national and regional scale.

National and regional statistics for area of seabed licensed, area dredged and cumulative dredge footprint are provided at the end of this report, along with regional charts showing the cumulative footprint.



## Electronic Monitoring System

Accurate information on the extent and intensity of dredging operations on Crown Estate licence areas is only possible through analysis of data recorded through an Electronic Monitoring System (EMS). Since 1993, The Crown Estate has required all vessels dredging on their licence areas to be fitted with such systems.

The EMS automatically records the date, time and position of all dredging activity, and automatically transmits this information back to The Crown Estate's managing agents and the scientific advisor to the industry's regulators for monitoring purposes.

Since 1993, over 450,000 hours of dredging tracks comprising 54 million individual dredging records, which equates to approximately 1.4 million kilometres of dredge track, have been stored and checked against conditions attached to production licences.

## Mitigating and managing

The UK's marine aggregate industry has come a long way since the 1700s when gangs of men used shovels to load sand and gravel into barges beached on sand banks at low water. Where in those days the need was simply for ballast, the industry now produces over 20 million tonnes that are essential to construction, to beach protection – and to our modern world.

Today's industry has also matured in terms of its recognition that dredging is not an “out of sight, out of mind” activity but an operation with the potential for impact on sensitive marine environments. BMAPA and The Crown Estate have insisted that, in terms of its control, management and compliance, the performance of the marine aggregate sector should be as good, if not better, than other UK marine development sectors. Regional Environmental Assessments (REAs) are a particularly good example – a ground-breaking, innovative solution to planning and development issues that also makes a significant contribution to the knowledge base for the marine environment as a whole. World-class science is enabling operators, regulators and their advisors to make robust, consistent, evidence-led decisions with confidence.

Crucial to this approach has been the outputs from projects funded through the Marine Aggregate Levy Sustainability Fund (MALSF). By 2011, around £25 million will have been invested in a host of projects, many of which are applying cutting-edge science to extend and develop our understanding of the marine environment and the issues associated with marine aggregate extraction.

The outcome of the MALSF's work needs to be viewed in tandem with that initiated by operators and The Crown Estate themselves, not least in establishing a world-class regionally-based monitoring and management regime for the newer licence areas in the East English Channel, following a ground breaking Regional Environmental Assessment process.

The challenge now is to ensure that the significant developments in knowledge and understanding are applied to the future management of marine aggregate extraction.

### More information

Marine ALSF programme: [www.alsf-mepf.org.uk](http://www.alsf-mepf.org.uk)

Completed research: [www.marinealsf.org.uk](http://www.marinealsf.org.uk)



## Area of seabed licensed

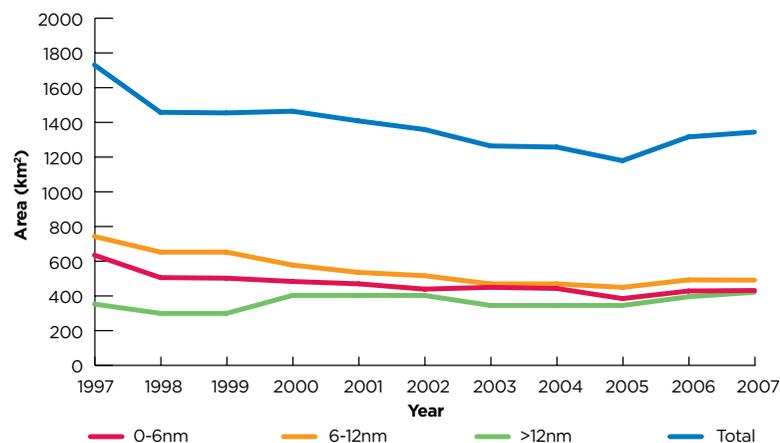
The area of seabed licensed for marine aggregate extraction continues to form a cornerstone of the 'Area Involved' initiative and, in turn, an indicator of both The Crown Estate's and the industry's overall commitment to sustainable management. Annual reporting has focused on two main indicators: changes to the total area of seabed licensed; and the relationship between licensed area and distance offshore.

Over the ten-year period between 1998 and 2007, the area of seabed licensed has decreased by a net 387.09km<sup>2</sup>, totalling 1343.81km<sup>2</sup> at the end of 2007. During this period, 749.84km<sup>2</sup> of licensed area has been surrendered, mainly from the Humber, East Coast, Thames Estuary and the South Coast regions, where 676.77km<sup>2</sup> was returned. The surrendered areas were predominantly older licence areas located within 12nm of the shore.

Over the same period, a total of 362.75km<sup>2</sup> of new licensed area was issued by The Crown Estate, following Government dredging permissions. Developments in survey technology and geological understanding, together with a greater awareness of the environmental issues surrounding marine aggregate extraction, have resulted in smaller licence areas being permitted, which correspond more closely to the sand and gravel resource.

As the majority of near-shore sand and gravel resources have already been licensed, many of the new areas being permitted are located further offshore. The licensing of offshore areas is reflected in the increase in licensed area beyond 12nm.

**Area of seabed licensed 1998-2007**



## Area of seabed dredged

A further indicator of the industry's performance is the area of seabed dredged, determined from analysis of Electronic Monitoring System (EMS) data.

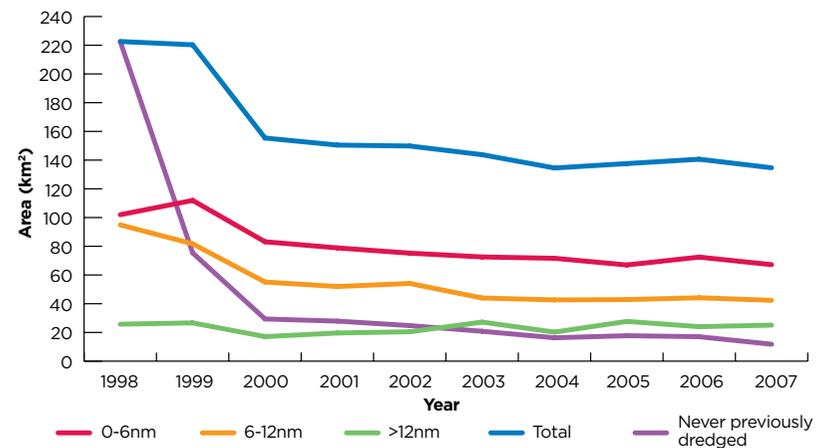
The total area of seabed dredged has fallen from 222.60km<sup>2</sup> in 1998, to 134.66km<sup>2</sup> in 2007, with the lowest annual value being 134.51km<sup>2</sup> dredged in 2004. While the area dredged within 12nm has steadily reduced, the area dredged beyond 12nm has remained relatively stable, slightly increasing over the last three years.

At the beginning of the reporting initiative (1998), the majority of dredging activity (88 per cent by area) took place within 12nm. This corresponds to the distribution of production licence areas, the majority of which (80 per cent by area) also lie within this zone.

Using 2007 as a modern baseline, the majority of dredging activity (81 per cent by area) continues to take place within 12nm, while the majority of production licence areas also continue to be located in this zone (69 per cent by area).

Overall, both the area of seabed permitted and dredged has significantly reduced over the last ten years. However, the time series data also shows that both indicators distribution relative to distance offshore has shifted slightly - reflecting the growing importance of dredging operations beyond 12nm.

**Area of seabed dredged 1998-2007**



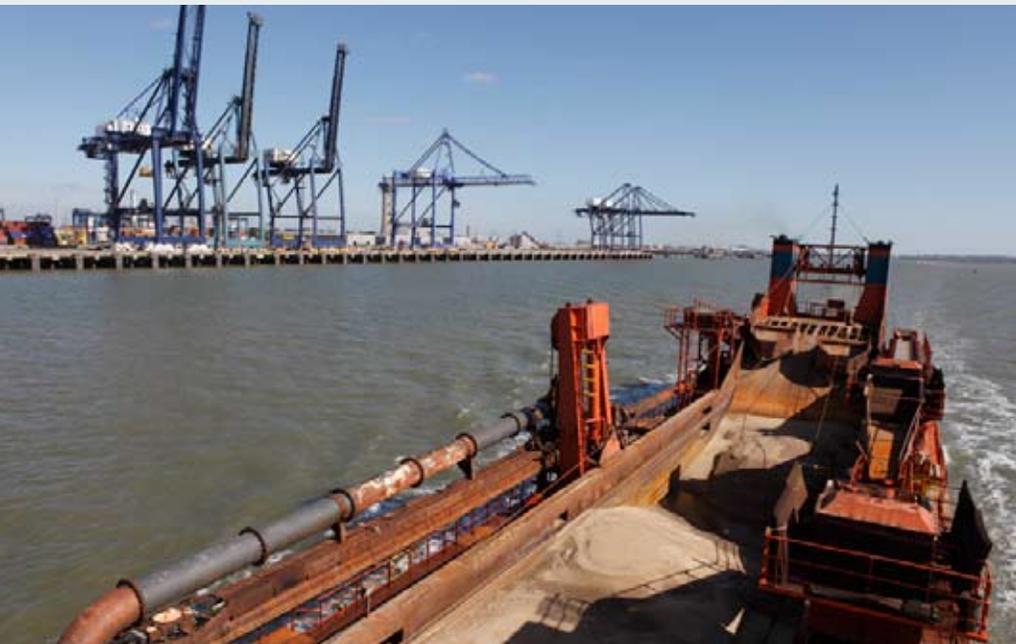
## The concept of the cumulative dredge footprint

The overall footprint of marine aggregate dredging activity over time has implications for both the extent and the intensity of the sector's potential for environmental impact. This in turn should have a bearing on how marine aggregate operations could be most effectively planned, regulated and managed.

While the 'Area Involved' reports present the area of seabed dredged in each year, analysis of the cumulative dredge footprint allows comparisons of longer-term changes in the extent of the area of seabed dredged annually through year-on-year comparison.

A cumulative footprint is generated by layering each year's complete dredging records on top of one another in a Geographic Information System. By analysing the annual dredge data in this way, it is possible to identify which areas have been repeatedly dredged, and which have been dredged for a single year.

The resultant footprint is, therefore, able to show the overall extent of dredging operations over the ten-year period between 1998 and 2007, while the associated data for year-on-year change in area also allow temporal trends in the dredging footprint to be identified.



## National cumulative dredge footprint

A total area of 463.71km<sup>2</sup> has been dredged from within Crown Estate licence areas in UK waters over the ten-year period from 1998 to the end of 2007. Of this, 17.19km<sup>2</sup> was repeatedly dredged in each of the ten years, representing 3.7 per cent of the total footprint.

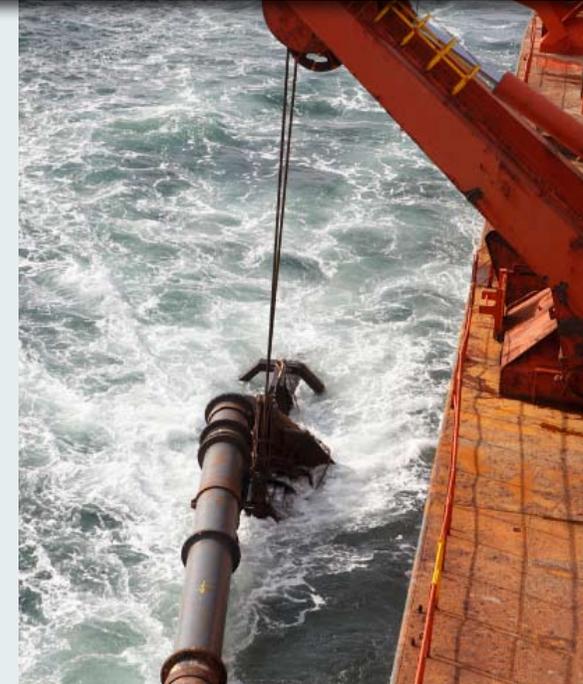
Taking the 1998 dredged footprint as a baseline position (222.60km<sup>2</sup>), over the following nine-year period a further 241.11km<sup>2</sup> was dredged. Averaged across the whole period, this represents 26.79km<sup>2</sup> of new area being dredged every year. However, taking the most recent five years (2003-2007) in isolation, this average falls to 16.73km<sup>2</sup> of newly dredged seabed each year.

The cumulative footprint analysis further allows the individual year-on-year changes in newly dredged seabed area to be identified. This shows a significant reduction over the reporting period - from 75.44km<sup>2</sup> in 1999 (representing 34.24 per cent of the 1999 footprint <sup>1</sup>) to 11.79km<sup>2</sup> in 2007 (representing 8.76 per cent of the 2007 footprint).

The area of cumulative footprint which remains licensed and available to be dredged in 2007 and beyond is 409.19km<sup>2</sup>. A total of 54.52km<sup>2</sup> or 11.76 per cent of the total 1998 to 2007 cumulative footprint is no longer licensed.

Overall, while the cumulative dredge footprint continues to increase year-on-year, the area of seabed that is newly dredged in each year has significantly reduced over the period 1998-2007, in line with the reductions in the overall area of seabed dredged. This trend very much reflects the desire to manage dredging operations to minimise not only the potential environmental footprint of marine aggregate operations, but also to reduce the wider potential for spatial conflicts with other marine users.

<sup>1</sup> For the purposes of this review, a 1998 baseline was adopted from which point onwards all area dredged was assumed to be newly dredged. The majority of licence areas will have been dredged for a number of years prior to this date.



## Extraction depths across the cumulative dredge footprint

An indication of the intensity of marine aggregate dredging activity can be derived from analysing the total tonnage of sand and gravel that has been removed from the dredged area.

Over the ten-year period from 1998 to 2007, 221.215 million tonnes of marine sand and gravel was extracted from Crown Estate licence areas for use as construction aggregate (in UK and overseas), for beach nourishment and for contract fill.

By converting this tonnage to cubic metres (1m<sup>3</sup> being equivalent to 1.66 tonnes of sand and gravel or 1.5 tonnes of sand), the volume of sediment removed can be averaged across the cumulative dredge footprint for the same period, providing a useful estimate of seabed lowering across the dredging areas. On this basis, across all regions, the average volume of sediment extracted was 290,354m<sup>3</sup> per square kilometre dredged, which represents the removal of 29cm of sea bed sediment across the entire area dredged, the equivalent to a single pass of a drag head.

At a regional scale, the relationship between cumulative footprint and the tonnage removed demonstrates the variation in the extent and intensity of dredging activity. In the Thames Estuary, for example, the average depth of sediment removed across the dredged area was equivalent to 13.8cm – reflecting the relatively low tonnage removed (11.2 million tonnes) from a relatively wide area (48.85km<sup>2</sup>). By contrast, in the East English Channel, where the tonnage is broadly similar (13.6 million tonnes) but the dredged area is considerably reduced (11.17km<sup>2</sup>), the average depth of sediment removed across the cumulative footprint is greater – 73.4cm.

In reality, of course, the extraction activity will not be spread evenly across the dredged area and some areas of seabed will not be dredged at all. Consequently, the thicknesses of sediment removed per given unit area will vary according to the intensity of dredging operations and the depth limits of the sand and gravel deposits being targeted. Nevertheless, the relationship between dredged area and extraction tonnage provides a further indicator of the relative scale of dredging intensity, both over time and between regions.

	Tonnage (million tonnes)	Volume <sup>2</sup> (million m <sup>3</sup> )	Cumulative footprint (km <sup>2</sup> )	Volume extracted /km <sup>2</sup> (m <sup>3</sup> )	Depth removed/ cumulative footprint(m)
Humber	37.327	22.486	103.3	217,678	0.217
East Coast	88.973	53.598	185.51	288,924	0.288
Thames	11.224	6.761	48.85	138,415	0.138
East English Channel	13.619	8.204	11.17	734,531	0.734
South	48.581	29.265	78.21	374,196	0.374
South West	16.756	11.171	30.56	365, 543	0.365
North West	4.733	3.155	6.11	516,367	0.516
<b>TOTAL</b>	<b>221.215</b>	<b>134.64</b>	<b>463.71</b>	<b>290,354</b>	<b>0.290</b>

<sup>2</sup> Volume conversion based on 1.66 tonnes/m<sup>3</sup> for all regions except South West and North West, where 1.5 tonnes/m<sup>3</sup> is used to reflect the sand resource extracted.



## Policy, regulation and management

Over the first ten years of the 'Area Involved' reporting initiative, there have been marked changes in the extent and distribution of both the area of seabed licensed and the area of seabed dredged at both national and regional levels.

The overall reduction in the area of seabed both licensed and dredged over the period 1998-2007 has reduced the marine aggregate sectors potential for impact on other marine interests, such as offshore nature conservation features, the fishing industry and offshore renewable energy development.

Use of more accurate navigation and communication technologies, coupled with a better understanding of the quality and distribution of licensed sand and gravel resources, have enabled the industry to control dredging operations far more effectively. This has resulted in dredging operations becoming more focused, reflected in the corresponding reduction in the overall area of seabed dredged.

Environmental policy, regulation and management also have a significant influence on the way the marine aggregate industry operates.

Marine Minerals Guidance 1 in English waters and the Interim Marine Aggregate Dredging Policy in Welsh waters define the current policy context, controlled under statutory Marine Mineral Dredging regulations introduced in 2007, which enact the requirements of the European EIA, Habitats and Birds Directives.

The forthcoming Marine & Coastal Access Act and the associated policy, planning and licensing elements likely to result will mean that the processes and mechanisms for delivering marine aggregate regulation and control will further evolve, as marine management moves towards a more integrated, holistic approach.

However, the value of voluntary, 'best practice' measures adopted by individual operators for both resource and environmental management purposes should not be underestimated. The 'Area Involved' initiative demonstrates just how effective a proactive co-operative approach (between seabed owner and industry) can be to responsible management in supporting sustainable marine development.



## Conclusion

The 'Area Involved' initiative has provided a high quality, high resolution time series set of data for key environmental performance indicators relating to UK marine aggregate industry operations.

The evolution of annual reports and the periodic reviews reflect the efforts made by both the marine aggregate industry and The Crown Estate to meet their commitment to review licence areas and to surrender areas no longer containing economic sand and gravel resources.

The greatest changes have come from voluntary 'good practice' initiatives, applied by operators to existing production licence areas and driven by the industry's desire to minimise the potential for impact and to improve the efficiency of operations. However, as existing production licence areas are renewed or consents for new areas issued, the role of more formal regulation and control has become increasingly influential.

As the various components of the Marine & Coastal Access Act continue to evolve, and in particular the marine planning and marine protected area elements, spatial and temporal data relating to marine aggregate dredging activity will become increasingly important in supporting the sustainable management of marine aggregate extraction in UK waters.

In this respect, both the industry and The Crown Estate are committed to maintaining the 'Area Involved' reporting initiative. In addition to the continuing commitment to reviewing all licences over a rolling five-year period, The Crown Estate and the industry will be utilising the new longer time series data provided by the ten-year cumulative footprint to undertake a comprehensive review of all licence areas.



# Breaking down the national picture



The location of production licences around England and Wales and their grouping into seven distinct geographical regions reflects the discrete distribution of the sand and gravel deposits that are targeted by the industry. In total, the licences cover only about 0.12 per cent of the UK continental shelf, and of that area only about 10 per cent is dredged in any year. In this section of our review, we provide national statistics and then break them down by region.

## National summary statistics 1998-2007

### Total newly and previously dredged area

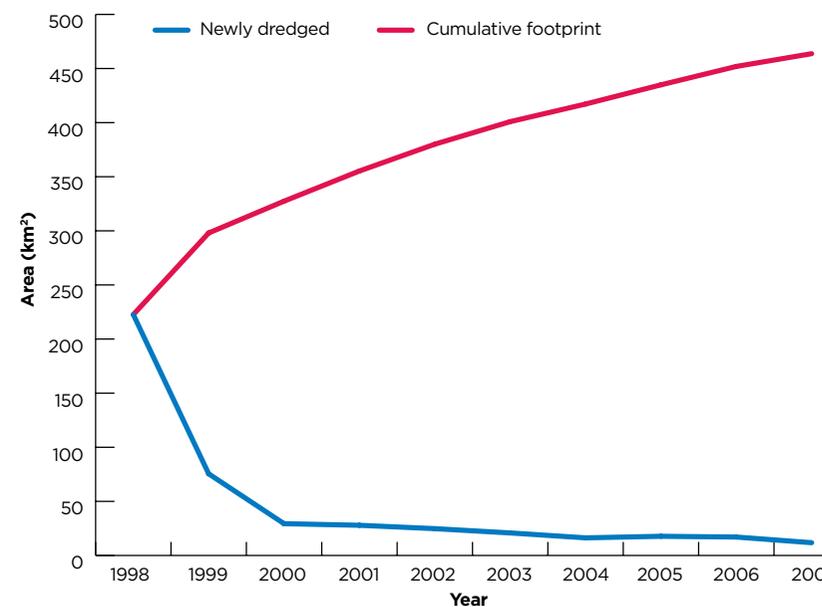
Year	Total	Newly dredged		Previously dredged	
	km <sup>2</sup>	km <sup>2</sup>	percent	km <sup>2</sup>	per cent
1998	222.60	222.60	100.00	0.00	0.00
1999	220.30	75.44	34.24	144.86	65.76
2000	155.38	29.37	18.90	126.01	81.10
2001	150.46	27.89	18.54	122.57	81.46
2002	149.81	24.77	16.53	125.04	83.47
2003	143.77	20.82	14.48	122.95	85.52
2004	134.51	16.28	12.10	118.23	87.90
2005	137.57	17.73	12.89	119.84	87.11
2006	140.62	17.02	12.10	123.60	87.90
2007	134.66	11.79	8.76	122.87	91.24
<b>Total extent</b>		<b>463.71</b>			

### Total newly dredged area as a percentage of cumulative footprint

Year	Annual newly dredged	Cumulative footprint	Percent of cumulative footprint newly dredged
	km <sup>2</sup>	km <sup>2</sup>	per cent
1998	222.60	222.60	100.00
1999	75.44	298.04	25.31
2000	29.37	327.41	8.97
2001	27.89	355.30	7.85
2002	24.77	380.07	6.52
2003	20.82	400.89	5.19
2004	16.28	417.17	3.90
2005	17.73	434.90	4.08
2006	17.02	451.92	3.77
2007	11.79	463.71	2.54



### Area of seabed newly dredged and cumulative footprint 1998-2007



## Humber region ten-year summary 1998-2007

### Summary

The majority of the area licensed in the region is beyond 12nm from the coast and most of the dredging occurs in licensed areas between 6nm and 12nm from the coast.

In general, more than 80 per cent of the annual area dredged over the ten-year period has been previously dredged, with only 2.25km<sup>2</sup> (2.18 per cent) dredged in all ten years.

### Area licensed

- The area of seabed licensed decreased by a net 19.14km<sup>2</sup>, with the greatest changes occurring beyond 12nm of the coast.
- 119.68km<sup>2</sup> licensed area was surrendered.
- 100.54km<sup>2</sup> of new area was licensed, the majority of which was beyond 12nm.

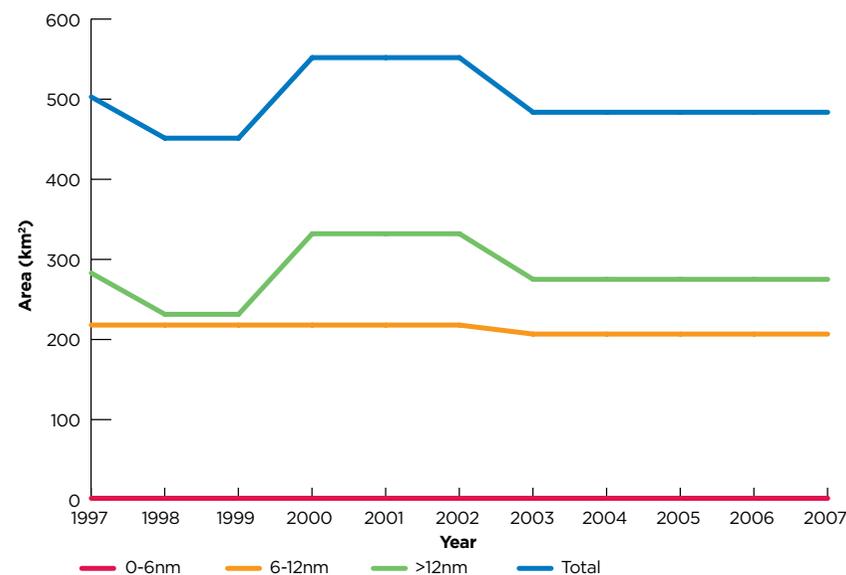
### Area dredged

- The area of seabed dredged in a single year ranged from 53.11km<sup>2</sup> in 1999 to 24.48km<sup>2</sup> in 2004.

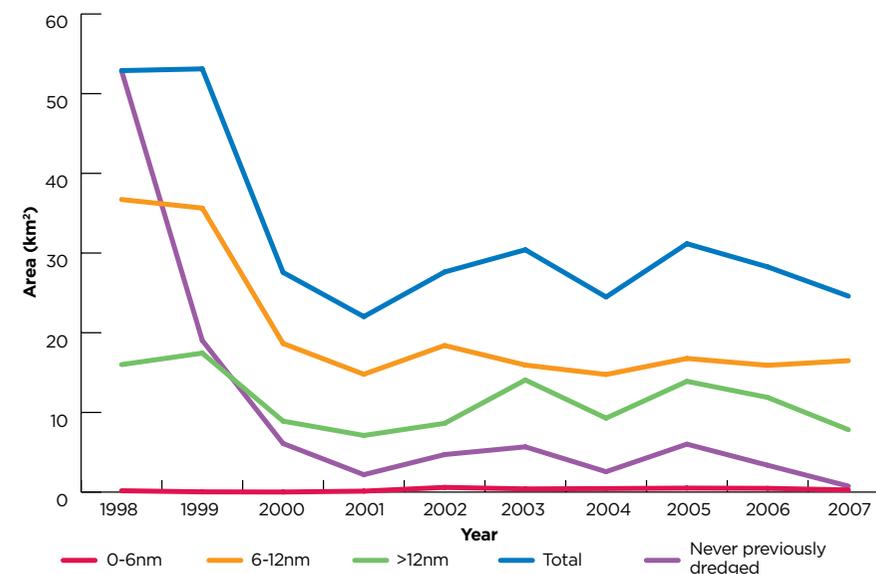
### Cumulative footprint

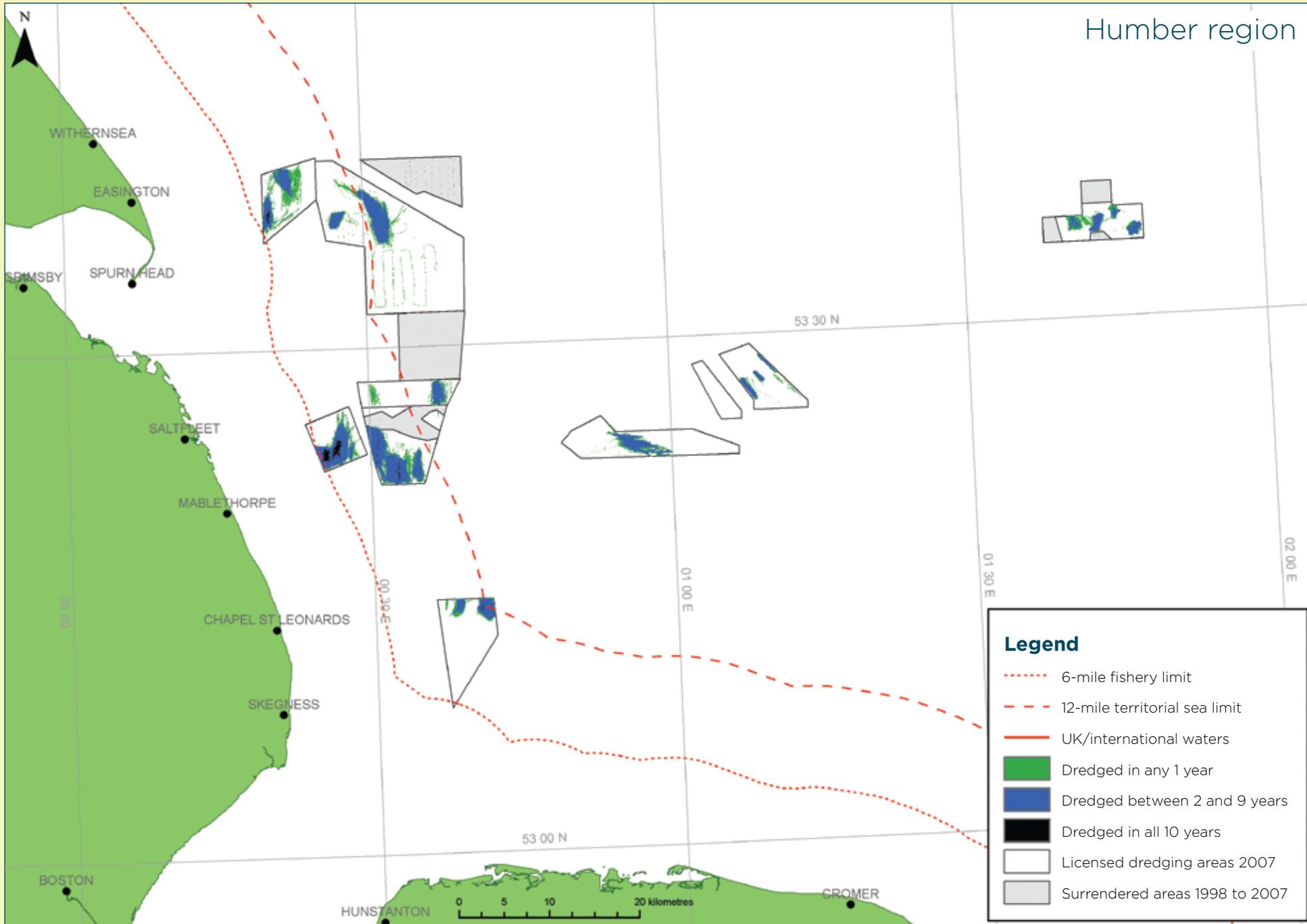
- The total area of seabed dredged between 1998 and 2007 – the ten-year cumulative footprint – amounted to 103.30km<sup>2</sup>.
- The area of new seabed dredged annually has reduced from 19.03km<sup>2</sup> in 1999 (35.83 per cent of the total area) to 0.75km<sup>2</sup> in 2007 (3.05 per cent of the total area).
- Over the full ten-year period (1998-2007), the average area of new seabed dredged each year was 5.60km<sup>2</sup>, however during the most recent five-year period (2003-2007) this figure has reduced to 3.68km<sup>2</sup>/year.
- A total of 37.327 million tonnes of marine sand and gravel was dredged from Crown Estate licence areas in the Humber region between 1998 and 2007. Averaged across the cumulative footprint, this represents 21.7cm of sediment removed across the area dredged.

### Area of seabed licensed 1998-2007



### Area of seabed dredged 1998-2007





## East Coast region ten-year summary 1998-2007

### Summary

The largest proportion of licensed area is between 6nm and 12nm from the coast, while the greatest proportion of dredging occurs within 6nm of the coast. Between 2004 and 2007 more than 90 per cent of the annual area dredged has been dredged previously and 7.74km<sup>2</sup> (4.17 per cent) has been dredged in all ten years.

### Area licensed

- The area of seabed licensed decreased by a net 141.62km<sup>2</sup>, with the greatest changes occurring within 12nm of the coast.
- 146.85km<sup>2</sup> licensed area was surrendered.
- 5.23km<sup>2</sup> of new area was licensed.

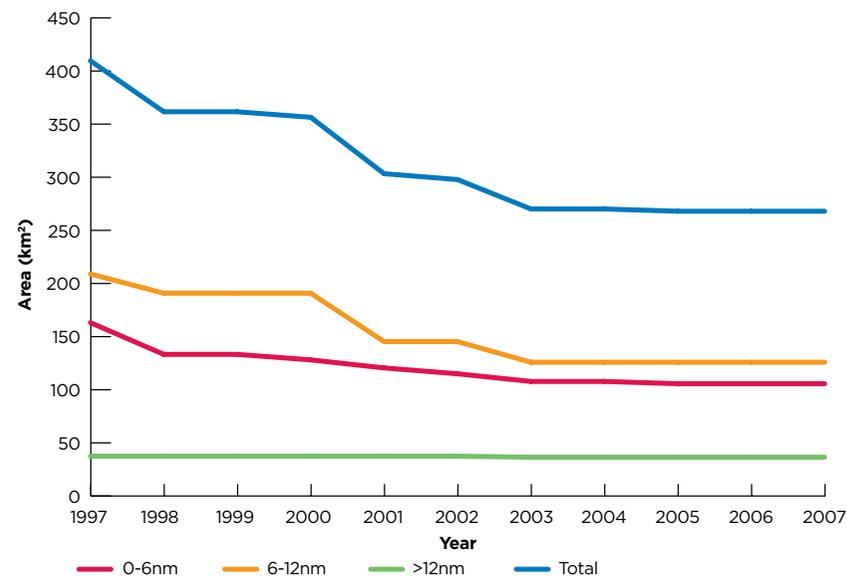
### Area dredged

- The area of seabed dredged in a single year ranged from 96.66km<sup>2</sup> in 1999 to 50.01km<sup>2</sup> in 2007.

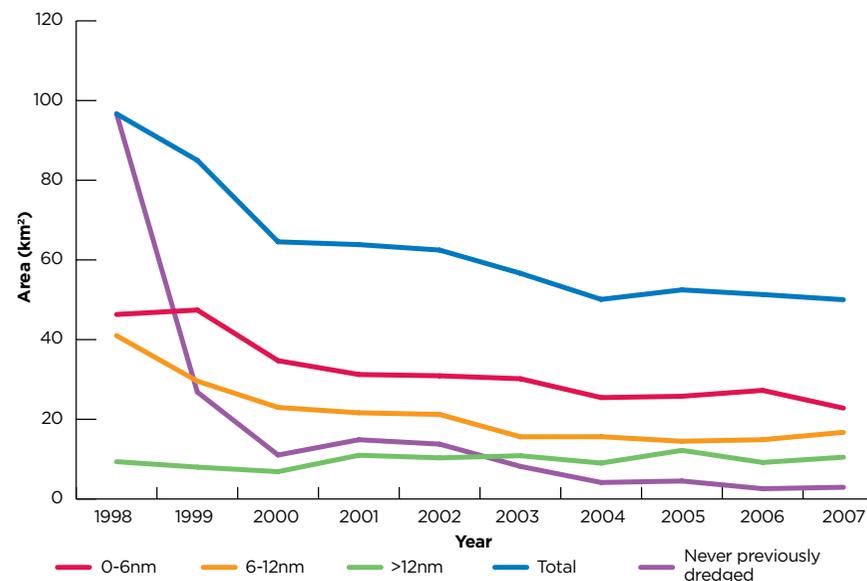
### Cumulative footprint

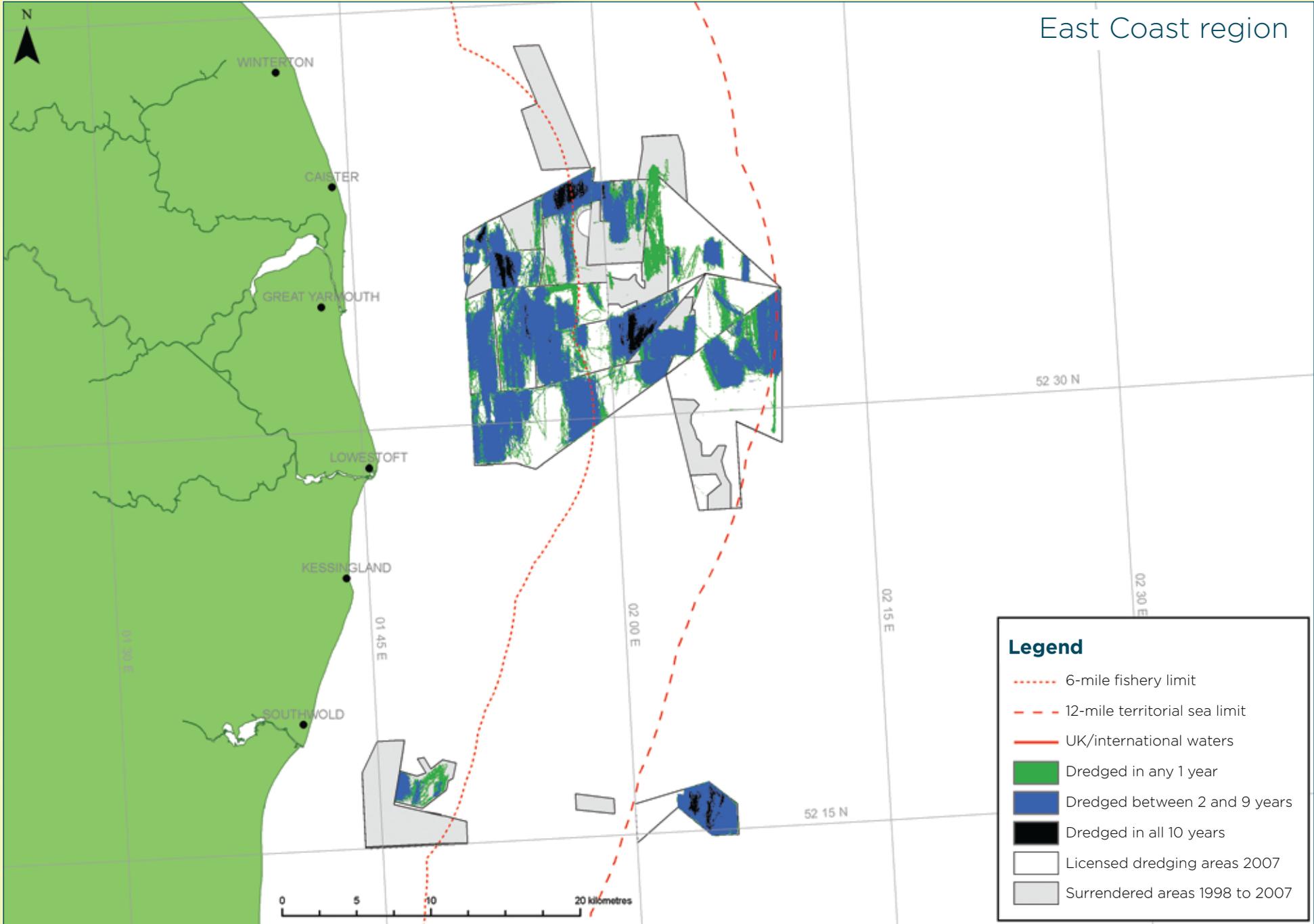
- The total area of seabed dredged between 1998 and 2007 - the ten-year cumulative footprint - amounted to 185.51km<sup>2</sup>.
- The area of new seabed dredged annually has reduced from 26.83km<sup>2</sup> in 1999 (31.56 per cent of the total area) to 2.58km<sup>2</sup> in 2006 (5.03 per cent of the total area).
- Over the full ten-year period (1998-2007), the average area of new seabed dredged each year was 9.87km<sup>2</sup>, however during the most recent five-year period (2003-2007) this figure has reduced to 4.47km<sup>2</sup>/year.
- A total of 88.973 million tonnes of marine sand and gravel was dredged from Crown Estate licence areas in the East Coast region between 1998 and 2007. Averaged across the cumulative footprint, this represents 28.8cm of sediment removed across the area dredged.

### Area of seabed licensed 1998-2007



### Area of seabed dredged 1998-2007





## Thames Estuary region ten-year summary 1998-2007

### Summary

**The majority of licensed area is within 6nm of the coast and almost all of the area dredged is within this area. Since 2001 more than 80 per cent of the annual area dredged has been dredged previously and only 1.50km<sup>2</sup> (3.07 per cent) has been dredged in all ten years.**

### Area licensed

- The area of seabed licensed decreased by a net 221.14km<sup>2</sup>, with the greatest changes occurring within 12nm of the coast.
- 230.19km<sup>2</sup> licensed area was surrendered.
- 9.05km<sup>2</sup> of new area was licensed.

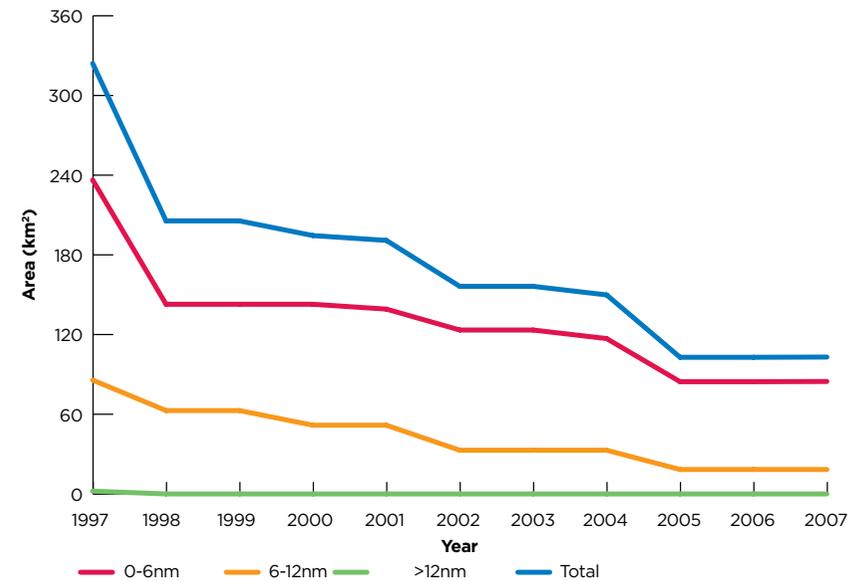
### Area dredged

- The area of seabed dredged in a single year ranged from 18.47km<sup>2</sup> in 1998 to 11.93km<sup>2</sup> in 2007.

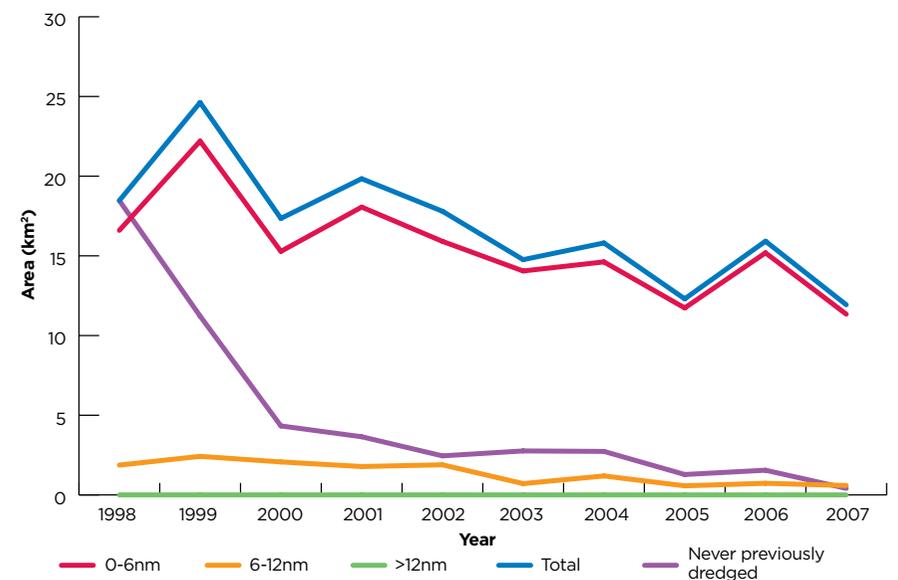
### Cumulative footprint

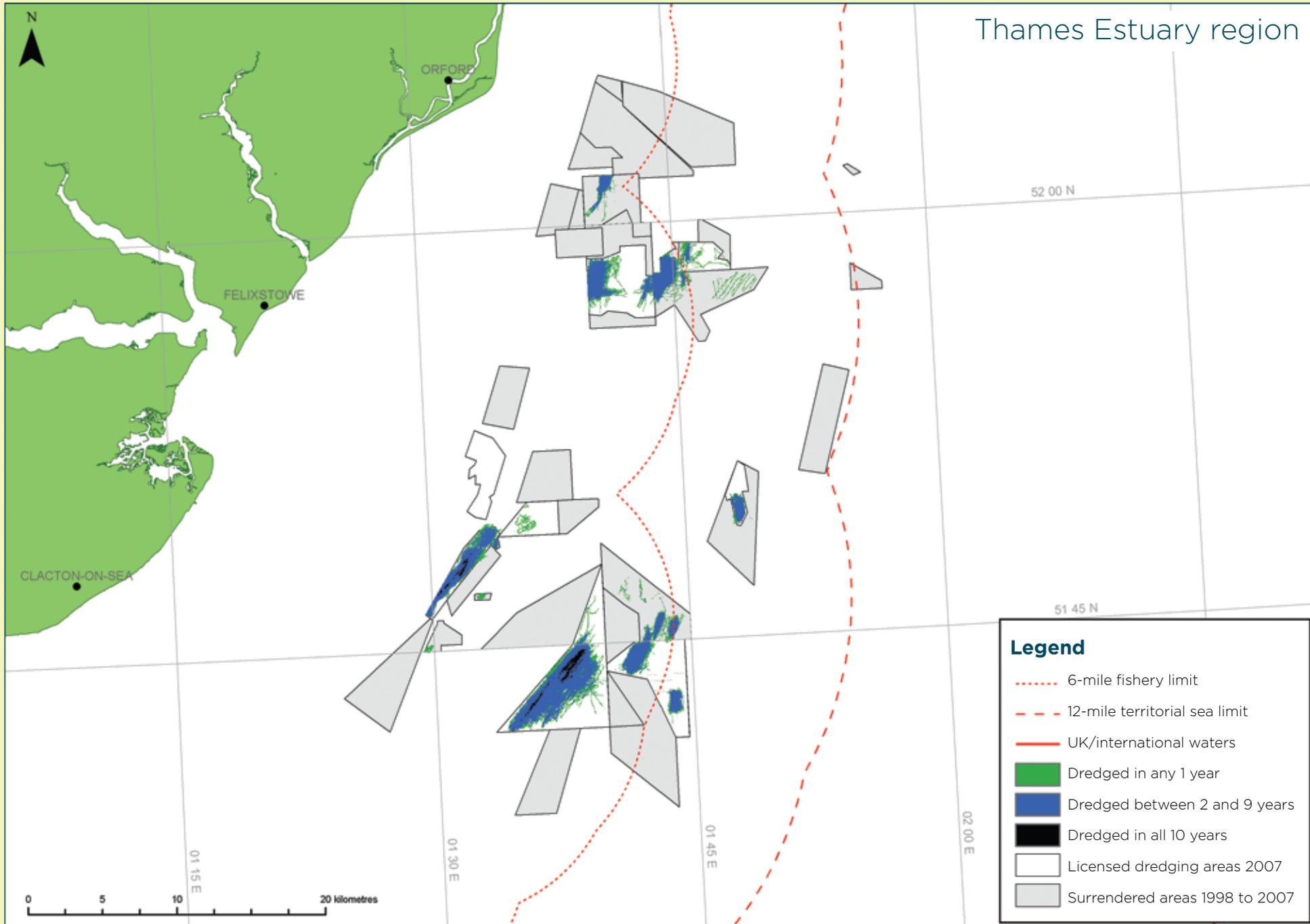
- The total area of seabed dredged between 1998 and 2007 - the ten-year cumulative footprint - amounted to 48.85km<sup>2</sup>.
- The area of new seabed dredged annually has reduced from 11.22km<sup>2</sup> in 1999 (45.57 per cent of the total area) to 0.41km<sup>2</sup> in 2007 (3.44 per cent of the total area).
- Over the full ten-year period (1998-2007), the average area of new seabed dredged each year was 3.38km<sup>2</sup>, however during the most recent five-year period (2003-2007) this figure has reduced to 1.75km<sup>2</sup>/year.
- A total of 11.224 million tonnes of marine sand and gravel was dredged from Crown Estate licence areas in the Thames region between 1998 and 2007. Averaged across the cumulative footprint, this represents 13.8cm of sediment removed across the area dredged.

### Area of seabed licensed 1998-2007



### Area of seabed dredged 1998-2007





## East English Channel region ten-year summary 1998-2007

### Summary

The majority of the area licensed until 2006 was between 6nm and 12nm of the coast, however since 2006, almost all of the area licensed is now beyond 12nm. This pattern is reflected in the area of seabed dredged. In general more than 90 per cent of the annual area dredged has been dredged previously until the introduction of the new offshore dredging areas in 2006. Only 0.60km<sup>2</sup> (5.37 per cent) of the area dredged has been dredged in all ten years.

### Area licensed

- The area of seabed licensed increased by a net 59.38km<sup>2</sup>, with the greatest changes occurring beyond 12nm of the coast.
- 20.27km<sup>2</sup> licensed area was surrendered.
- 79.65km<sup>2</sup> of new area was licensed, all of which was beyond 12nm.

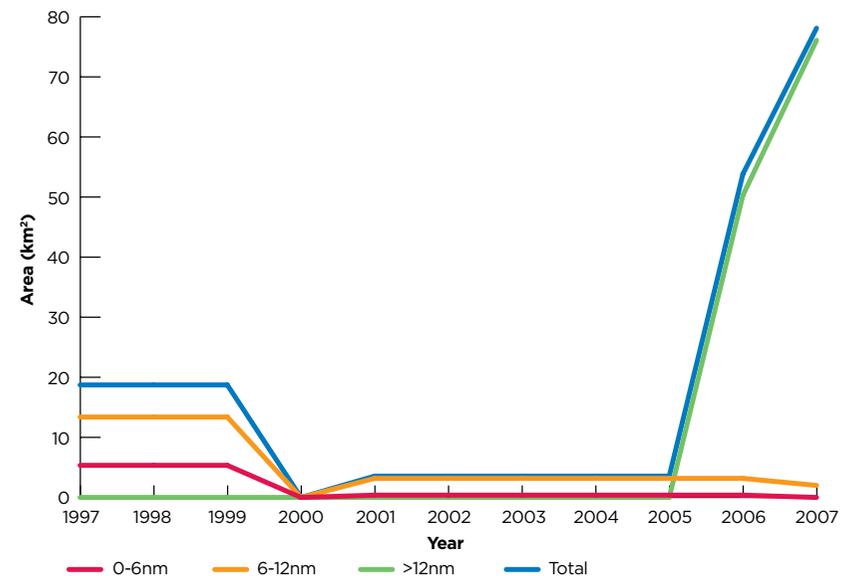
### Area dredged

- The area of seabed dredged in a single year ranged from 2.21km<sup>2</sup> in 2005 to 7.56km<sup>2</sup> in 2007.

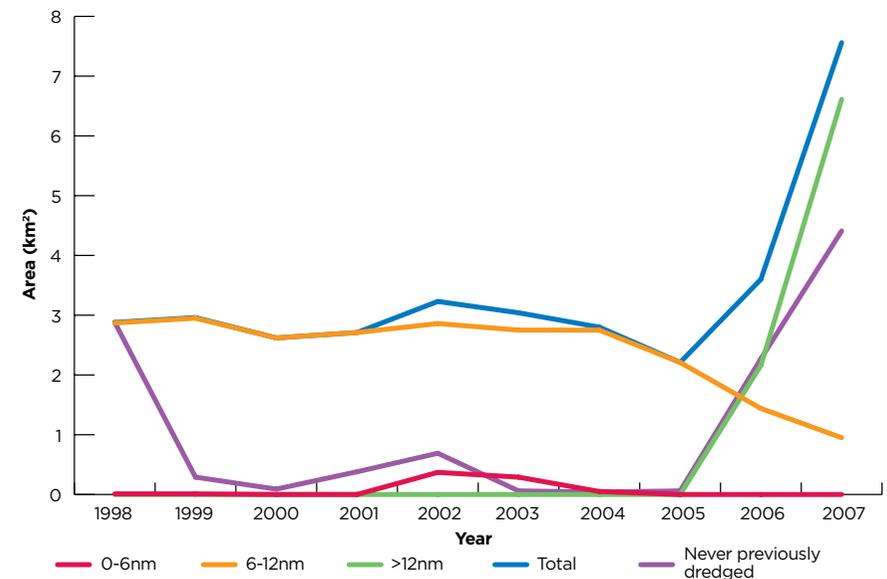
### Cumulative footprint

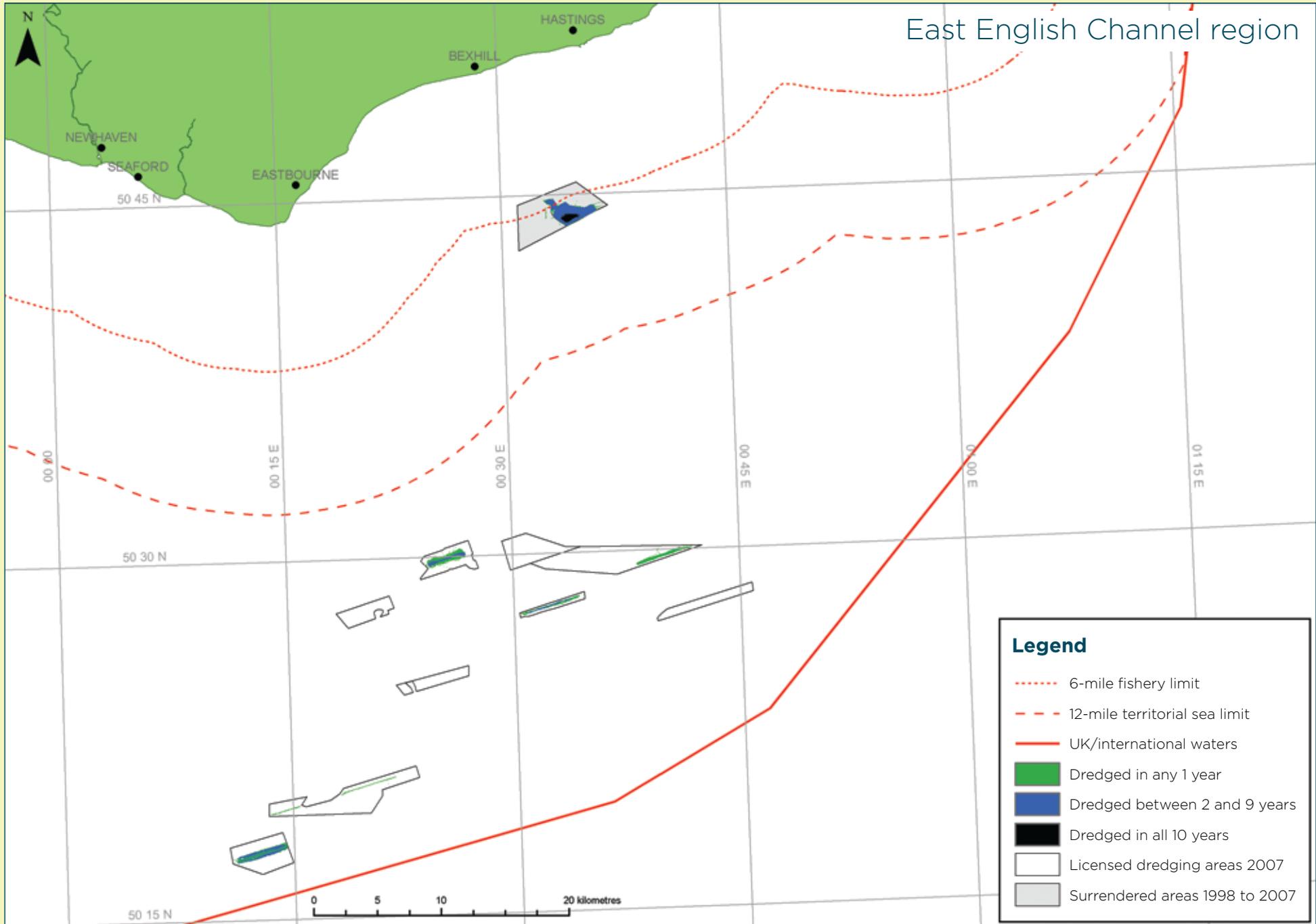
- The total area of seabed dredged between 1998 and 2007 - the ten-year cumulative footprint - amounted to 11.17km<sup>2</sup>.
- The area of new seabed dredged annually has increased from 0.04km<sup>2</sup> in 2004 (1.43 per cent of the total area) to 4.41km<sup>2</sup> in 2007 (58.33 per cent of the total area).
- Over the full ten-year period (1998-2007), the average area of new seabed dredged each year was 0.92km<sup>2</sup>, however during the most recent five-year period (2003-2007) this figure has increased to 1.37km<sup>2</sup>/year.
- A total of 13.619 million tonnes of marine sand and gravel was dredged from Crown Estate licence areas in the East English Channel region between 1998 and 2007. Averaged across the cumulative footprint, this represents 73.4cm of sediment removed across the area dredged.

### Area of seabed licensed 1998-2007



### Area of seabed dredged 1998-2007





## South Coast region ten-year summary 1998-2007

### Summary

The majority of the area licensed has alternated between 6nm and 12nm and within 6nm of the coast. The greatest proportion of area dredged has been within 6nm of the coast. In general more than 80 per cent of the annual area dredged has been dredged previously and only 2.95km<sup>2</sup> (3.77 per cent) has been dredged in all ten years.

### Area licensed

- The area of seabed licensed decreased by a net 98.48km<sup>2</sup>, with the majority of changes occurring within 12nm of the coast.
- 180.05km<sup>2</sup> licensed area was surrendered.
- 81.57km<sup>2</sup> of new area was licensed.

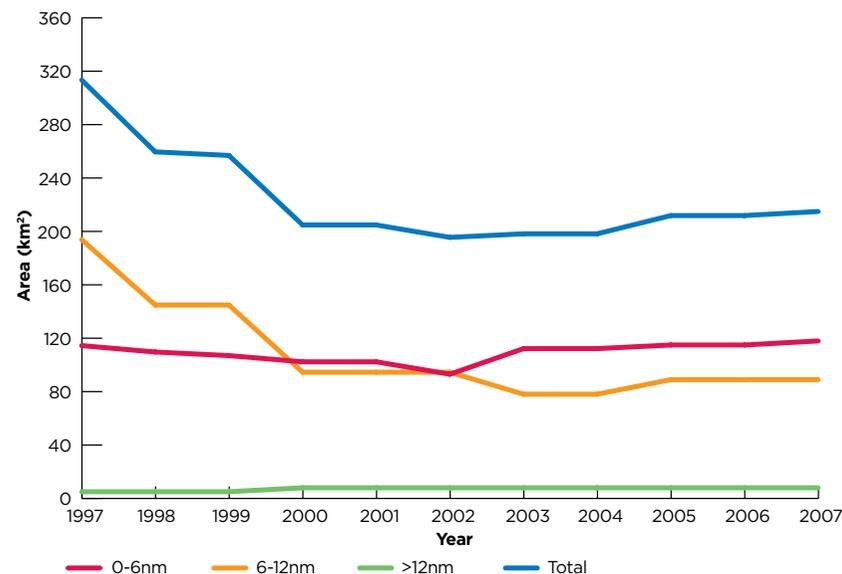
### Area dredged

- The area of seabed dredged in a single year ranged from 34.92km<sup>2</sup> in 1998 to 25.45km<sup>2</sup> in 2003.

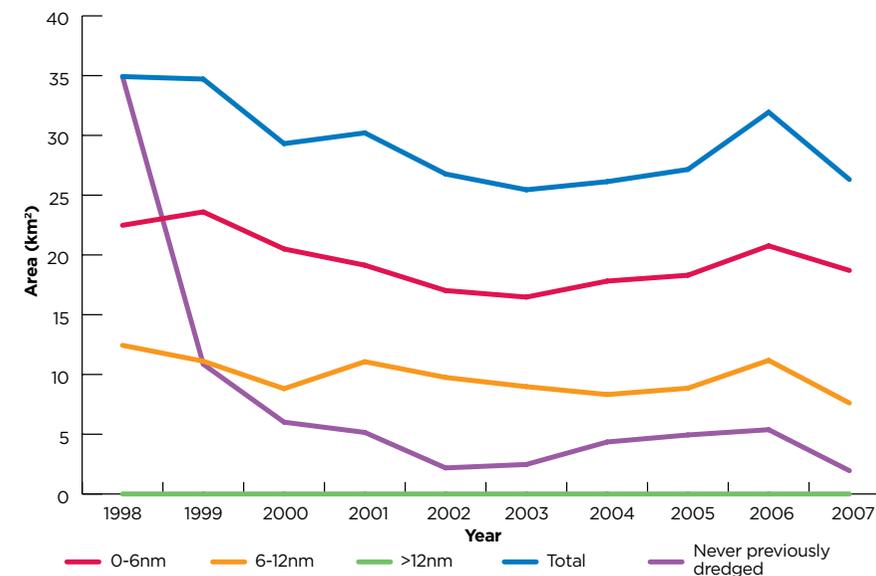
### Cumulative footprint

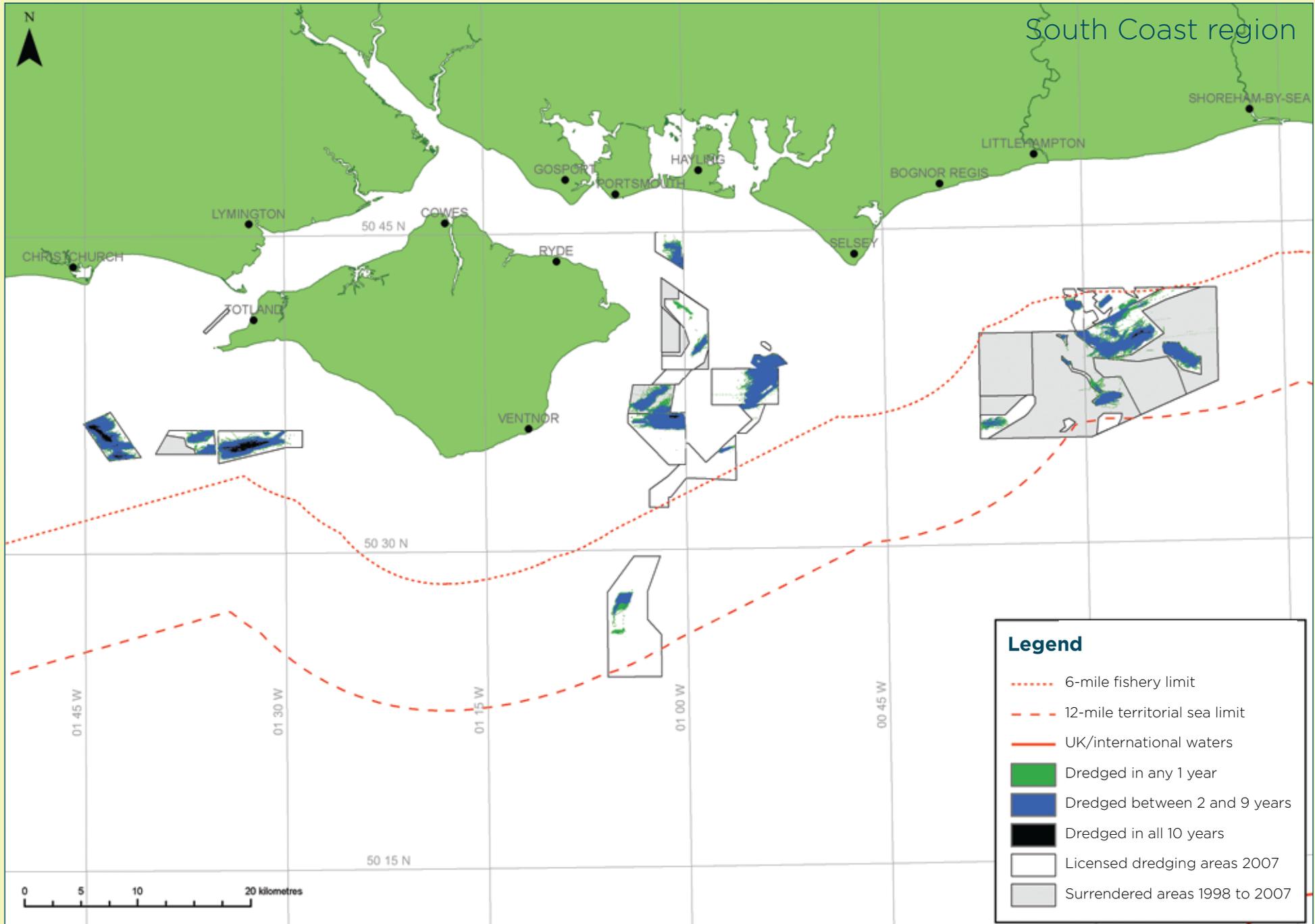
- The total area of seabed dredged between 1998 and 2007 - the ten-year cumulative footprint - amounted to 78.21km<sup>2</sup>.
- The area of new seabed dredged annually has reduced from 10.86km<sup>2</sup> in 1999 (31.29 per cent of the total area) to 1.95km<sup>2</sup> in 2007 (7.41 per cent of the total area).
- Over the full ten-year period (1998-2007), the average area of new seabed dredged each year was 4.81km<sup>2</sup>, however during the most recent five-year period (2003-2007) this figure has reduced to 3.82km<sup>2</sup>/year.
- A total of 48.581 million tonnes of marine sand and gravel was dredged from Crown Estate licence areas in the South Coast region between 1998 and 2007. Averaged across the cumulative footprint, this represents 37.4cm of sediment removed across the area dredged.

### Area of seabed licensed 1998-2007



### Area of seabed dredged 1998-2007





## South West region ten-year summary 1998-2007

### Summary

Until 2006 all of the area licensed in the region was within 6nm of the coast and over the ten-year period, all dredging has taken place within this area. In most years approximately 90 per cent of the annual area dredged has been dredged previously and 2.14km<sup>2</sup> (7.00 per cent) has been dredged in all ten years.

### Area licensed

- The area of seabed licensed increased by a net 76.88km<sup>2</sup>, with all of the changes occurring within 12nm of the coast.
- 9.82km<sup>2</sup> licensed area was surrendered.
- 86.70km<sup>2</sup> of new area was licensed.

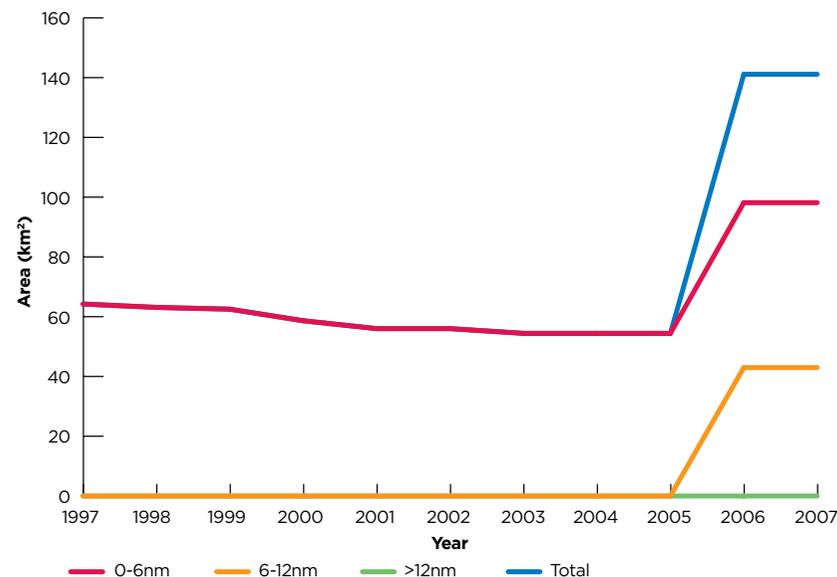
### Area dredged

- The area of seabed dredged in a single year ranged from 15.93km<sup>2</sup> in 1998 to 8.34km<sup>2</sup> in 2006.

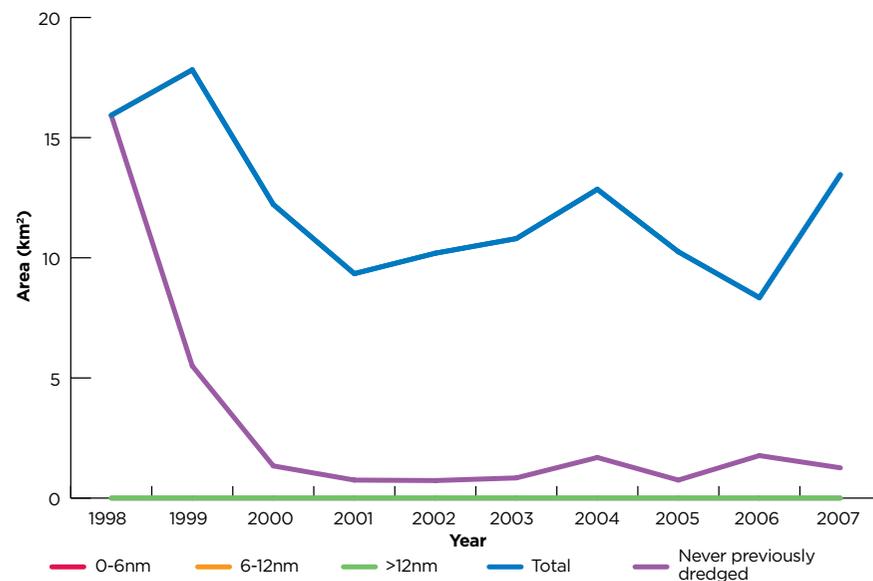
### Cumulative footprint

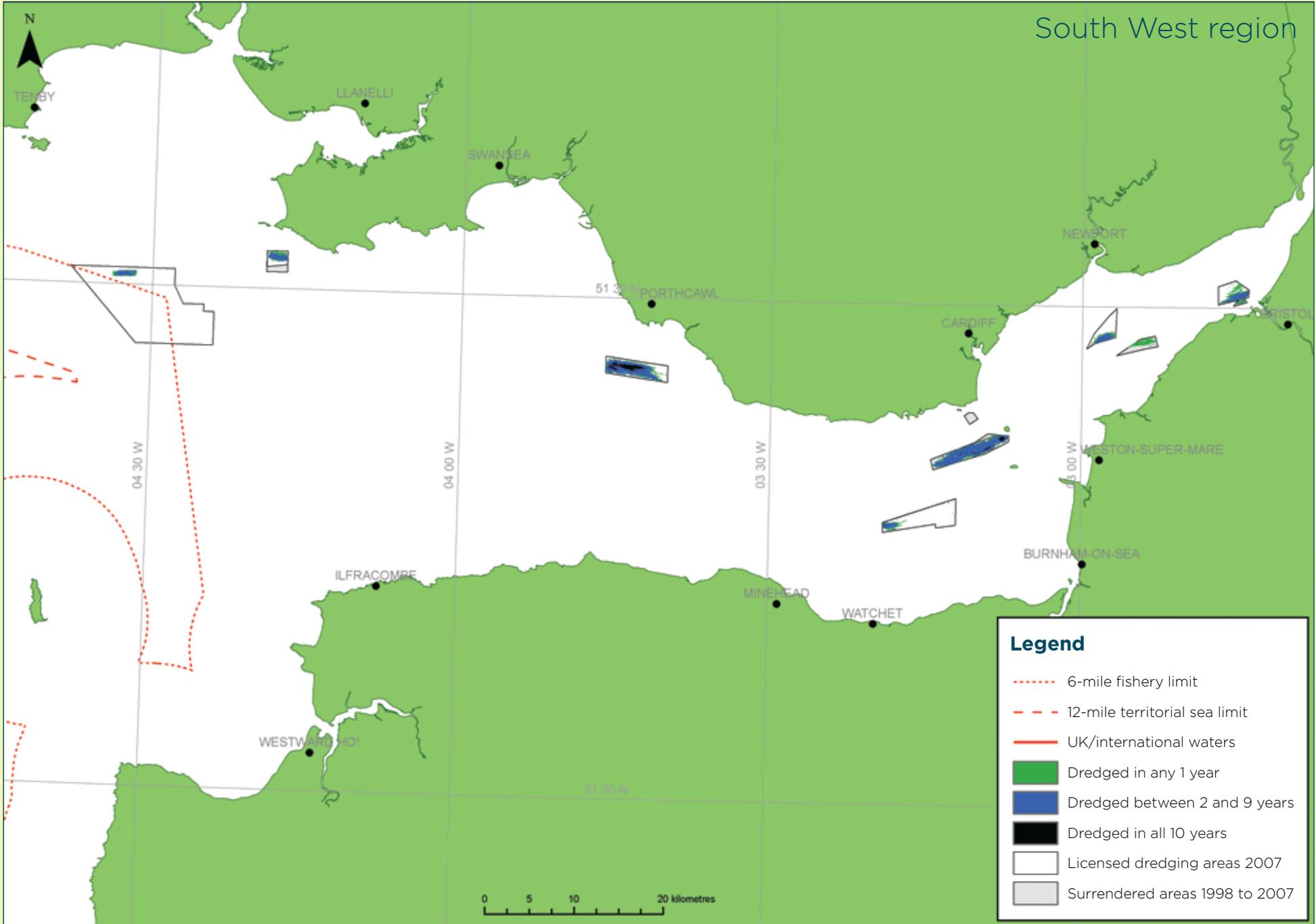
- The total area of seabed dredged between 1998 and 2007 - the ten-year cumulative footprint - amounted to 30.56km<sup>2</sup>.
- The area of new seabed dredged annually has reduced from 5.50km<sup>2</sup> in 1999 (30.86 per cent of the total area) to 0.73km<sup>2</sup> in 2002 (7.16 per cent of the total area).
- Over the full ten-year period (1998-2007), the average area of new seabed dredged each year was 1.63km<sup>2</sup>, however during the most recent five-year period (2003-2007) this figure has reduced to 1.26km<sup>2</sup>/year.
- A total of 16.756 million tonnes of marine sand was dredged from Crown Estate licence areas in the South West region between 1998 and 2007. Averaged across the cumulative footprint, this represents 36.5cm of sediment removed across the area dredged.

### Area of seabed licensed 1998-2007



### Area of seabed dredged 1998-2007





## North West region ten-year summary 1998-2007

### Summary

Until 2005 the largest proportion of area licensed was within 6nm of the coast, where due to surrenders this has become beyond 12nm. The majority of the area dredged is beyond 12nm from the coast. Since 2005 more than 90 per cent of the annual area dredged has been previously dredged and only 0.01km<sup>2</sup> (0.16 per cent) has been dredged in all ten years.

### Area licensed

- The area of seabed licensed decreased by a net 42.97km<sup>2</sup>, with all changes occurring within 12nm of the coast.
- 42.97km<sup>2</sup> licensed area was surrendered.
- No new area was licensed.

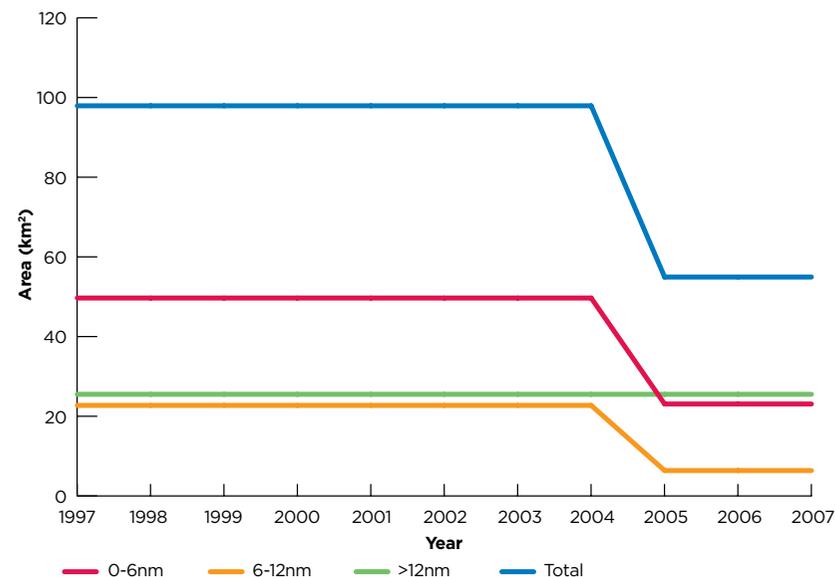
### Area dredged

- The area of seabed dredged in a single year ranged from 2.67km<sup>2</sup> in 2003 to 0.80km<sup>2</sup> in 2007.

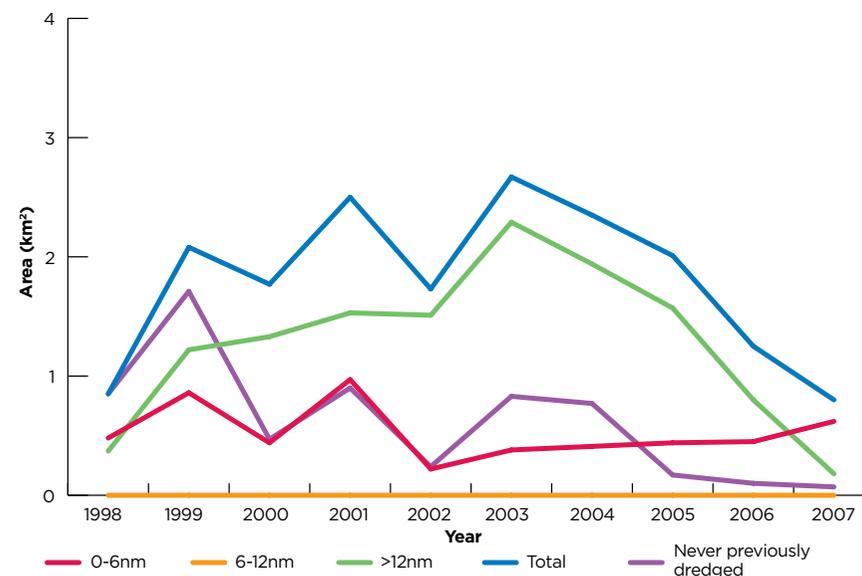
### Cumulative footprint

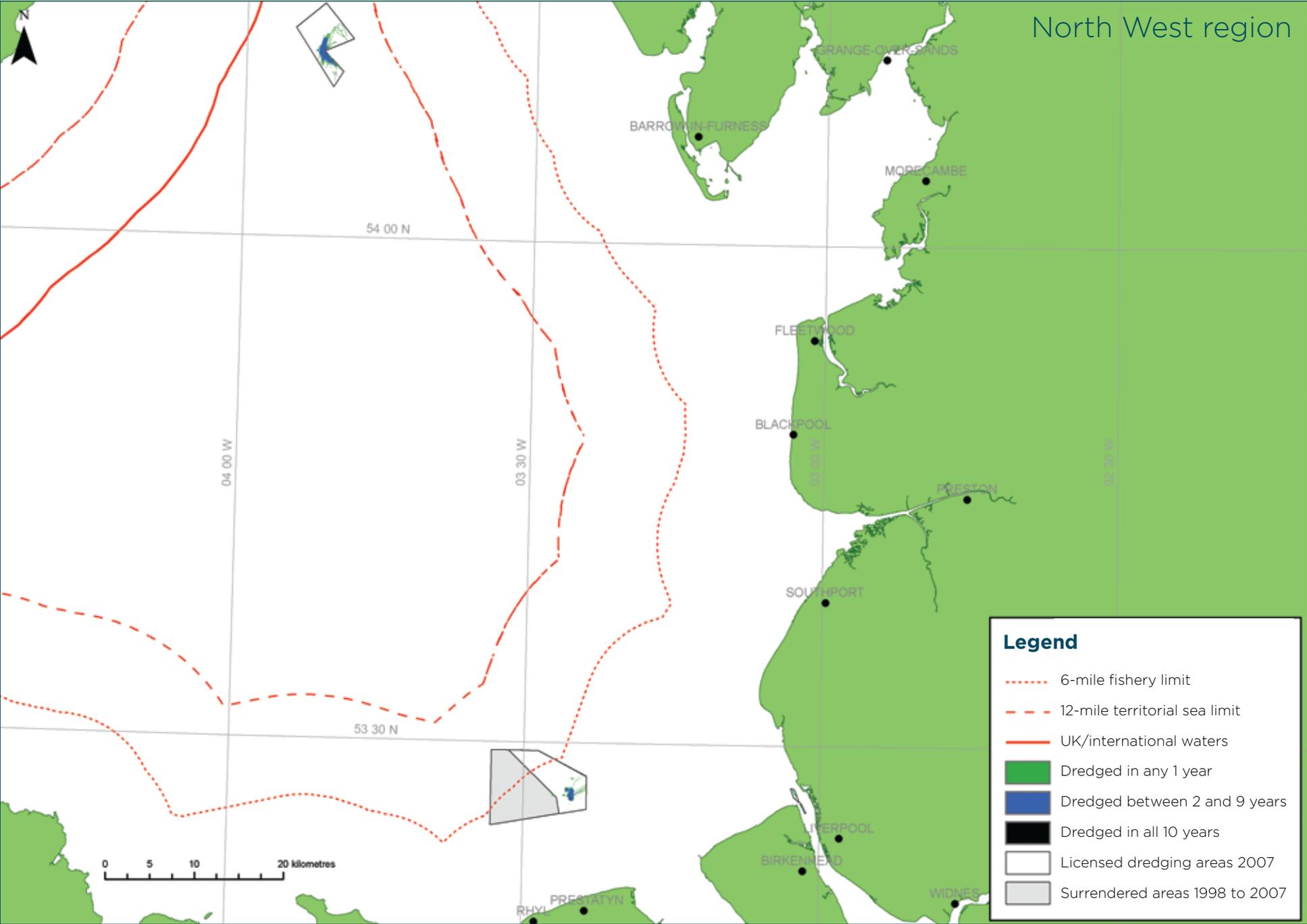
- The total area of seabed dredged between 1998 and 2007 - the ten-year cumulative footprint - amounted to 6.11km<sup>2</sup>.
- The area of new seabed dredged annually has reduced from 1.71km<sup>2</sup> in 1999 (82.21 per cent of the total area) to 0.07km<sup>2</sup> in 2007 (8.75 per cent of the total area).
- Over the full ten-year period (1998-2007), the average area of new seabed dredged each year was 0.58km<sup>2</sup>, however during the most recent five-year period (2003-2007) this figure has reduced to 0.39km<sup>2</sup>/year.
- A total of 4.733 million tonnes of marine sand was dredged from Crown Estate licence areas in the North West region between 1998 and 2007. Averaged across the cumulative footprint, this represents 51.6cm of sediment removed across the area dredged.

### Area of seabed licensed 1998-2007



### Area of seabed dredged 1998-2007







The Crown Estate is a landed estate including more than 120,000 hectares of agricultural land in England, Scotland and Wales, substantial blocks of commercial property (primarily in London) and an extensive marine estate covering 55 per cent of the foreshore and almost all of the seabed out to the 12-mile territorial limit. Its origins date back to the reign of King Edward the Confessor. The Crown Estate is part of the hereditary possessions of the Sovereign “in right of the Crown” managed under the provisions of the Crown Estate Act 1961 by the Crown Estate Commissioners who have a duty to maintain and enhance the value of the Estate and the income derived from it. The net revenue surplus is paid to the exchequer.



The British Marine Aggregate Producers Association (BMAPA) was formed in 1992 and comprises members of the Mineral Products Association with a marine interest. Marine sand and gravel is supplied to home markets, as well as contributing to the balance of payments through exports to Continental Europe. In addition, marine aggregates are fulfilling an increasingly important role by supporting beach replenishment schemes. The marine aggregates industry operates over 25 vessels on 70 production licences around the UK.

BMAPA membership is comprised of: Brett Group Ltd, Britannia Aggregates Ltd, CEMEX UK Marine Ltd, DEME Building Materials Ltd, Hanson Aggregates Marine Ltd, Kendall Bros. (Portsmouth) Ltd, Lafarge Aggregates Ltd, Northwood (Fareham) Ltd, Sea Aggregates Ltd, United Marine Dredging Ltd and Volker Dredging Ltd.

Photo courtesy D Reibbit, Hanson Aggregates Marine Ltd





**THE CROWN  
ESTATE**

**The Crown Estate**

16 New Burlington Place  
London  
W1S 2HX

**T** 020 7851 5080

**W** [www.thecrownestate.co.uk](http://www.thecrownestate.co.uk)



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**bmapa**

**British Marine Aggregate  
Producers Association**

Gillingham House  
38-44 Gillingham Street  
London  
SW1V 1HU

**T** 020 7963 8000

**E** [bmapa@mineralproducts.org](mailto:bmapa@mineralproducts.org)

**W** [www.bmapa.org](http://www.bmapa.org)

ISBN: 978-1-906410-12-4