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Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL



# Primary Aggregate Reserves in England 1990–2004

BRITISH GEOLOGICAL SURVEY

REPORT CR/06/168<sup>N</sup>

# Primary Aggregate Reserves in England 1990–2004

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*Front cover*

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*Bibliographical reference*

Brown, TJ and Highley, DE  
2006. Primary Aggregate Reserves  
in England 1990–2004. British  
Geological Survey Commissioned  
Report, CR/06/168<sup>N</sup> 48 pp.

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Published for the Department for Communities and Local Government.

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## Acknowledgements

The authors would like to acknowledge the considerable assistance of the Secretaries of the Regional Aggregate Working Parties for providing statistical information in the form of their Annual Reports, for investigating and answering questions as they arose and also for their valuable comments on the draft. The Quarry Products Association and British Aggregates Association also provided helpful comments. In addition, the authors would like to thank the Department for Communities and Local Government for their support and guidance.



Croxden Quarry, Staffordshire.



Scrooby Top Quarry, near Doncaster.

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Mountsorrel Quarry, Leicestershire.

## Summary

Aggregates are the most commonly used construction minerals in the UK and are essential for the sustainable development of a modern economy.

The resources of material suitable for use as primary aggregates in England comprise land-won sand and gravel, and crushed rock (limestone, sandstone, igneous and metamorphic rock). These materials are not evenly distributed throughout the country. In particular, there is very little hard rock suitable for crushed rock aggregate in southern and eastern England, where demand is high.

Monitoring the size of England's permitted reserves of primary aggregates, and the extent that they are being supplemented by new permissions or depleted through sales, is a crucial element of the system of managed aggregate supply.

This report brings together data on reserve levels, sales and planning permissions for each year from 1990 to 2004 for land-won sand and gravel, and crushed rock. The information is presented for England and also by region.

Reserves of land-won sand and gravel in England have declined from a high of 907 million tonnes in 1995 to 650 million tonnes in 2004 and action is required if long-term supply is to be maintained. Some regions are experiencing

more significant declines than others. The South East is the worst affected with reserves declining by 61 per cent from 207 million tonnes in 1995 to 81 million tonnes in 2004. To a large extent, the decline in reserves is caused by the failure to replenish sales tonnages with new planning permissions. However, increasing pressure from other uses of land, particularly in the South East, makes this situation difficult to resolve.

Crushed rock reserves in England, at 4247 million tonnes in 2004, are higher than they were 10 years ago, despite a small reduction between 2001 and 2004. Reserves are dominated by two regions, the East Midlands (1657 million tonnes) and the South West (1330 million tonnes), which together account for 70 per cent of total crushed rock reserves in the country. These regions are major suppliers of aggregate to the South East, London and the East of England.

The majority of sales tonnages of crushed rock have been replenished by new planning permissions in the last 10 years, almost entirely through extensions to existing quarries. Although it would appear that the position for crushed rock is more positive than that for sand and gravel, recent permissions are in respect of only a few quarries and therefore productive capacity from these existing quarries may mean that the reserves cannot necessarily be realised any more quickly.



Croxden Quarry, Staffordshire.

## I Introduction

The British Geological Survey has produced this report for the Department for Communities and Local Government (formerly the Office of the Deputy Prime Minister). It is one of a number of reports, leaflets and factsheets prepared under the Joint DCLG-BGS Minerals Information Programme. Much of this information is made available on the BGS minerals website, [www.mineralsUK.com](http://www.mineralsUK.com).

Aggregates are the most widely used construction materials in the UK and are essential for constructing and maintaining the physical framework of our society, from roads to airports, houses to schools. The sustainable development of a modern economy requires a continuous supply of construction materials and, whilst it is important to maximise the use of recycled and secondary aggregates, these are not of sufficient quantity or quality to meet the full demand. It is, therefore, essential to maintain the supply of primary aggregates.

The extraction of aggregates requires planning permission and the terms ‘reserves’ or ‘permitted reserves’ refer to mineral that has a valid planning permission. Mineral Planning Authorities (MPAs) have the responsibility for considering the suitability of planning applications for mineral development and either granting or refusing planning permission, as they consider appropriate. MPAs

are required to maintain a ‘landbank’ of permitted reserves within their area, normally expressed as a number of years of supply (calculated using an average rate of output). This is discussed further in Section 3.12.

Regional Aggregate Working Parties (RAWPs) were established in the 1970s to provide technical advice to DCLG and Regional Assemblies in relation to the supply of aggregates and to identify potential problems in that supply. They draw their membership from the MPAs, the aggregate industry (through their trade associations) and from other Government bodies. A map showing the area of responsibility for each of the nine RAWPs in England, together with further details of their work are included as Appendix 1. Each RAWP publishes information on permitted reserves of aggregates, together with details of sales, planning permissions and other events of interest that affect their region, on an annual basis.

This report presents and analyses information on permitted reserves of primary, land-won aggregates in England, over the period 1990 to 2004. It compares these with the available data on sales of locally-sourced material and additional reserves granted in new planning permissions. It provides a strategic overview by English region of the extent that permitted reserves of aggregates are being depleted and the extent to which they are being replenished by new permissions.

## 2 General approach

The data presented in this report were compiled from the annual reports produced by each RAWP in England following their Aggregates Monitoring Surveys. Similar data are also collected in Wales, but these are not included in this report. Information was also obtained from the four-yearly Aggregate Minerals Surveys carried out in 1997 and 2001. Preliminary information collated on new planning permissions for the current 2005 Aggregate Minerals Survey was also used.

A comparison between the figures obtained from the annual Aggregates Monitoring Surveys carried out by the RAWPs and the four-yearly Aggregate Minerals Surveys, for 1997 and 2001, can be found in Section 4. Section 4 also compares the sales data in this report with the results of the Annual Minerals Raised Inquiry carried out on behalf of DCLG and DTI by the Office for National Statistics.

In 1998 the geographical extent of some English regions were redefined and consequently some MPAs moved from one RAWP to another. In addition, a separate RAWP was created for London in 2003. In order to produce a consistent time series for each region, in this report the current regional boundaries have been used throughout the whole time period. The data have, therefore, been compiled by MPA, to enable the results to be presented here by current region. More detailed information on permitted reserves, sales and new planning permissions by MPA, or groups of MPAs, are available electronically via the website [www.mineralsUK.com](http://www.mineralsUK.com).

Although RAWP annual reports are available for most years from 1990 to 2004, in some regions it was not possible to obtain reports for the earlier years. For this reason the combined results for England can only be presented from 1993. However, where data are available, they are presented for each region for the complete 15-year period.

Each RAWP has developed its own style of report to present the results of their annual surveys and these styles have been modified over the years. Some of the earlier reports do not give all the data that were required for this study. For example, some reports discuss sales of aggregates by MPA but do not report reserves; others mention that

planning permissions were granted but do not give figures for the tonnages involved. Instances where this has occurred are mentioned in the notes for each region.

This report relates to land-won sand and gravel and crushed rock only and, wherever possible, figures for marine dredged sand and gravel have been removed.

The information presented relates only to aggregates and data on reserves of minerals for non-aggregate uses have been removed wherever possible. In some cases this has been difficult because there are sites, for example some limestone quarries, where the same material is worked for both aggregate and non-aggregate uses. In most cases the RAWPs have removed an amount for non-aggregate use from their specified aggregate reserves in their reports and this is usually based on the split of aggregate to non-aggregate sales from those particular locations over the previous three years. In other instances the same method has been used in this report to remove reserves likely to be used for non-aggregate purposes. However, it should be recognised that some reserves for non-aggregate purposes could, with changing markets, be used for aggregate purposes, and vice versa.

There are some inconsistencies between regions relating to whether chalk is classified as a 'crushed rock aggregate' in reserves and sales figures. In Yorkshire and the Humber and East Midlands Regions chalk is harder than it is in southern England and is used on a modest scale as a source of aggregates for less demanding applications. In southern England, however, it is not included as a source of aggregates. This report has followed the regions in this regard even though it appears to be inconsistent throughout the country.

Permitted reserves, i.e. those covered by a valid planning permission, include reserves in both active and inactive quarries. This includes sites that have been worked in the past and also those where extraction is yet to begin. Reserves in sites classified as 'dormant', as defined by the Planning and Compensation Act 1991 and the Environment Act 1995, are not considered 'permitted reserves' because they cannot be worked until new schemes of conditions have been determined. However, it is likely that up until 2004 the permitted reserves reported in many of the RAWP

reports will include some dormant sites. The tonnages involved are likely to be modest for most regions; the four-yearly Aggregate Minerals Survey for 2001 gives total figures for dormant sites in England of 29 million tonnes for sand and gravel and 315 million tonnes for crushed rock.

Throughout this report the term ‘sales’ relates to sales of locally sourced aggregates, irrespective of their eventual destination. It does not include the sales of material imported into a region from elsewhere because this material is included as ‘sales’ in the region from which it originates.

### 3 Results and discussion

#### 3.1 Primary aggregate reserves in England

Primary aggregates in England can be divided into two categories: sand and gravel, and crushed rock (limestone, sandstone, igneous and metamorphic rocks). The geology of England is such that very little hard rock occurs in the south and east of the country and in these regions reserves of sand and gravel form the main source of land-won primary aggregates.

However, crushed rock is still required in southern and eastern regions for a wide range of applications, and to meet this demand crushed rock aggregate is imported by rail or sea from other parts of the UK (and occasionally from continental Europe). Further information regarding the movement of aggregates around the UK can be obtained from the four-yearly Aggregate Minerals Surveys.

Figure 1 shows the relative size of reserves of sand and gravel and crushed rock in England for the years 1993 to 2004.

Crushed rock reserves are much greater than sand and gravel reserves reflecting the larger size of crushed rock quarries, the higher yields (per unit area) and the significant scale of investment they require.

Although crushed rock quarries are mainly located in the northern, central and western parts of England, sand and gravel quarries are located in river valleys throughout the country. Important reserves of sand and gravel are present in regions other than those in the south and east. In general sand and gravel quarries tend to be smaller and require less investment than their crushed rock counterparts. However, their lower yields per unit area mean that a greater number of planning permissions are

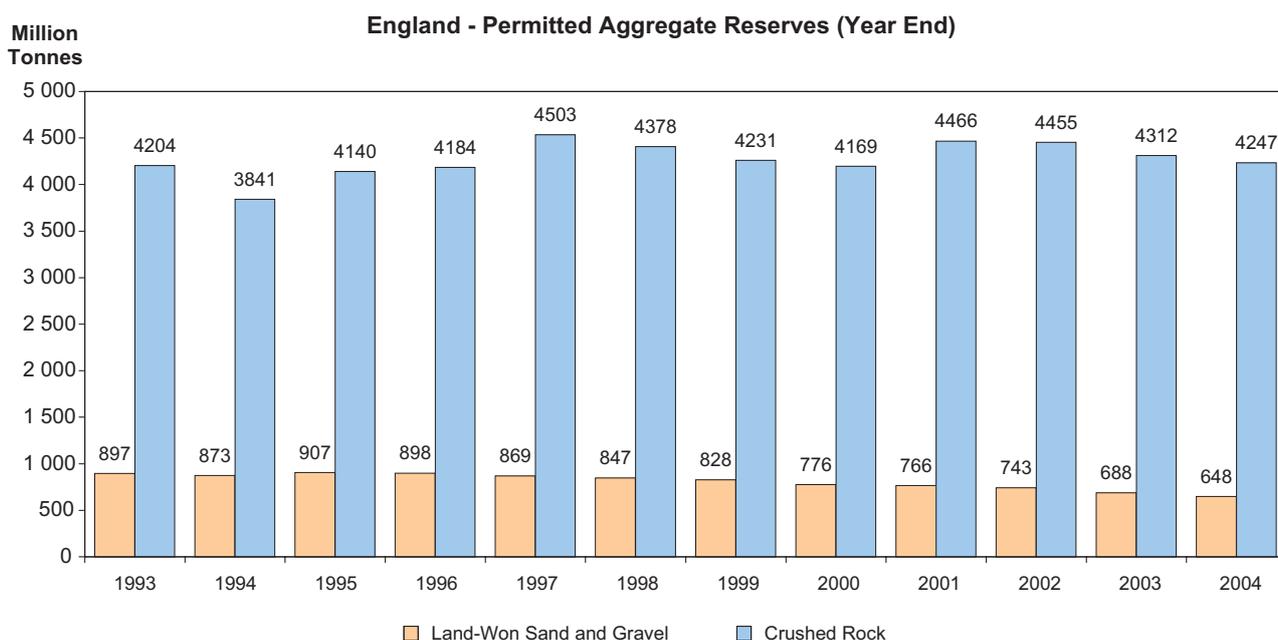


Figure 1 Permitted aggregate reserves in England 1993 to 2004.

required to continually replace the reserves extracted and sold.

### 3.1.1 Trends in sand and gravel reserves

Sand and gravel reserves in England have declined from a high of nearly 907 million tonnes in 1995 to less than 650 million tonnes in 2004. This represents a fall of 28.5 per cent. However, there are regional variations in this trend.

In the north of England (Figure 2) the decline for England as a whole is mirrored by a similar decline for the North East, despite an increase in 1999, and in the North West, despite an increase in 2001. However, the decline in Yorkshire and the Humber is much less and contains small increases. Further details of these regions are presented in Sections 3.2 to 3.4.

In Figures 2 to 7, the trend line for reserves in England relate to the value axis on the right, while the regional trends relate to the left value axis.

In the central part of the country (Figure 3) the rate of decline in reserves for the East Midlands has increased since 1999, whilst the decline in the West Midlands

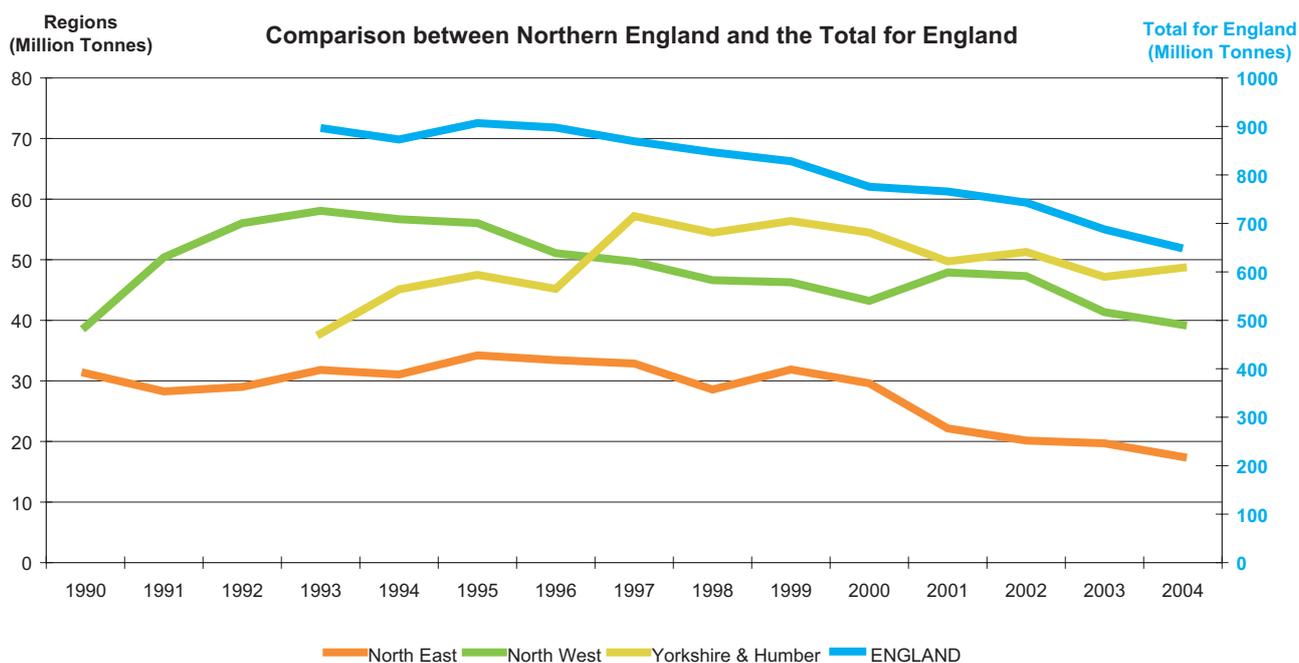
started in 1997 but is much shallower than the decline for England as a whole. In the East of England there has been little overall reduction in reserves, despite a noticeable dip for 2000. More details of these regions are presented in Sections 3.5 to 3.7.

The most dramatic decline in sand and gravel reserves is in the South East (Figure 4), with a fall (from 1995 to 2004) of 61 per cent. In the South West and London the reductions are much less pronounced. More details of these regions are presented in Sections 3.8 to 3.10.

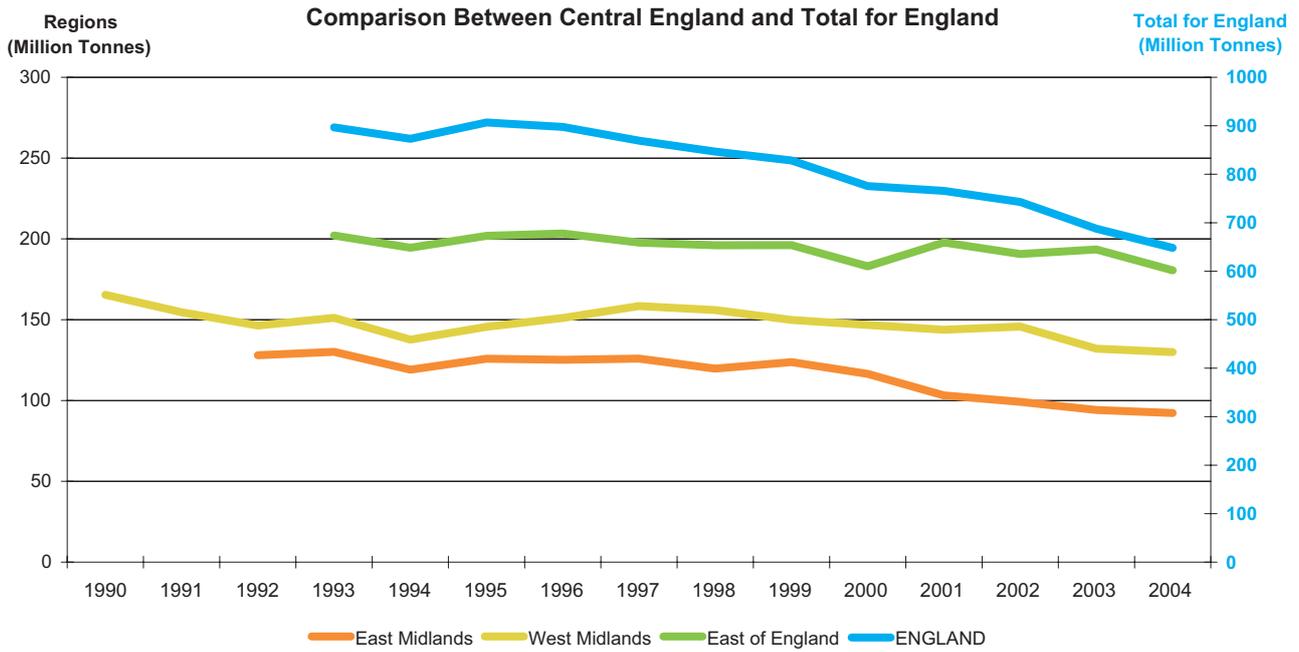
### 3.1.2 Trends in crushed rock reserves

The overall trend in crushed rock reserves in England reveals a more positive picture than that for sand and gravel. There was an increase in reserves from 1994 to a high in 1997 of over 4503 million tonnes. A subsequent small decline has been offset by an increase in 2001, which is probably due to a reassessment of reserves carried out as a result of the four-yearly Aggregate Minerals Survey. In 2004 crushed rock reserves were over 4247 million tonnes.

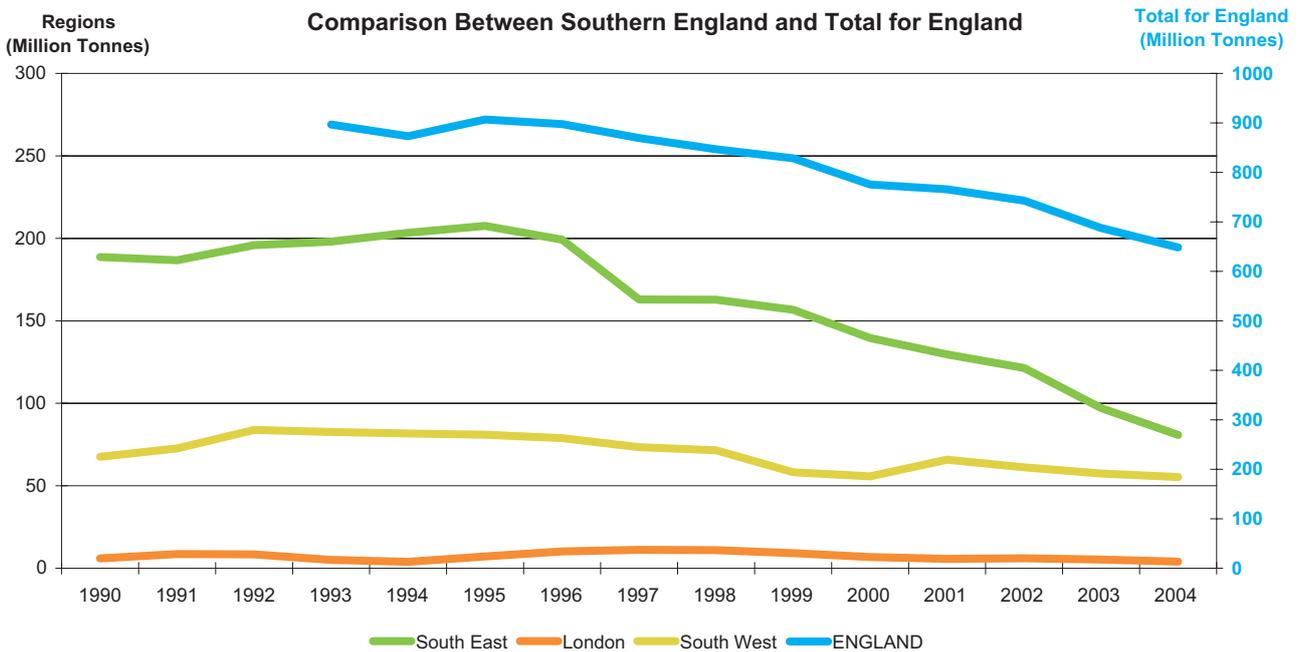
Again the regional picture is more varied. In the north of the country (Figure 5), there were noticeable declines



**Figure 2** Trends in sand and gravel reserves – Northern England compared to the overall trend for England.



**Figure 3** Trends in sand and gravel reserves – Central England compared to the overall trend for England.

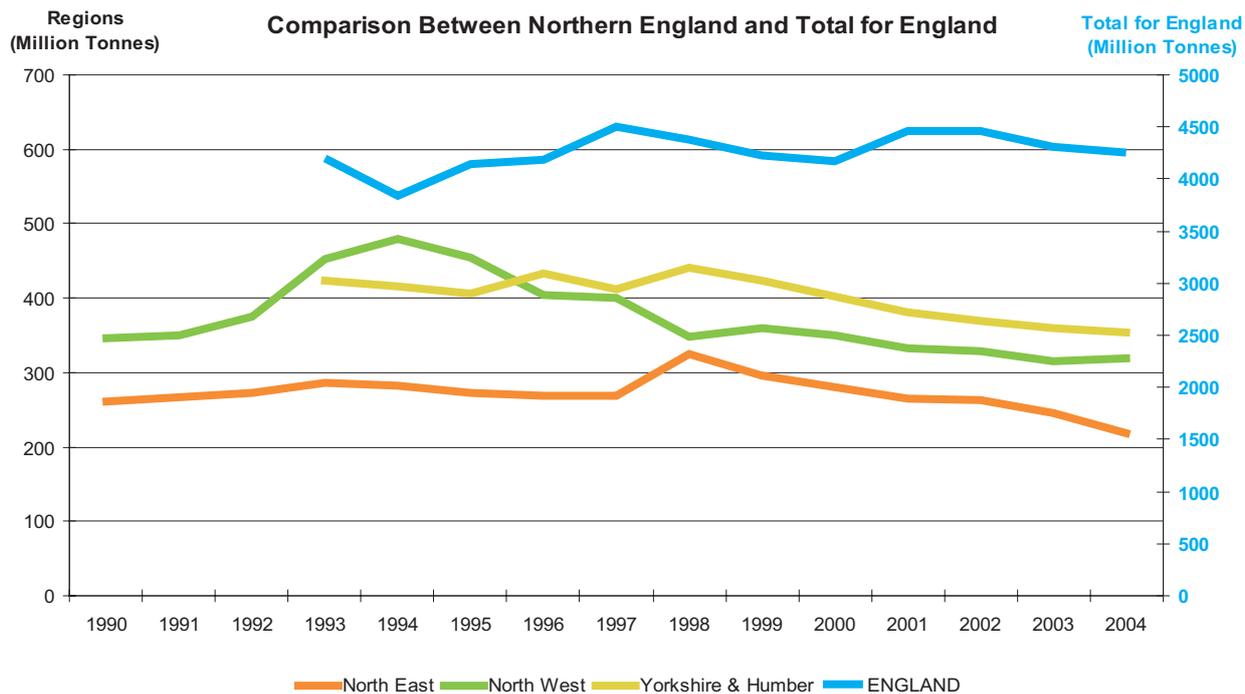


**Figure 4** Trends in sand and gravel reserves – Southern England compared to the overall trend for England.

in reserves for all three regions. The North East and Yorkshire & the Humber have seen declines of 33 per cent and 20 per cent respectively since 1998, while the North West has seen a decline in reserves of 34 per cent since 1994, although the decrease has flattened out in

recent years. Further details are presented in Sections 3.2 to 3.4.

In central England (Figure 6), crushed rock reserves are dominated by the East Midlands, the region with the



**Figure 5** Trends in crushed rock reserves – Northern England compared to the overall trend for England.

largest crushed rock reserves in England. Here reserves are increasing, despite small decreases in some years, and this clearly has a big impact on the overall trend for England.

In the West Midlands the reserve trend has been fairly flat since 1997 but the level remains higher than in previous years. The limited availability of crushed rock in the East of England is reflected in this diagram. Further details of all these regions are presented in Sections 3.5 to 3.7.

The graph for the southern regions of England (Figure 7) is dominated by the South West, which has the second largest reserves of crushed rock in the country, after the East Midlands. Here the trend is much more variable than other regions, but there have been noticeable increases between 1994 and 1997 and between 1999 and 2002.

There are only limited resources of crushed rock aggregates in the South East and there are no crushed rock reserves in London. Further details of these regions are presented in Sections 3.8 to 3.10.

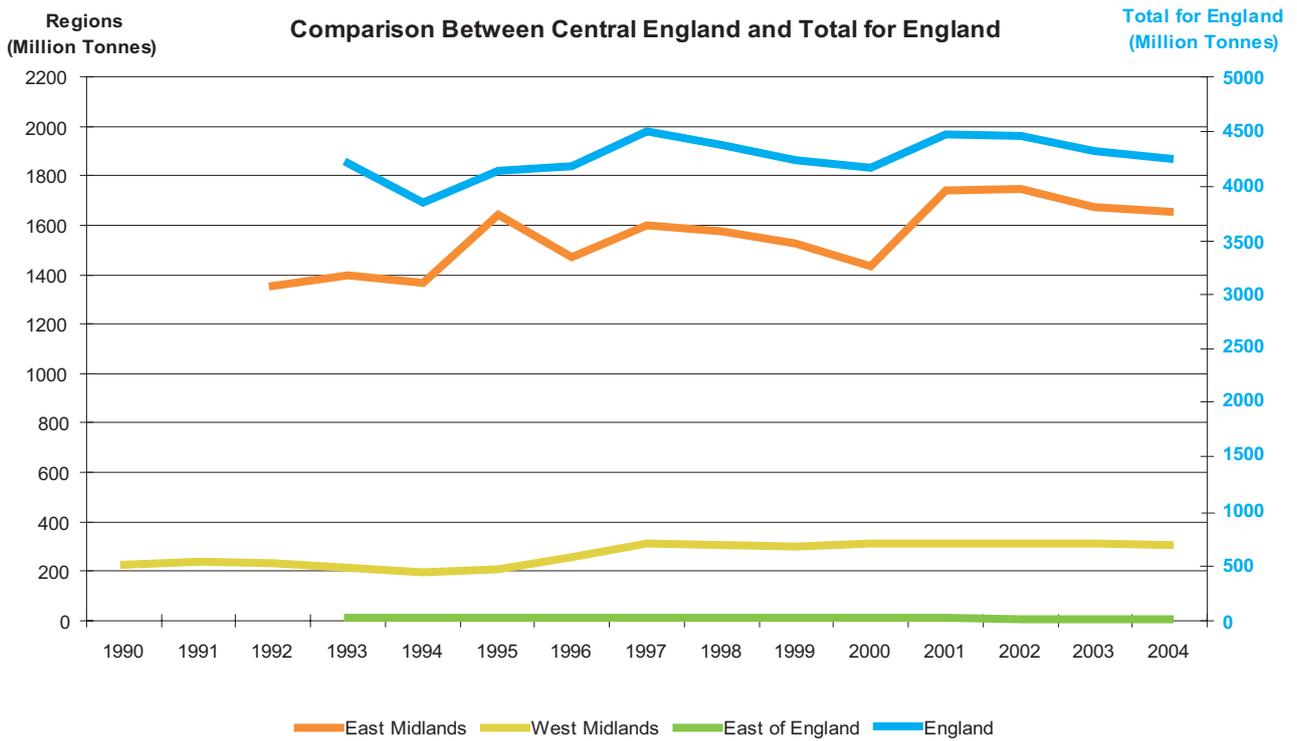
### 3.2 North East

The North East Region includes the MPAs for Northumberland, Northumberland National Park, Durham, Newcastle-upon-Tyne, North Tyneside, South Tyneside, Sunderland, Gateshead, Darlington, Stockton-on-Tees, Hartlepool, Middlesbrough and Redcar & Cleveland.

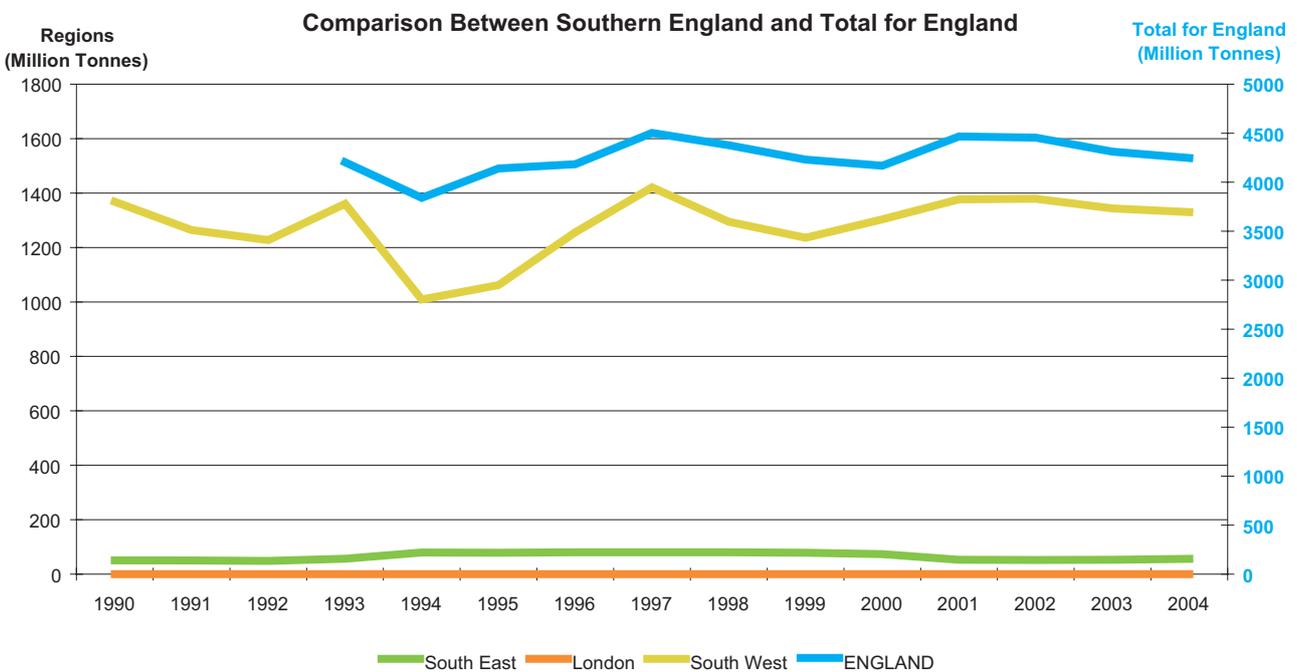
For the purposes of the RAWP annual surveys the figures for the National Park are included with Northumberland, and some of the smaller MPAs are grouped together to preserve confidentiality.

#### 3.2.1 Sand and gravel

Reserves of land-won sand and gravel in the North East have declined by 45 per cent from a high of nearly 32 million tonnes in 1999 to just 17.5 million tonnes in 2004. Prior to 1999 reserves were consistently between 28 million tonnes and 34 million tonnes and the decline is, therefore, a significant change in the position in recent years.



**Figure 6** Trends in crushed rock reserves – Central England compared to the overall trend for England.



**Figure 7** Trends in crushed rock reserves – Southern England compared to the overall trend for England.

The decline is probably caused by the absence of any new planning permissions in the years 1997 to 2002 and the consequent depletion of reserves through sales. There appears to have been an increase in reserves from 1998 to 1999, but this is likely to have been caused by a reassessment of reserves by a site operator. New permissions in 2003 and 2004 are considerably smaller in size than the sales figures for those years, thus continuing the downward trend in reserves.

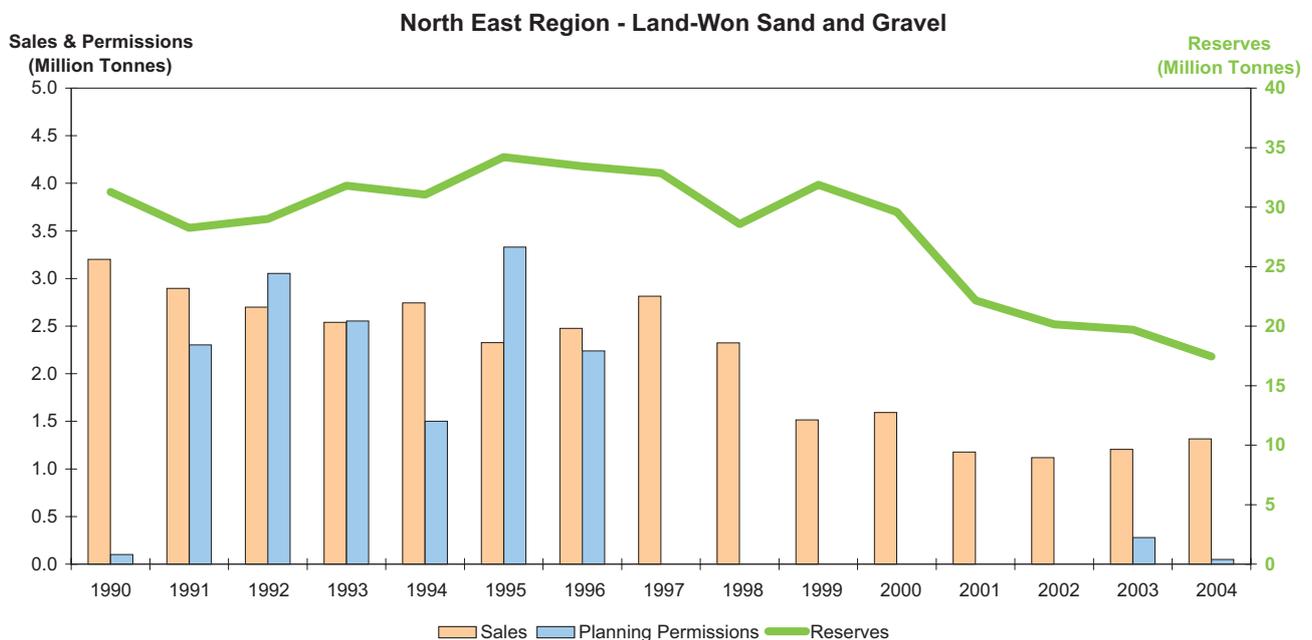
Sales also show a similar decline, having been consistently over 2 million tonnes per year before 1999.

### 3.2.2 Crushed rock

There has been a decline in crushed rock reserves in the North East from a high point in 1998 of over 324 million tonnes to a low in 2004 of less than 219 million tonnes. This is the lowest level of reserves

	Million Tonnes		
	Reserves	Sales	Permissions
1990	31.28	3.20	0.10
1991	28.26	2.90	2.30
1992	29.01	2.70	3.05
1993	31.81	2.54	2.56
1994	31.05	2.74	1.50
1995	34.21	2.33	3.33
1996	33.43	2.48	2.24
1997	32.86	2.81	0.00
1998	28.58	2.33	0.00
1999	31.87	1.52	0.00
2000	29.59	1.59	0.00
2001	22.16	1.18	0.00
2002	20.15	1.12	0.00
2003	19.69	1.21	0.28
2004	17.45	1.32	0.05

**Table I** North East Region: Land-won sand and gravel – Reserves, sales and additional reserves granted in new planning permissions.



**Figure 8** North East Region: Land-won sand and gravel – Trend in reserves compared to sales and new planning permission tonnes.

Notes on data sources:

- Figures for marine-dredged sand and gravel have been excluded.
- Cumbria has been removed from these figures for the entire period (prior to 1998 Cumbria was included in the 'Northern Region').
- Planning permissions for borrow pits have not been included as they do not add to the Region's reserves.

	Million Tonnes		
	Reserves	Sales	Permissions
1990	260.31	9.79	0.00
1991	265.93	9.11	4.45
1992	272.33	8.20	1.05
1993	286.58	7.84	0.05
1994	281.68	7.30	3.70
1995	272.69	6.67	0.00
1996	269.50	6.05	0.00
1997	269.23	7.89	18.18
1998	324.46	5.81	95.35
1999	295.33	5.45	0.00
2000	280.94	5.26	1.85
2001	264.03	5.46	1.12
2002	262.07	5.76	0.00
2003	245.69	6.69	0.00
2004	218.87	6.51	0.00

**Table 2** North East Region: Crushed rock – Reserves, sales and additional reserves granted in new planning permissions.

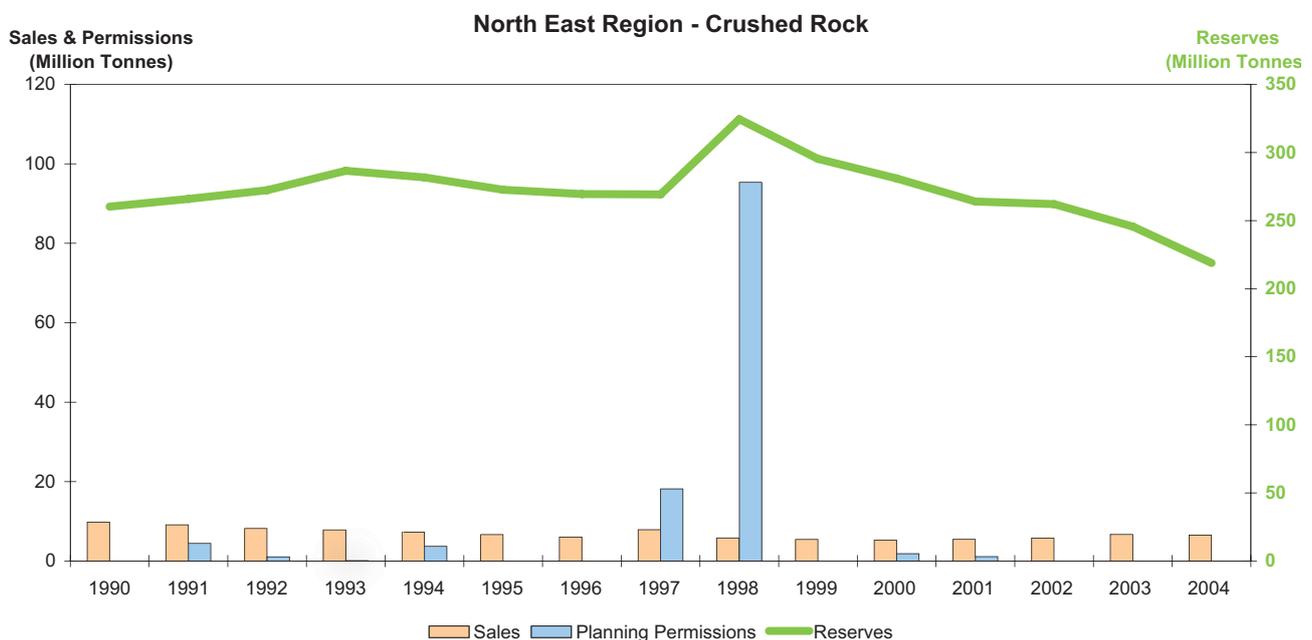
in the region during the 15-year period covered by this study and represents a 33 per cent decrease from 1998.

In 1997 and 1998 new reserves granted in planning permissions were greater than sales, and in 1998 this was by a considerable margin. However, in every other year the new reserves in permissions have been less than sales.

### 3.3 North West

The North West includes the MPAs of Cumbria, Lake District National Park, Lancashire, Cheshire, Blackpool, Sefton, Wirral, Liverpool, Knowsley, St Helens, Halton, Wigan, Warrington, Blackburn with Darwen, Bolton, Salford, Trafford, Bury, Rochdale, Manchester, Oldham, Tameside and Stockport.

In the RAWP annual surveys, the Lake District National Park is included within Cumbria and some of the smaller MPAs are grouped together to protect confidentiality.



**Figure 9** North East Region: Crushed rock – Trend in reserves compared to sales and new planning permission tonnes.

Notes on data sources:

- Reserves for non-aggregate uses have been removed from these figures using the proportion of aggregate to non-aggregate sales over the preceding three years.
- Cumbria has been removed from these figures for the entire period (prior to 1998 Cumbria was included in the 'Northern Region').
- The planning permission figures for 1998 include two large permissions, one for 'Magnesian Limestone' in Durham and the other for 'whinstone' (dolerite) in Northumberland.

### 3.3.1 Sand and gravel

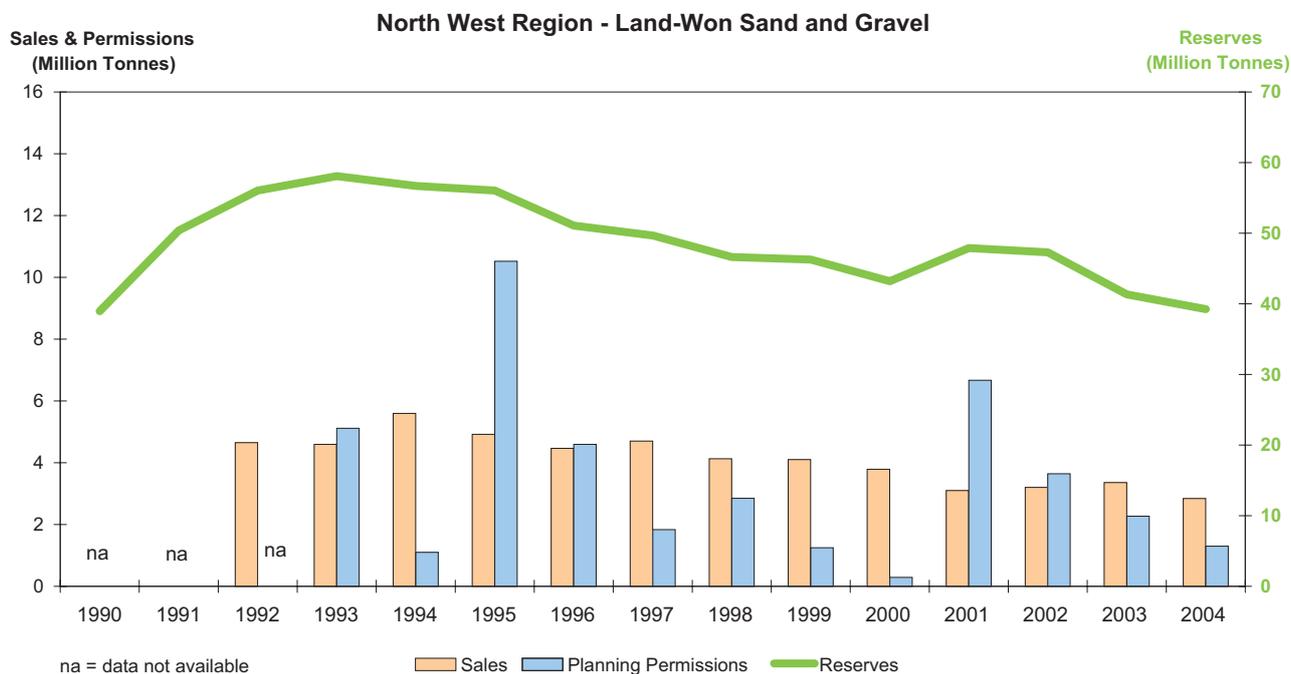
Despite an increase in 2001, the overall trend in land-won sand and gravel reserves from 1993 to 2004 is down. From a high of 58 million tonnes in 1993 there has been a 32 per cent decrease to just over 39 million tonnes in 2004, despite the rise to nearly 48 million tonnes in 2001.

Where data are available, the reserve tonnages added in new planning permissions are less than sales tonnages in 7 out of 12 years and this is the probable cause for the decline in reserves. In the years when there were significant new tonnages permitted, no single site was responsible, rather the new reserve was spread across several locations.

	Million Tonnes		
	Reserves	Sales	Permissions
1990	38.95	na	na
1991	50.39	na	na
1992	56.04	4.65	na
1993	58.08	4.59	5.11
1994	56.69	5.60	1.10
1995	56.04	4.92	10.52
1996	51.09	4.47	4.60
1997	49.67	4.70	1.84
1998	46.63	4.13	2.85
1999	46.27	4.10	1.25
2000	43.20	3.79	0.29
2001	47.90	3.10	6.67
2002	47.30	3.20	3.65
2003	41.34	3.36	2.27
2004	39.24	2.84	1.30

na = data not available

**Table 3** North West Region: Land-won sand and gravel – Reserves, sales and additional reserves granted in new planning permissions.



**Figure 10** North West Region: Land-won sand and gravel – Trend in reserves compared to sales and new planning permission tonnes.

Notes on data sources:

- All figures include Cumbria (prior to 1998 Cumbria was part of the former 'Northern' region).
- All figures exclude marine-dredged material.
- In 1995 planning permissions were spread across 9 sites in Lancashire, Cheshire and Greater Manchester. In 2001 planning permissions were granted at 6 sites in Cheshire and Cumbria.

	Million Tonnes		
	Reserves	Sales	Permissions
1990	345.75	11.94	na
1991	350.37	11.37	na
1992	375.95	12.20	na
1993	452.97	14.25	3.65
1994	480.18	15.44	16.32
1995	455.10	13.30	14.38
1996	403.45	11.50	2.88
1997	400.88	11.63	0.02
1998	347.74	10.71	6.75
1999	360.50	10.50	6.79
2000	350.06	10.30	8.19
2001	332.70	10.10	1.09
2002	327.90	10.21	16.30
2003	315.60	9.32	0.00
2004	319.40	9.45	10.66

na = data not available.

**Table 4** North West Region: Crushed rock – Reserves, sales and additional reserves granted in new planning permissions.

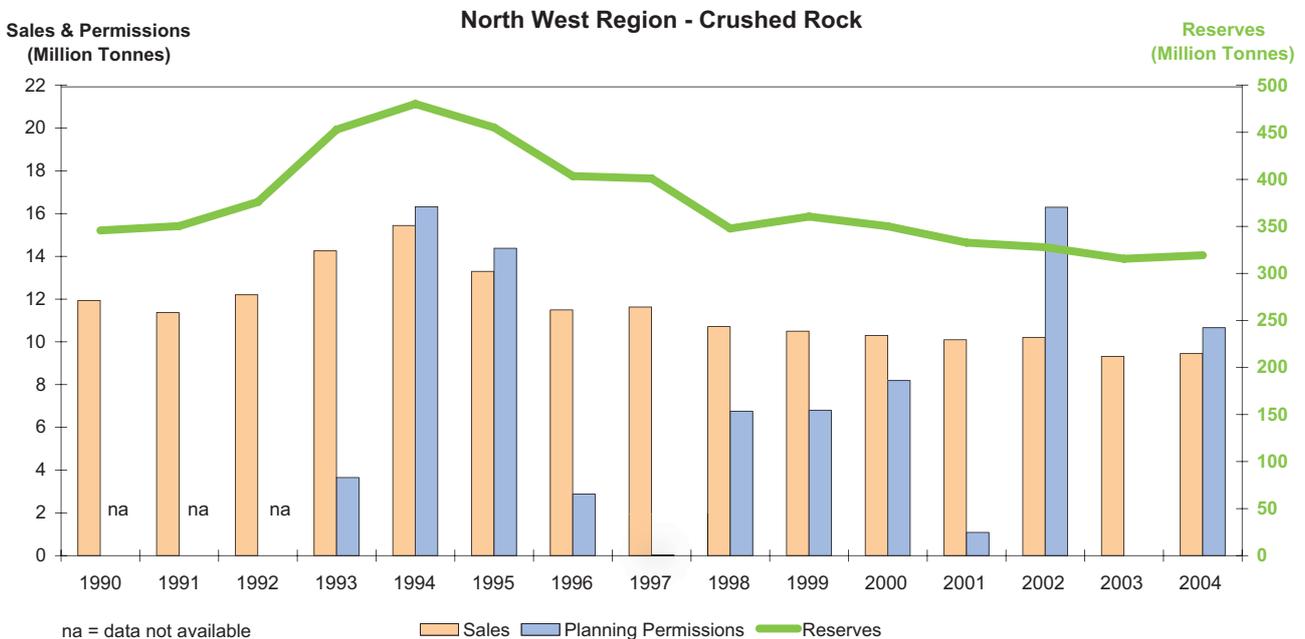
### 3.3.2 Crushed rock

Reserves of crushed rock in the North West have fallen by 33 per cent, from a high of 480 million tonnes in 1994, to just over 319 million tonnes in 2004.

RAWP reports for 1990 to 1992 do not give figures for new planning permissions, but where data are available the reserves granted in new permissions have been less than sales figures for 8 out of 12 years. This is the probable cause of the decline in reserves.

### 3.4 Yorkshire and the Humber

Yorkshire and the Humber Region includes the MPAs of North Yorkshire, Yorkshire Dales National Park, North York Moors National Park, York, Bradford, Leeds, Calderdale, Kirklees, Wakefield, Barnsley, Sheffield, Rotherham, Doncaster, East Riding of Yorkshire, North Lincolnshire, Kingston upon Hull and North East Lincolnshire.



**Figure 11** North West Region: Crushed rock – Trend in reserves compared to sales and new planning permission tonnes.

Notes on data sources:

- No planning permissions granted in 2003; new permissions in 1997 are too small to show.
- Figures for non-aggregate uses have been removed.
- All figures include Cumbria.

**Table 5** Yorkshire & the Humber Region: Land-won sand and gravel – Reserves, sales and additional reserves granted in new planning permissions.

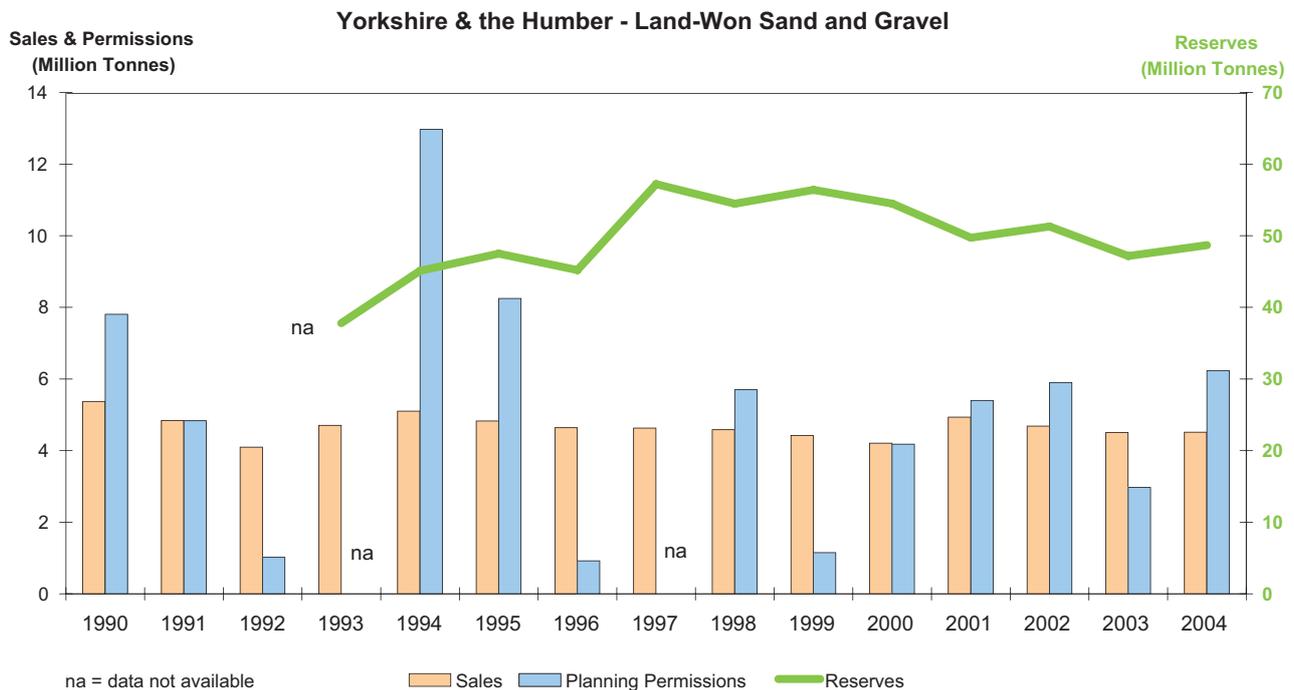
	Million Tonnes		
	Reserves	Sales	Permissions
1990	na	5.37	7.81
1991	na	4.84	4.84
1992	na	4.10	1.02
1993	37.80	4.71	na
1994	45.10	5.10	12.97
1995	47.50	4.83	8.25
1996	45.20	4.64	0.92
1997	57.21	4.58	na
1998	54.47	4.42	5.70
1999	56.40	4.21	1.15
2000	54.48	4.94	4.18
2001	49.72	4.94	5.40
2002	51.29	4.69	5.90
2003	47.17	4.50	2.97
2004	48.68	4.52	6.24

na = data not available

For the purposes of the RAWP annual surveys the two National Parks and the city of York are included in the figures for North Yorkshire. Several of the other MPAs are combined to protect confidentiality.

### 3.4.1 Sand and gravel

The overall trend in sand and gravel reserves in the region shows an increase from 37.8 million tonnes in 1993 to a high of 57 million tonnes in 1997. Thereafter reserves have remained in the range 47 million tonnes (2003) to 56 million tonnes (1999).



**Figure 12** Yorkshire & the Humber Region: Land-won sand and gravel – Trend in reserves compared to sales and new planning permission tonnes.

Notes on data sources:

- All figures exclude marine-dredged sand and gravel and material for non-aggregate uses.
- Planning permission data are extracted from the text of each report and therefore may not represent the full volume if figures are not given. The report for 1997 mentions two permissions in North Lincolnshire but did not give figures.
- A significant increase in reserves in 1997 was due to a reassessment of reserves as part of the four-yearly Aggregate Minerals Survey. Most of this increase was in South Yorkshire.

**Table 6** Yorkshire and the Humber Region: Crushed Rock – Reserves, sales and additional reserves granted in new planning permissions.

	Million Tonnes		
	Reserves	Sales	Permissions
1990	na	16.12	7.17
1991	na	14.91	15.69
1992	na	13.36	29.53
1993	422.60	13.47	na
1994	416.44	16.96	6.50
1995	405.42	15.05	2.34
1996	434.07	13.37	45.70
1997	412.18	13.16	1.20
1998	440.74	13.67	48.02
1999	423.07	12.90	12.00
2000	401.57	11.94	7.19
2001	379.98	12.70	4.16
2002	369.92	12.79	3.49
2003	360.32	12.13	2.98
2004	353.04	12.08	8.78

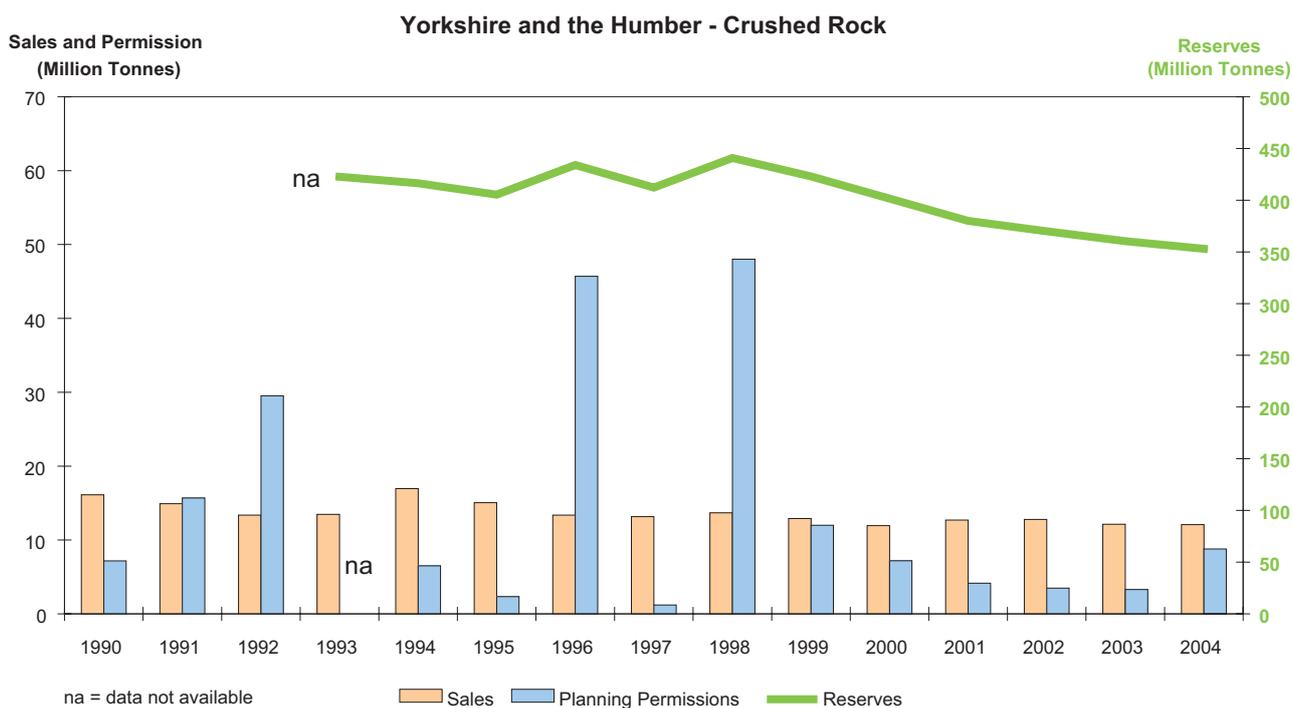
Sales have also remained reasonably constant, in the range 4 million tonnes per year to 5.3 million tonnes per year.

Planning permission data are not fully available for the years 1993 and 1997 but, where data are available, new permissions have equalled or exceeded sales in 9 out of 13 years.

### 3.4.2 Crushed rock

Crushed rock reserves in Yorkshire and the Humber show an increase from 1995 to a high point in 1998 of more than

na = data not available.



**Figure 13** Yorkshire and the Humber Region: Crushed Rock – Trend in reserves compared to sales and new planning permission tonnes.

Notes on data sources:

- Reserves for non-aggregate uses have been removed from these figures using the aggregate to non-aggregate split of sales over the preceding three years. Sales and permission figures are for aggregate use only.
- Planning permission data have been extracted from the text of the RAWP reports and therefore may not represent the full volume granted if figures are not quoted.
- Planning permissions in 1992 included 22 million tonnes of Carboniferous Limestone in North Yorkshire. Permissions in 1996 included 37 million tonnes of Carboniferous Limestone in the Yorkshire Dales National Park. Permissions in 1998 included 40 million tonnes of 'Magnesian Limestone' in Doncaster.

440 million tonnes. Since then they have declined to 353 million tonnes in 2004, representing a reduction in reserves of 20 per cent. Some of this decline is due to reserves that have been relinquished in the Yorkshire Dales National Park.

Planning permission data are not available for 1993, but in the remaining 14 years new reserves permitted have been less than sales in 10 years.

Sales have remained relatively constant since 2000 at around 12 million tonnes per year, but this is slightly down from the sales of 13 million tonnes to 17 million tonnes per year during the 1990s.

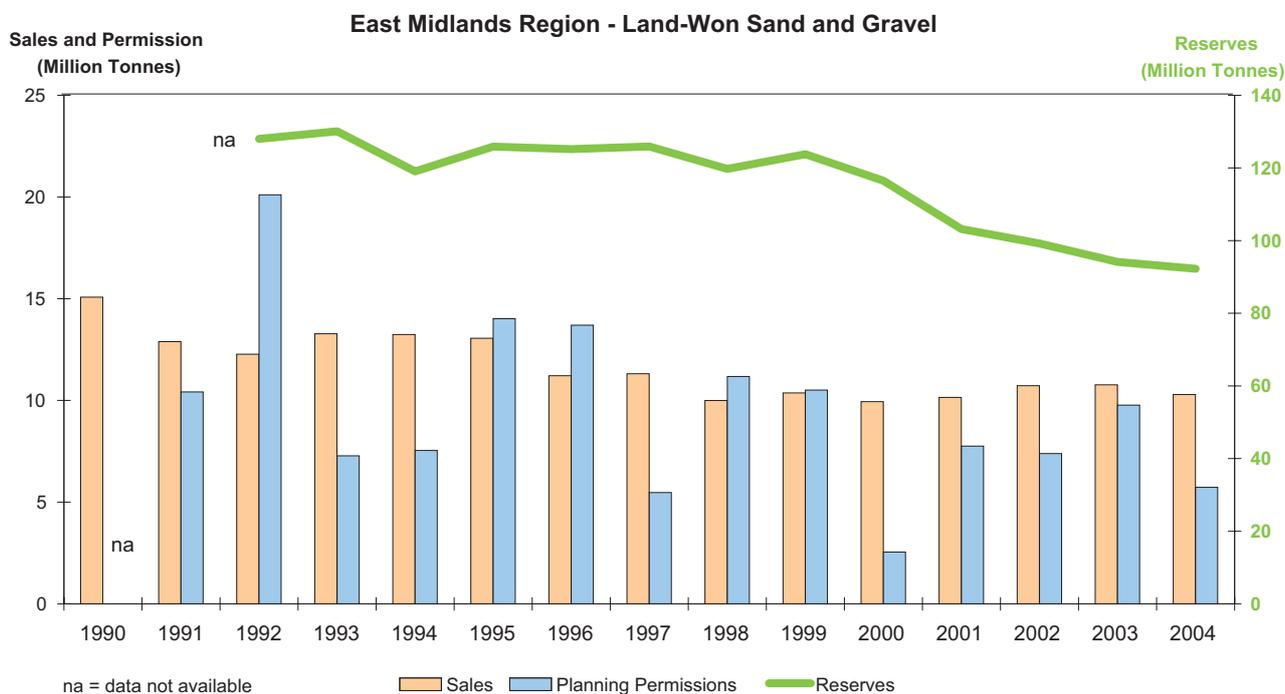
### 3.5 East Midlands

The East Midlands Region consists of the MPAs of Lincolnshire, Nottinghamshire, City of Nottingham, Derbyshire, City of Derby, Peak District National Park, Leicestershire, City of Leicester, Rutland and Northamptonshire.

	Million Tonnes		
	Reserves	Sales	Permissions
1990	135.59	15.08	na
1991	na	12.89	10.42
1992	128.00	12.28	20.11
1993	130.11	13.28	7.28
1994	119.05	13.24	7.54
1995	125.89	13.06	14.02
1996	125.20	11.22	13.70
1997	125.91	11.31	5.47
1998	119.75	10.00	11.18
1999	123.77	10.37	10.51
2000	116.50	9.94	2.54
2001	103.18	10.15	7.75
2002	99.20	10.72	7.39
2003	94.15	10.77	9.77
2004	92.26	10.29	5.73

na = data not available

**Table 7** East Midlands Region: Land-won sand and gravel – Reserves, sales and additional reserves granted in new planning permissions.



**Figure 14** East Midlands Region: Land-won sand and gravel – Trend in reserves compared to sales and new planning permission tonnes.

Notes on data sources:

- The 1991 RAWP report does not include a reserve figure for Derbyshire.
- There is no marine-dredged sand and gravel landed in the region for aggregate purposes, and the figures exclude all material for non-aggregate uses.

In the RAWP reports, the City of Nottingham MPA is included in Nottinghamshire and the City of Derby is included in Derbyshire. Both the City of Leicester and the Rutland MPA are included in Leicestershire in order to protect confidentiality. However, the Peak District National Park is usually shown separately.

### 3.5.1 Sand and gravel

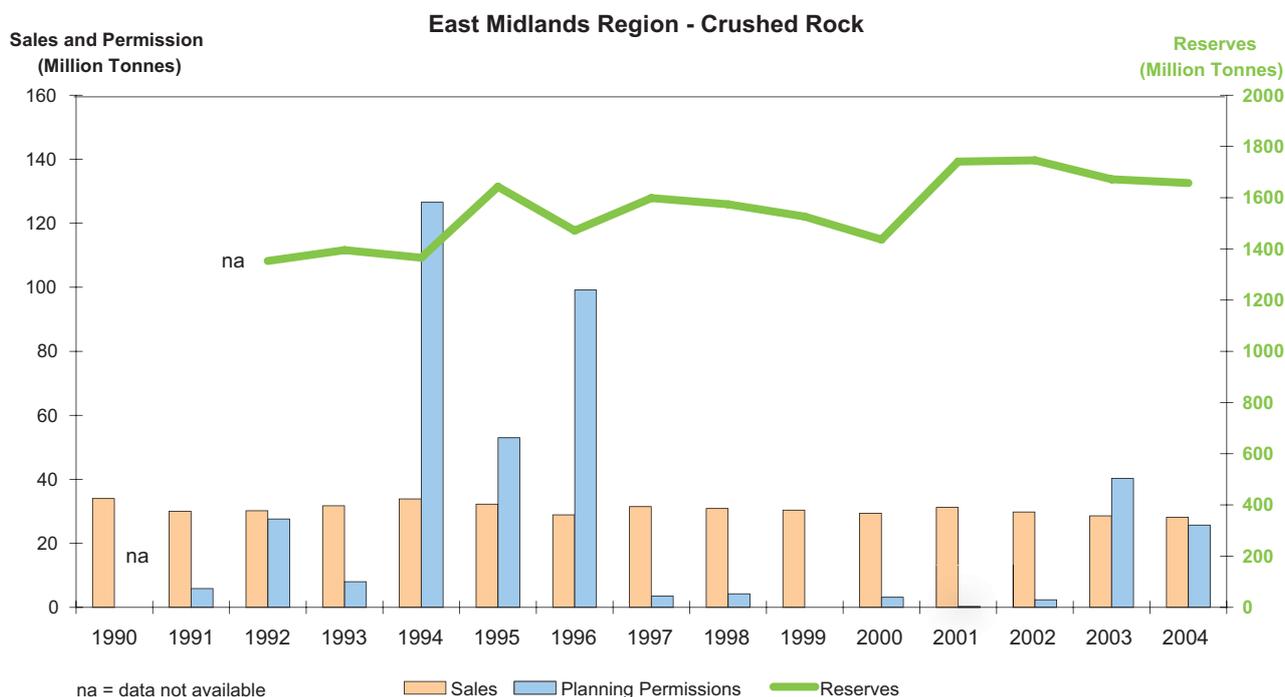
Reserves of sand and gravel in the East Midlands have declined by 25 per cent from nearly 124 million tonnes in 1999 to just over 92 million tonnes in 2004. Prior to 1999 reserves remained in the range 119 million tonnes to 136 million tonnes.

Planning permission data are not available for 1990, but for the remaining years, the tonnages granted in new planning permissions have been less than sales tonnages in 9 out of 14 years.

	Million Tonnes		
	Reserves	Sales	Permissions
1990	1848.58	34.02	na
1991	na	30.02	5.86
1992	1352.80	30.19	27.62
1993	1394.85	31.74	8.00
1994	1365.60	33.89	126.55
1995	1642.65	32.26	53.00
1996	1471.28	28.91	99.15
1997	1598.12	31.48	3.53
1998	1574.24	30.90	4.25
1999	1525.87	30.38	0.00
2000	1436.61	29.42	3.14
2001	1740.66	31.24	0.22
2002	1745.83	29.81	2.38
2003	1671.89	28.57	40.25
2004	1657.03	28.15	25.72

na = data not available

**Table 8** East Midlands Region: Crushed rock – Reserves, sales and additional reserves granted in new planning permissions.



**Figure 15** East Midlands Region: Crushed rock – Trend in reserves compared to sales and new planning permission tonnes.

Notes on data sources:

- All figures exclude material for non-aggregate uses.
- There were no planning permissions for crushed rock in 1999 and those in 2001 are too small to show.
- The planning permission figures include one extension for 100 million tonnes in 1994, one for 45 million tonnes in 1995 and one for 90 million tonnes in 1996, all of which were for igneous rock in Leicestershire.

Sales have remained relatively constant between 10 million tonnes per year and 11 million tonnes per year since 1998.

### 3.5.2 Crushed rock

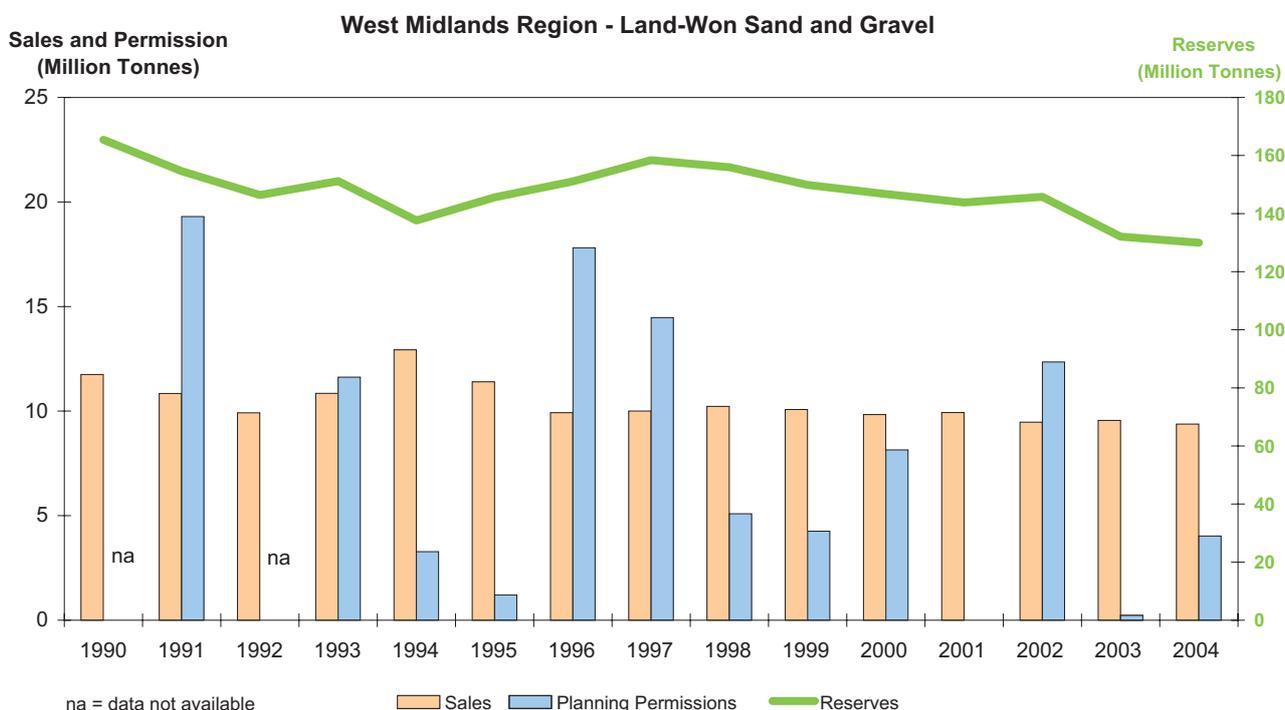
Reserves of crushed rock in the East Midlands are very large and have increased from a low in 1992 of just under 1353 million tonnes to a high in 2002 of nearly 1746 million tonnes, although there has been a small reduction in 2003 and 2004.

Perhaps reflecting the size of this reserve, the tonnages in new planning permissions have been less than sales tonnages for 10 of the last 14 years (information on planning permissions is not available for 1990). The significant increase in reserves in 2001 was probably due to a reassessment of reserves by the operators at the time of the four-yearly Aggregate Minerals Survey.

	Million Tonnes		
	Reserves	Sales	Permissions
1990	165.40	11.75	na
1991	154.64	10.84	19.31
1992	146.38	9.92	na
1993	151.19	10.85	11.63
1994	137.66	12.93	3.28
1995	145.61	11.40	1.21
1996	151.08	9.92	17.81
1997	158.41	10.00	14.47
1998	155.95	10.23	5.09
1999	149.86	10.07	4.26
2000	146.72	9.84	8.15
2001	143.81	9.93	0.00
2002	145.77	9.47	12.35
2003	132.07	9.56	0.23
2004	129.99	9.38	4.03

na = data not available

**Table 9** West Midlands Region: Land-won sand and gravel – Reserves, sales and additional reserves granted in new planning permissions.



**Figure 16** West Midlands Region: Land-won sand and gravel – Trend in reserves compared to sales and new planning permission tonnes.

Notes on data sources:

- There is no marine-dredged sand and gravel in the West Midlands, and the figures also exclude mineral for non-aggregate uses.
- Most of the new reserves permitted in 1991 were in Warwickshire (15 million tonnes); in 1996 the permissions were mostly in Staffordshire (over 17 million tonnes); and 1997 they were also mostly in Staffordshire (nearly 10 million tonnes).

Sales have remained relatively constant at between 28 million tonnes per year to 34 million tonnes per year throughout the 15-year period of this study, although there has been a slight decline in the last three years.

### 3.6 West Midlands

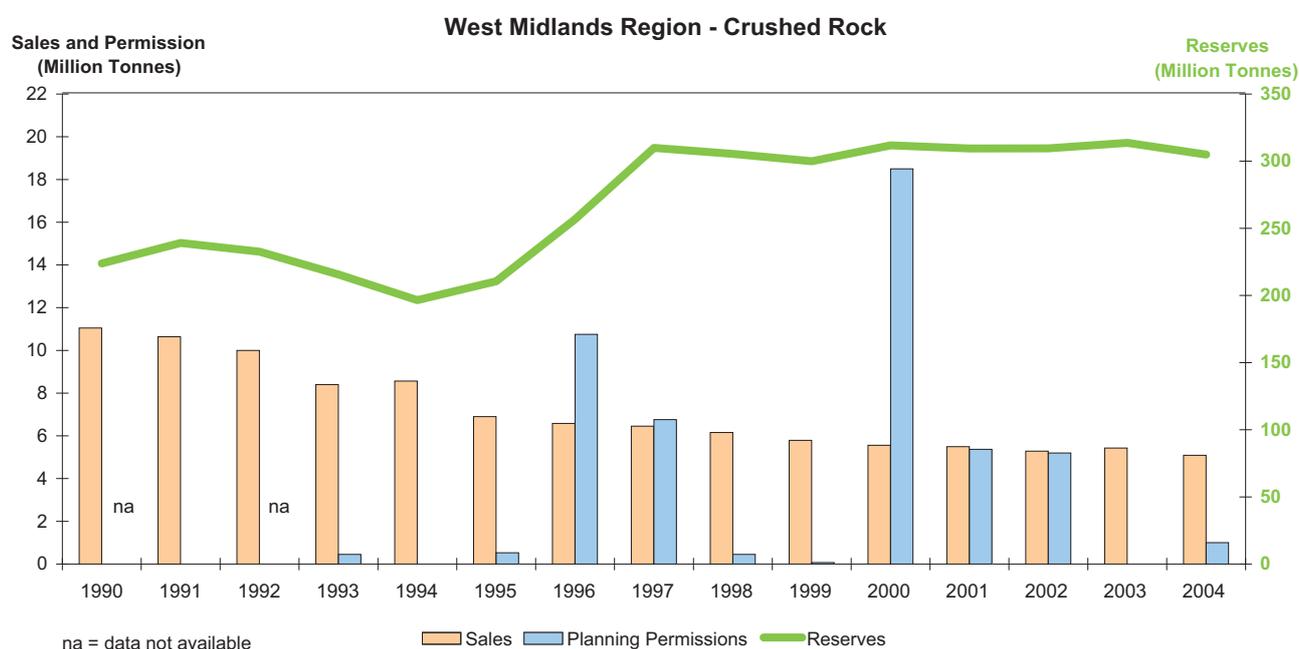
The West Midlands Region includes the MPAs of Staffordshire, City of Stoke-on-Trent, Shropshire, Telford & Wrekin, Herefordshire, Worcestershire, Warwickshire, Wolverhampton, Dudley, Walsall, Sandwell, Birmingham, Solihull and Coventry.

For the purposes of the RAWP reports the City of Stoke-on-Trent is included in Staffordshire, and Telford & Wrekin is included in Shropshire. To protect confidentiality the MPAs of Wolverhampton, Dudley, Walsall, Sandwell, Birmingham, Solihull and Coventry are combined.

	Million Tonnes		
	Reserves	Sales	Permissions
1990	223.87	11.05	na
1991	239.12	10.64	0.00
1992	232.59	10.00	na
1993	215.63	8.40	0.45
1994	196.50	8.56	0.00
1995	210.60	6.90	0.53
1996	256.76	6.58	10.75
1997	309.91	6.46	6.76
1998	305.43	6.16	0.45
1999	299.98	5.79	0.07
2000	311.74	5.56	18.50
2001	309.49	5.50	5.37
2002	309.56	5.28	5.20
2003	313.63	5.43	0.00
2004	304.88	5.09	1.00

na = data not available

**Table 10** West Midlands Region: Crushed rock – Reserves, sales and additional reserves granted in new planning permissions.



**Figure 17** West Midlands Region: Crushed rock – Trend in reserves compared to sales and new planning permission tonnes.

Notes on data sources:

- Less than 1 per cent of crushed rock reserves are allocated to non-aggregate uses. No attempt has been made to remove this due to the small amount involved.
- There were no planning permissions for crushed rock granted in 1991, 1994 or 2003.
- In 1996 the planning permissions included 9.4 million tonnes granted in Shropshire. The planning permissions in 2000 included 14.4 million tonnes also granted in Shropshire.

**Table 11** East of England Region: Land-won sand and gravel – Reserves, sales and additional reserves granted in new planning permissions.

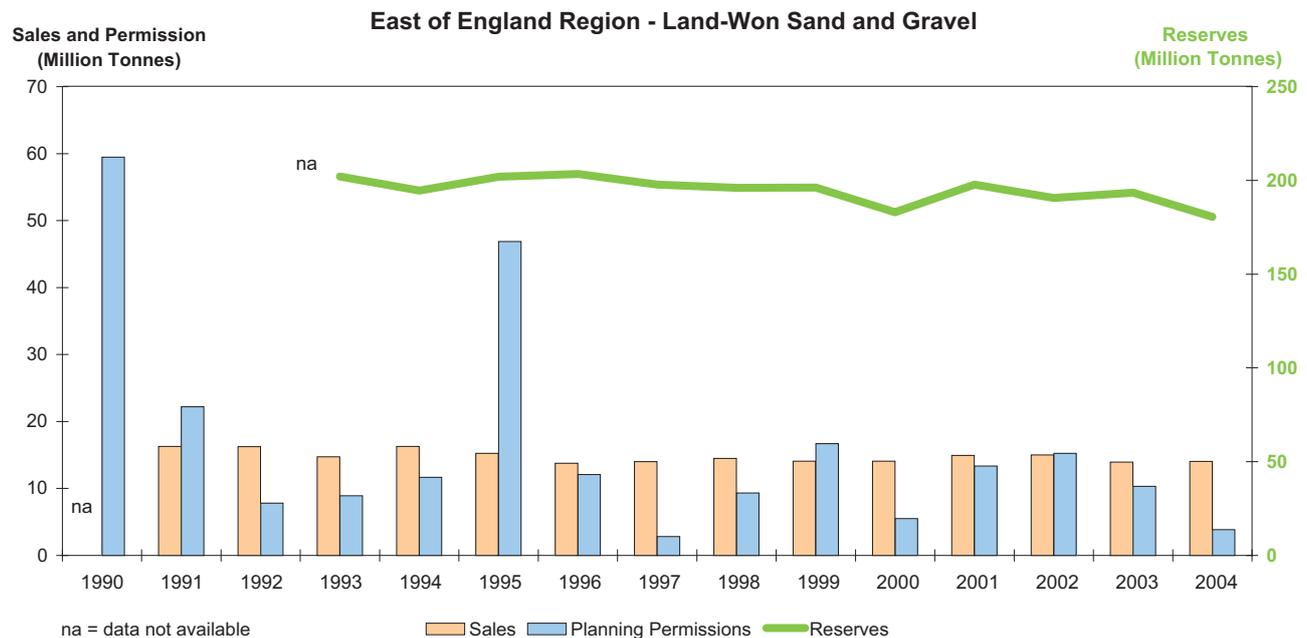
	Million Tonnes		
	Reserves	Sales	Permissions
1990	na	na	59.46
1991	na	16.27	22.18
1992	na	16.24	7.81
1993	202.09	14.74	8.91
1994	194.53	16.28	11.65
1995	201.92	15.25	46.88
1996	203.37	13.76	12.09
1997	197.75	14.00	2.82
1998	196.08	14.48	9.32
1999	196.14	14.06	16.68
2000	183.02	14.09	5.51
2001	197.79	14.95	13.36
2002	190.64	15.00	15.25
2003	193.49	13.94	10.31
2004	180.56	14.04	3.85

na = data not available

### 3.6.1 Sand and gravel

Reserves of sand and gravel in the West Midlands have shown a relatively small but steady decline since a high of over 158 million tonnes in 1997, despite a small increase in 2002. They reached a low point of just under 130 million tonnes in 2004, representing a decline of 18 per cent since 1997.

Planning permission information was not available for 1990 or 1992, but, where figures are available, new tonnages granted in planning permissions were lower than sales tonnages for 8 out of 13 years.



**Figure 18** East of England Region: Land-won sand and gravel – Trend in reserves compared to sales and new planning permission tonnes.

Notes on data sources:

- Sales figures for Suffolk for the mid-1990s may include small amounts of marine-dredged sand and gravel because there was insufficient information to enable this to be removed. All other figures exclude marine-dredged material.
- Where there is no further information available, it has been assumed that planning permissions in the East of England relate to sand and gravel. The data for permissions have been extracted from the text of RAWP reports and therefore may not represent the full tonnage granted if figures were not quoted.
- The 1990 planning permissions included 40 million tonnes in Essex. The 1995 permissions included 24 million tonnes in Cambridgeshire and over 10 million tonnes in Essex.

Sales have declined slightly and have been generally less than 10 million tonnes per year since 2000; prior to 2000 they were usually over 10 million tonnes per year.

### 3.6.2 Crushed rock

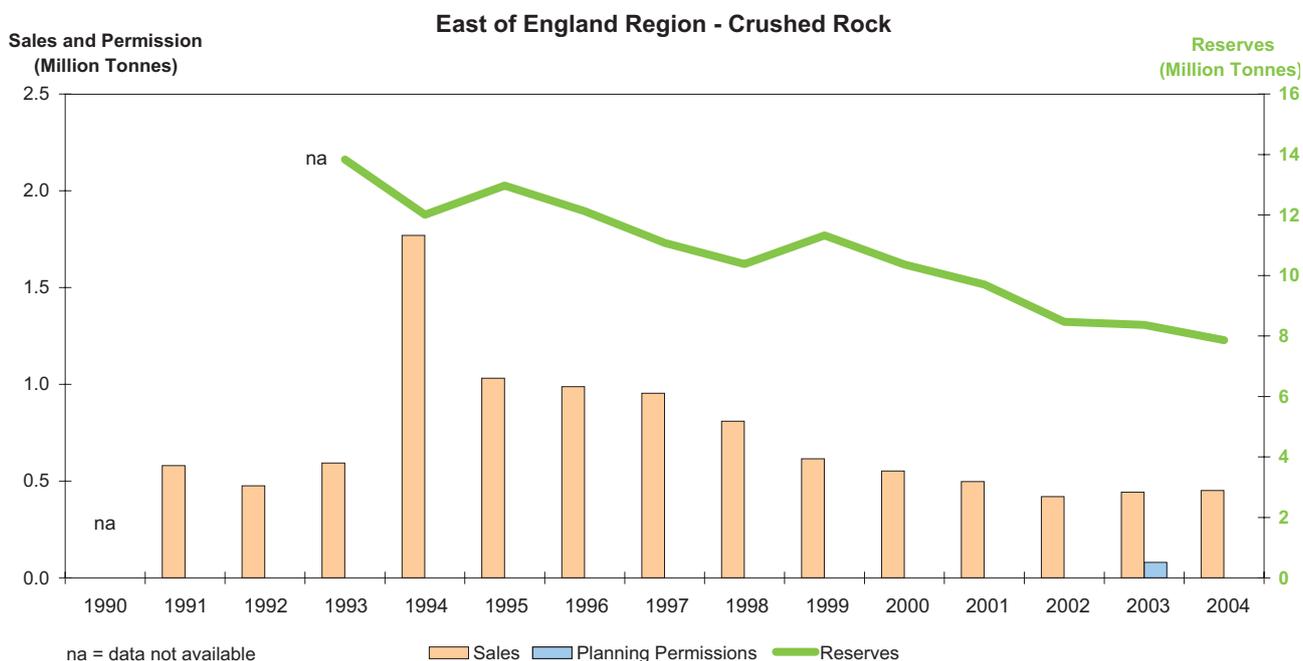
Reserves of crushed rock in the West Midlands have increased from a low of less than 200 million tonnes in 1994 to over 300 million tonnes in 2004. The bulk of this increase occurred in 1996 and 1997, partly due to some significant new planning permissions, but also partly due to a reassessment of reserves as part of the four-yearly Aggregate Minerals Survey carried out in 1997. Reserves have remained consistently between 304 million tonnes and 314 million tonnes since 2000.

Data on planning permissions are not available for 1990 and 1992, but, where figures are available, new tonnages granted have been significantly less than sales in 8 out of 13 years.

	Million Tonnes		
	Reserves	Sales	Permissions
1990	na	na	0.00
1991	na	0.58	0.00
1992	na	0.48	0.00
1993	13.83	0.59	0.00
1994	12.00	1.77	0.00
1995	12.97	1.03	0.00
1996	12.12	0.99	0.00
1997	11.07	0.95	0.00
1998	10.37	0.81	0.00
1999	11.32	0.62	0.00
2000	10.36	0.55	0.00
2001	9.70	0.50	0.00
2002	8.47	0.42	0.00
2003	8.36	0.44	0.08
2004	7.86	0.45	0.00

na = data not available

**Table 12** East of England Region: Crushed rock – Reserves, sales and additional reserves granted in new planning permission.



**Figure 19** East of England Region: Crushed rock – Trend in reserves compared to sales and new planning permission tonnes.

Notes on data sources:

- Sales figures for Cambridgeshire in the mid 1990s may include a small amount for non-aggregate uses. All other figures are for aggregate use only.
- Where there is no information to suggest otherwise, it has been assumed that planning permissions relate to sand and gravel and therefore excluded here.

Sales show a steady decline over the period of this study from more than 11 million tonnes per year in 1990 to just 5 million tonnes per year in 2004.

### 3.7 East of England

The East of England Region includes the MPAs of Norfolk (including the Norfolk Broads), Suffolk, Cambridgeshire, City of Peterborough, Bedfordshire, Luton, Hertfordshire, Essex, Southend-on-Sea and Thurrock.

In the RAWP reports the City of Peterborough is included in Cambridgeshire and Luton is included in Bedfordshire. Both Southend-on-Sea and Thurrock MPAs are included with Essex.

Prior to 1998, Bedfordshire, Hertfordshire and Essex were part of the South East Region and Norfolk, Suffolk and Cambridgeshire formed a separate region known as 'East Anglia'. In order to produce a consistent time series for the region, data for these MPAs have been brought together.

#### 3.7.1 Sand and gravel

The RAWP reports for the former East Anglia Region are not available for 1990 to 1992 and, although sales and permission data can be obtained from subsequent reports for most years, it has not been possible to obtain reserve data for those years. For the 12 years where data are available, reserves have remained relatively constant at between 180 million tonnes and 203 million tonnes, with only a slight decreasing trend of less than 11 per cent between 1993 and 2004.

Reserve tonnages in new planning permissions have fallen short of sales tonnages for 10 of the 14 years where data are available, and it is perhaps surprising that there has not been a more significant decreasing trend in reserves.

Sales have also declined slightly from over 16 million tonnes in 1991 to 14 million tonnes in 2004.

#### 3.7.2 Crushed rock

The East of England Region has very limited resources of material suitable for crushed rock aggregates. These are

confined to limestone in Cambridgeshire and 'Carstone' (a type of sandstone) in Norfolk.

The RAWP reports for the former East Anglia Region are not available for the years 1990 to 1992. However reserves of crushed rock in the region have declined significantly over the period from 1993 to 2004, despite small increases in 1995 and 1999. From a high of nearly 14 million tonnes in 1993 there has been a 43 per cent decrease to a low of under 8 million tonnes in 2004. Reflecting the scarcity of resources, very few planning permissions for crushed rock have been granted in the region.

Sales have remained at around 0.5 million tonnes per year since 2000.

### 3.8 South East

The South East Region includes the MPAs of Oxfordshire, Buckinghamshire, Milton Keynes, West Berkshire, Reading, Wokingham, Windsor & Maidenhead, Bracknell Forest, Slough, Hampshire, New Forest, City of Southampton, Isle of Wight, City of Portsmouth, West Sussex, Surrey, Brighton & Hove, East Sussex, Kent and Medway.

In the RAWP reports, and to protect confidentiality, the MPAs of West Berkshire, Reading, Wokingham, Windsor & Maidenhead, Bracknell Forest and Slough have been grouped together under the term 'Berkshire'.

Figures for Bedfordshire, Hertfordshire and Essex have been moved to the East of England Region for all years prior to 1998 when they were part of the South East Region. Figures for London have been separated into its own Region.

#### 3.8.1 Sand and gravel

Although sand and gravel reserves in the South East increased slightly between 1990 and 1995, they have subsequently shown a significant and dramatic decline. From high in 1995 when reserves stood at over 207 million tonnes, there has been a 61 per cent decline to just 81 million tonnes in 2004.

Although sales have declined slightly from a high of nearly 13 million tonnes in 1996 and 1997 to 10.4 million tonnes in 2004, the reason for the decline in reserves is clear from Figure 20. In every year since 1996 the tonnages added to reserves through new permissions have been significantly less than sales tonnages.

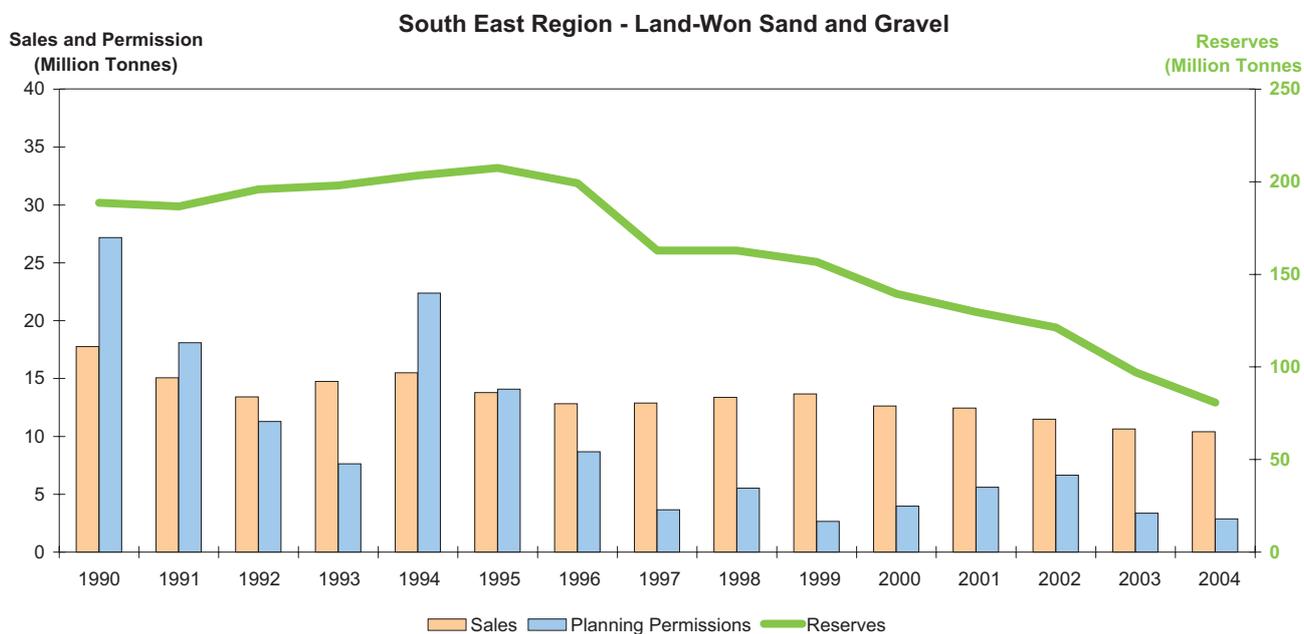
### 3.8.2 Crushed rock

Hard rock resources, suitable for use as crushed rock aggregate are scarce in the South East. These consist of limestone and ironstone in Oxfordshire, sandstone in Surrey and West Sussex and 'ragstone' (a limestone) in Kent. In the South East chalk is specifically excluded from reserves of crushed rock aggregate. Over the years there has been some inconsistency in the RAWP reports with regards to whether ironstone should be included in the aggregate reserves; in this report ironstone is included.

The trend in reserves follows an unusual pattern, with a significant increase in 1994 and a marked decline in

	Million Tonnes		
	Reserves	Sales	Permissions
1990	188.64	17.75	27.19
1991	186.70	15.06	18.09
1992	195.87	13.40	11.29
1993	198.02	14.74	7.63
1994	203.37	15.50	22.38
1995	207.51	13.79	14.08
1996	199.22	12.83	8.66
1997	162.91	12.87	3.66
1998	162.81	13.37	5.52
1999	156.69	13.67	2.65
2000	139.56	12.63	3.98
2001	129.67	12.45	5.61
2002	121.36	11.48	6.66
2003	97.09	10.64	3.37
2004	80.81	10.41	3.20

**Table 13** South East Region: Land-won sand and gravel – Reserves, sales and additional reserves granted in new planning permissions.



**Figure 20** South East Region: Land-won sand and gravel – Trend in reserves compared to sales and new planning permission tonnes.

Notes on data sources:

- All figures exclude marine-dredged sand and gravel.
- Some sand reserves in Kent are used for non-aggregate purposes and these have been excluded where possible.
- Planning permissions in 1990 included nearly 10 million tonnes in Surrey and more than 8 million tonnes in Hampshire. Permissions in 1991 included 10 million tonnes in Kent and permissions in 1994 included 10 million tonnes in Buckinghamshire.

2001. The decline in 2001 was probably as a result of a reassessment of reserves, mainly relating to ironstone in Oxfordshire, as part of the four-yearly Aggregate Minerals Survey. Apart from this fall, reserves have actually remained relatively flat since 1994.

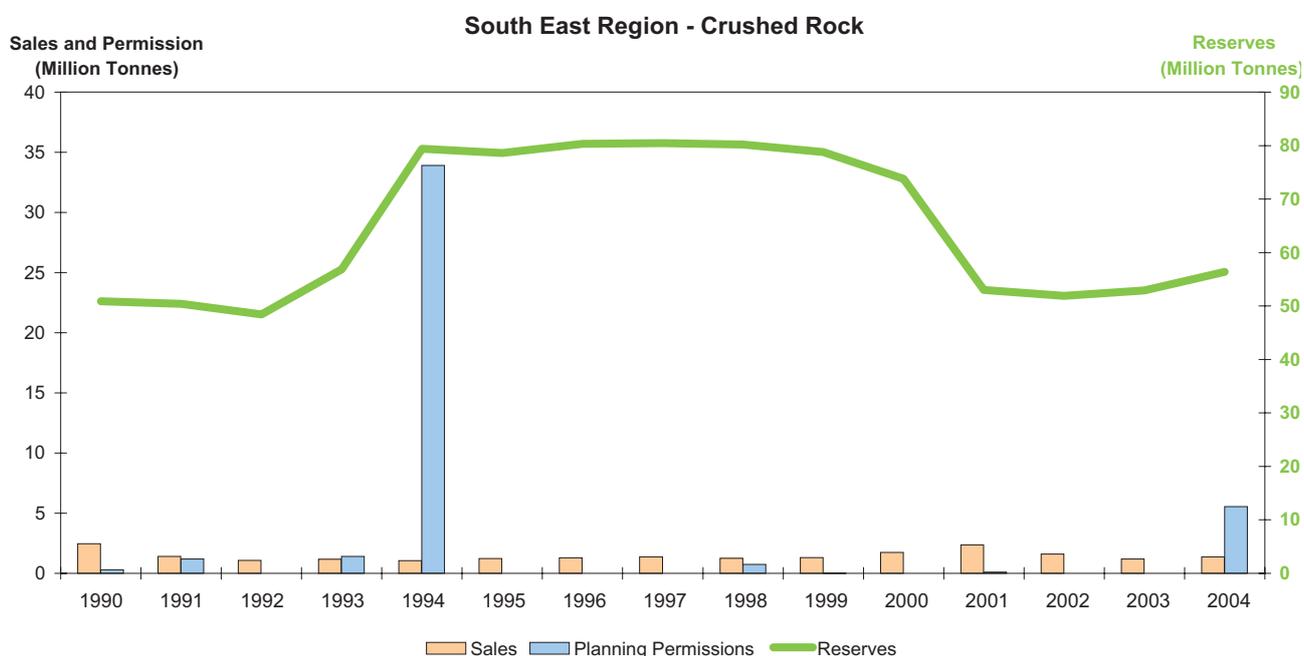
Sales have been in the range of 1 million tonnes per year to 2.5 million tonnes per year for the entire period of this study and planning permissions have been less than sales for 12 of the 15 years. However, with only limited resources of crushed rock in the South East, large tonnages of crushed rock are imported into the region each year to make up for the major shortfall in local supply.

### 3.9 London

The London Region includes all the London Boroughs although very few have any aggregate quarries.

	Million Tonnes		
	Reserves	Sales	Permissions
1990	50.89	2.46	0.30
1991	50.39	1.40	1.20
1992	48.43	1.08	0.00
1993	56.84	1.17	1.41
1994	79.39	1.06	33.90
1995	78.62	1.24	0.00
1996	80.33	1.28	0.00
1997	80.47	1.37	0.00
1998	80.20	1.24	0.75
1999	78.77	1.32	0.01
2000	73.79	1.73	0.00
2001	53.00	2.36	0.09
2002	51.90	1.60	0.00
2003	52.90	1.20	0.00
2004	56.40	1.37	5.55

**Table 14** South East Region: Crushed rock – Reserves, sales and additional reserves granted in new planning permissions.



**Figure 21** South East Region: Crushed rock – Trend in reserves compared to sales and new planning permission tonnes.

Notes on data sources:

- There may be small amounts of material for non-aggregate uses in Kent, where it was not possible to remove them. All other figures are for aggregate uses only.
- Planning permissions in 1994 include 33.9 million tonnes granted in Kent.

**Table 15** London Region: Land-won sand and gravel – Reserves, sales and additional reserves granted in new planning permissions.

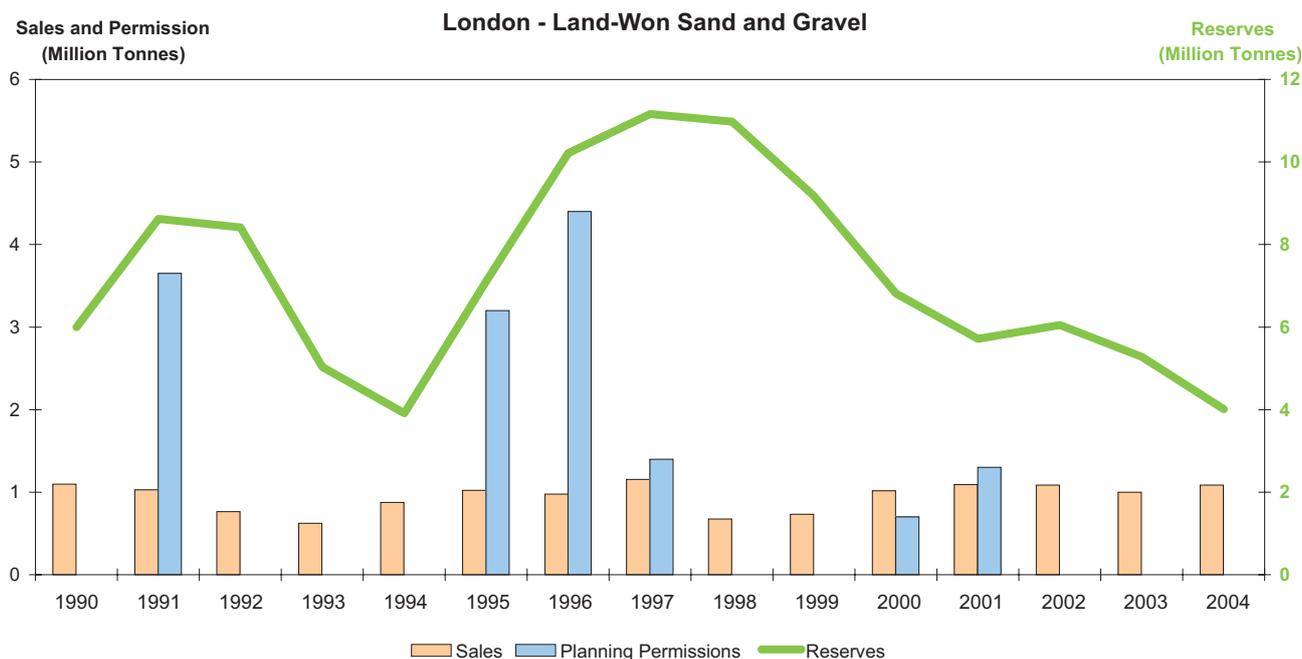
	Million Tonnes		
	Reserves	Sales	Permissions
1990	6.00	1.10	0.00
1991	8.62	1.03	3.65
1992	8.41	0.76	0.00
1993	5.03	0.62	0.00
1994	3.91	0.88	0.00
1995	7.11	1.02	3.20
1996	10.22	0.98	4.40
1997	11.16	1.16	1.40
1998	10.98	0.68	0.00
1999	9.17	0.73	0.00
2000	6.81	1.02	0.70
2001	5.72	1.09	1.30
2002	6.05	1.09	0.00
2003	5.13	0.95	0.00
2004	4.01	1.09	0.00

3.9.1 Sand and gravel

Sand and gravel reserves in London have shown a general decrease between 1998 and 2004. This appears to be primarily due to a lack of new planning permissions in several of those years. With annual sales of around 1 million tonnes it does not take many new permissions in any year for the new tonnage to exceed sales.

3.9.2 Crushed rock

There is no local source of crushed rock in London. However, approximately 3.6 million tonnes of crushed rock



**Figure 22** London Region: Land-won sand and gravel – Trend in reserves compared to sales and new planning permissions.

Notes on data sources:

- These figures relate to land-won sand and gravel sourced locally within London. Significant tonnages of marine-dredged sand and gravel are landed in London and material is also imported from neighbouring regions by road and rail.
- There is some inconsistency in a few of the RAWP reports between the ‘closing’ reserve in one year and the ‘opening’ reserve in the next year’s report. This is probably due to regular reassessments of reserves carried out by operators.
- Data are available for all years and therefore the absence of a planning permission bar means that no permissions were granted in that year.
- Planning permissions in 1996 were granted in Barking & Dagenham and Redbridge. Planning permissions in 1995 include 2.2 million tonnes granted in Sutton. No further information is available regarding the permissions granted in 1991.

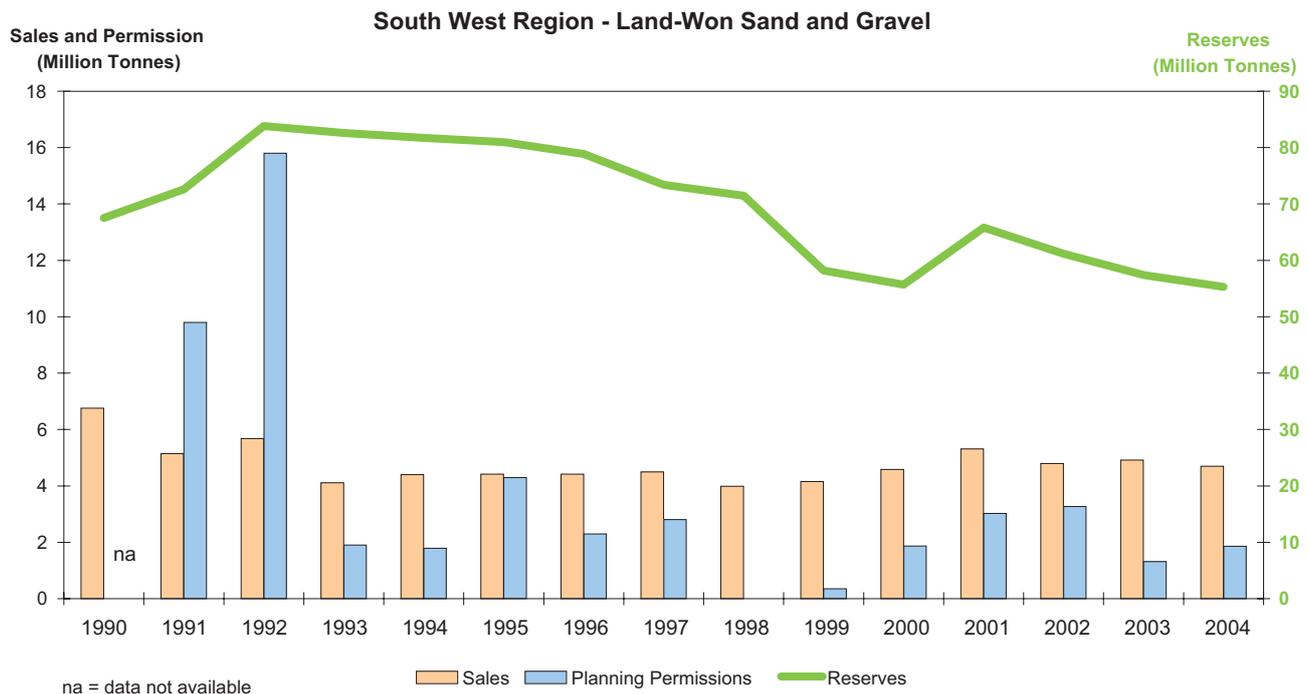
**Table 16** South West Region: Land-won sand and gravel – Reserves, sales and additional reserves granted in new planning permissions.

	Million Tonnes		
	Reserves	Sales	Permissions
1990	67.53	6.76	na
1991	72.62	5.14	9.80
1992	83.84	5.68	15.80
1993	82.58	4.11	1.90
1994	81.74	4.40	1.79
1995	80.97	4.42	4.29
1996	78.87	4.42	2.30
1997	73.41	4.50	2.81
1998	71.48	3.99	0.00
1999	58.20	4.16	0.35
2000	55.68	4.58	1.87
2001	65.80	5.31	3.03
2002	61.18	4.79	3.27
2003	57.40	4.92	1.32
2004	55.30	4.70	1.86

na = data not available

is imported annually by rail into 17 active railheads and an additional 1.1 million tonnes of crushed rock is imported annually by sea into wharves on the River Thames. This does not include the aggregate landed at wharves on the River Thames in Kent and Essex, which are outside the boundaries of the London Boroughs.

According to the Aggregate Minerals Survey for 2001 nearly 62 per cent of the imported material comes from the East Midlands Region (mostly igneous rock) and 25 per cent from the South West Region (mostly limestone), with



**Figure 23** South West Region: Land-won sand and gravel – Trend in reserves compared to sales and new planning permission tonnes.

Notes on data sources:

- The figures for Devon may include small amounts of marine-dredged material, where there was not sufficient information to remove it. All other figures exclude marine-dredged sand and gravel
- There may be small amounts of reserves for non-aggregate uses in some years but wherever possible these have been removed.
- The planning permission data are extracted from the text of the RAWP reports and therefore may not represent the full tonnage if figures were not quoted. There were no planning permissions for sand and gravel in the region for 1998.
- 2004 data were provisional at the time of inclusion.

the majority of the remaining 13 per cent coming from outside England.

### 3.10 South West

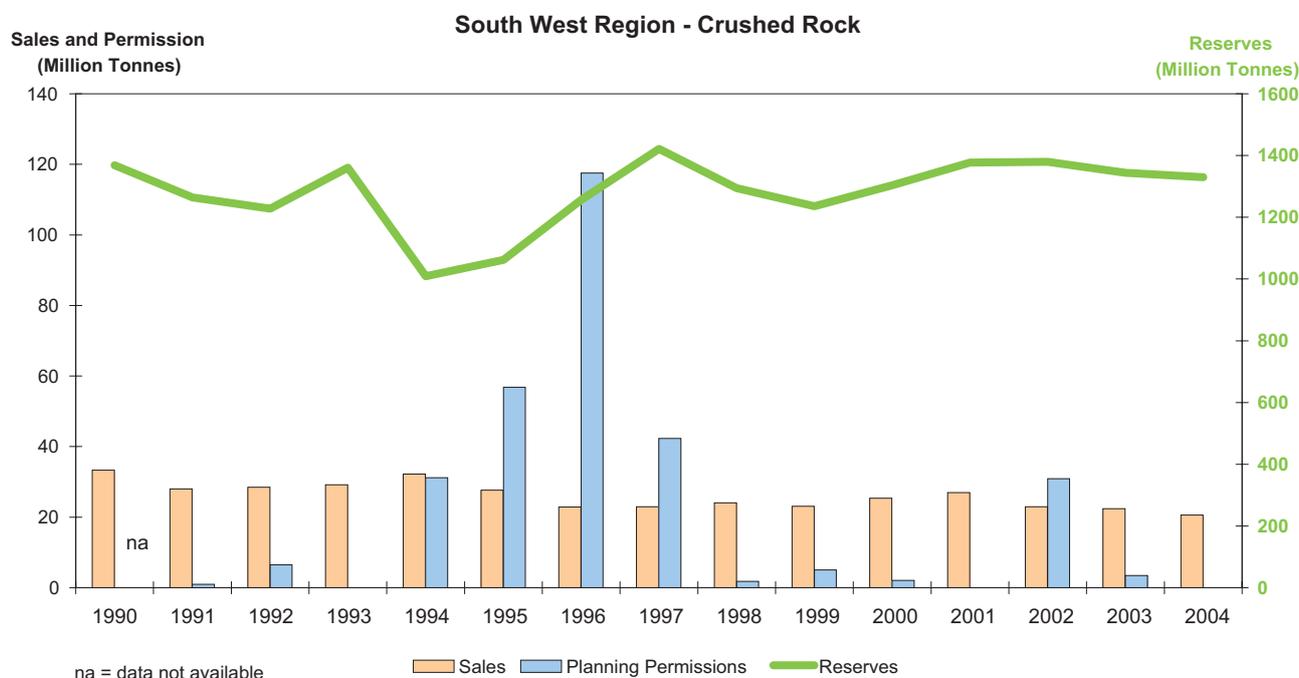
The South West Region includes the MPAs of Gloucestershire, Wiltshire, Swindon, South Gloucestershire, Bristol City, North Somerset, Bath & North East Somerset, Somerset, Dorset, Poole, Bournemouth, Exmoor National Park, Devon, Dartmoor National Park, Torbay, City of Plymouth, Cornwall and Isles of Scilly.

In the RAWP reports, and to protect confidentiality, South Gloucestershire, Bristol City, North Somerset and Bath & North East Somerset have been grouped together as 'Avon'. The Isles of Scilly are included with Cornwall. Torbay, City of Plymouth and Dartmoor National Park are all included with Devon, and Exmoor National Park is included with Somerset. Poole and Bournemouth are included with Dorset, and Swindon is included with Wiltshire.

	Million Tonnes		
	Reserves	Sales	Permissions
1990	1368.13	33.32	na
1991	1264.04	28.00	1.00
1992	1227.52	28.50	6.50
1993	1360.74	29.20	0.00
1994	1008.95	32.24	31.15
1995	1062.00	27.66	56.80
1996	1256.10	22.86	117.50
1997	1421.24	22.97	42.30
1998	1294.53	24.09	1.80
1999	1235.97	23.07	5.04
2000	1303.43	25.34	2.05
2001	1376.89	26.94	0.03
2002	1379.20	22.95	30.94
2003	1343.70	22.40	3.43
2004	1330.00	20.60	0.00

na = data not available

**Table 17** South West Region: Crushed rock – Reserves, sales and additional reserves granted in new planning permissions.



**Figure 24** South West Region: Crushed rock – Trend in reserves compared to sales and new planning permission tonnes.

Notes on data sources:

- 2004 data were provisional at the time of inclusion

### 3.10.1 Sand and gravel

Sand and gravel reserves in the South West have been in decline since 1992, despite an increase in 2001 which was probably due to a reassessment of reserves as part of the four-yearly Aggregate Minerals Survey. From a high of nearly 84 million tonnes in 1992, the region has seen a 34 per cent decline in reserves to just over 55 million tonnes in 2004.

Sales have remained relatively constant since 1991, in the range 4 million tonnes per year to just over 5.7 million tonnes per year. However, the tonnages granted in new planning permissions have not exceeded sales in any year since 1993.

### 3.10.2 Crushed rock

Reserves of crushed rock in the South West are the second largest of any region in the country, after the East Midlands. The reserves appear to vary considerably from one year to the next, but there have been noticeable increases between 1994 and 1997 and between 1999 and 2002. Part of this latter increase was probably due to a reassessment of reserves.

New tonnages in planning permissions have fallen short of sales for 9 of the 14 years where data are available (there was no information available for 1990), but for

the three years 1995 to 1997 new permissions were significantly greater than sales. Sales tonnages have remained between 22 and 33 million tonnes per year.

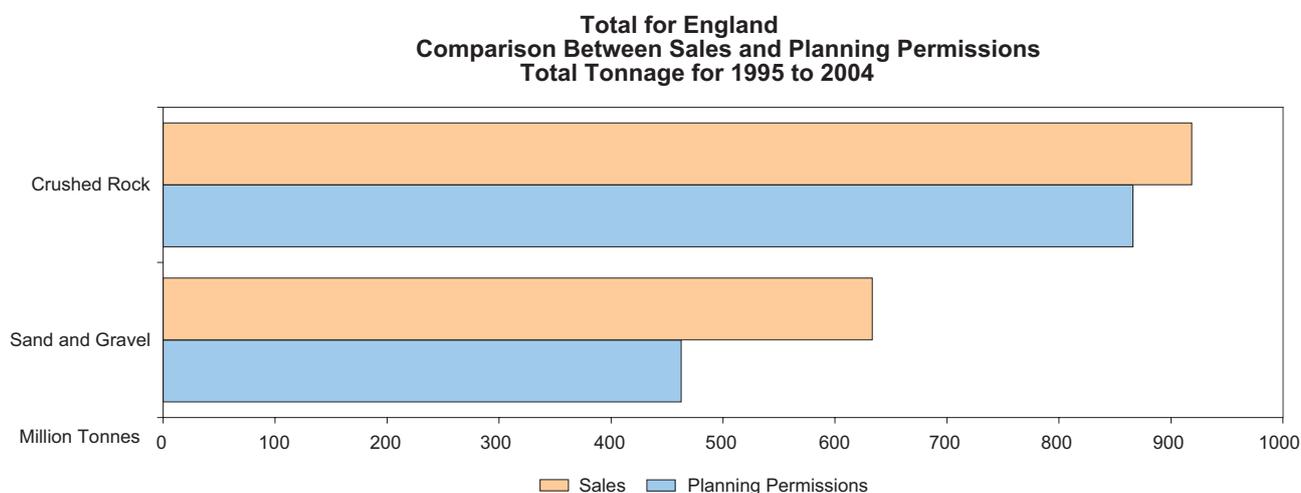
### 3.11 Comparison between sales and planning permission tonnes

The analysis of regional data has highlighted the importance of replacing sales of primary aggregates with similar levels of tonnages in new planning permissions if reserves are to remain constant. Significant declines in reserves will result where tonnages in planning permissions fall below sales for several consecutive years.

During the 10-year period from 1995 to 2004 total sales of sand and gravel and crushed rock aggregate have been greater than total new reserves granted planning permission, as shown in Figure 25.

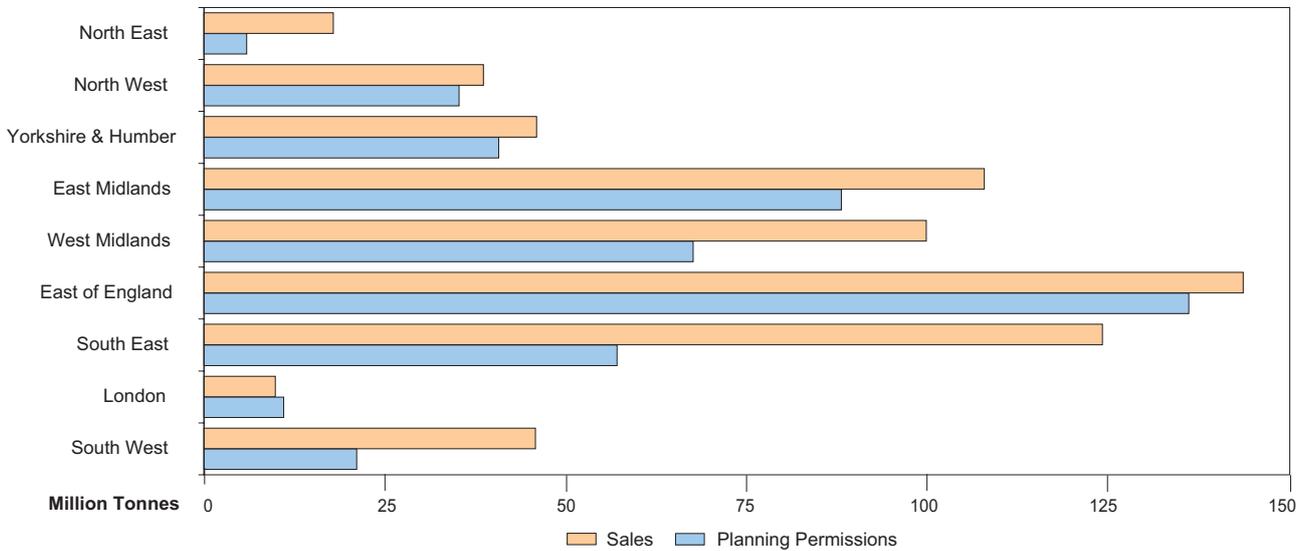
The shortfall has been most marked for land-won sand and gravel where 463 million tonnes were permitted between 1995 and 2004 but sales for the same period were 634 million tonnes. There was a shortfall of 171 million tonnes, or 27 per cent of sales were not replaced by new permissions. Clearly, in the long term, a shortfall such as this is not sustainable.

For crushed rock new planning permissions amounted to 866 million tonnes, compared to sales of 918 million



**Figure 25** Total for England: Comparison between sales and planning permission tonnes.

**Land-Won Sand and Gravel**  
**Total Sales Compared to Total Tonnes Granted on Planning Permissions**  
**1995 to 2004**



**Figure 26** Land-won sand and gravel by region – sales tonnes compared to planning permission tonnes.

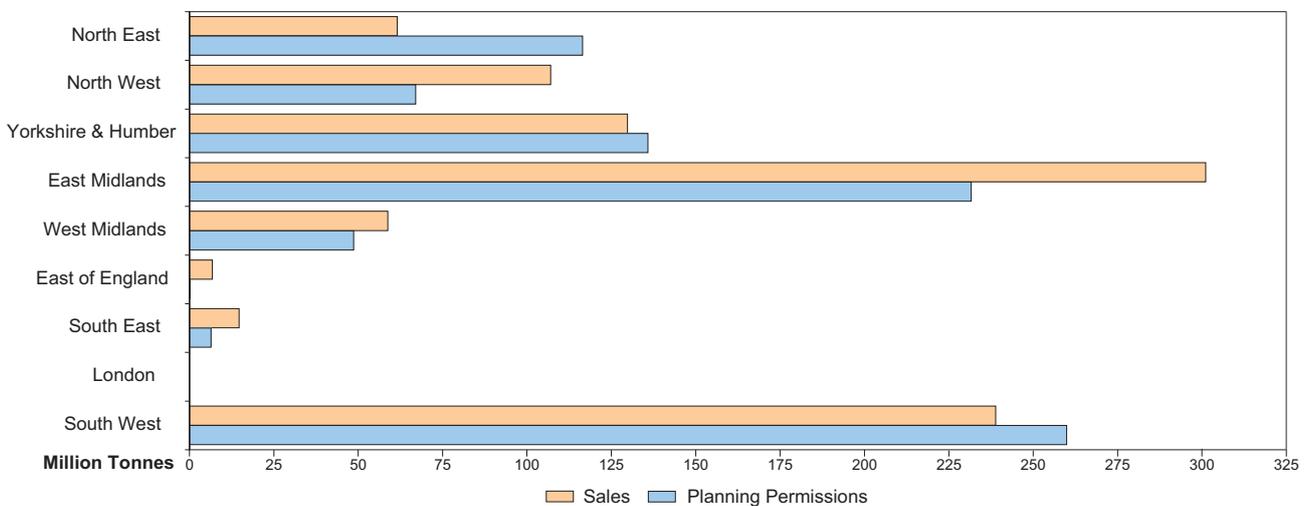
tonnes. The shortfall of 52 million tonnes represents 6 per cent of sales.

There are, however, wide variations between different parts of the country as shown in Figures 26 and 27. For sand and gravel the biggest shortfall in volume terms was in the South

East where 67 million tonnes were sold and not replaced by new permissions, representing 54 per cent of sales.

However, in terms of percentage of sales the North East had a larger shortfall of 67 per cent, although this was a smaller volume at nearly 12 million tonnes. Only in London were planning permission tonnages higher than sales.

**Crushed Rock for Aggregate Use**  
**Total Sales Compared to Total Tonnes Granted on Planning Permissions**  
**1995 to 2004**



**Figure 27** Crushed rock by region – sales tonnes compared to planning permission tonnes.

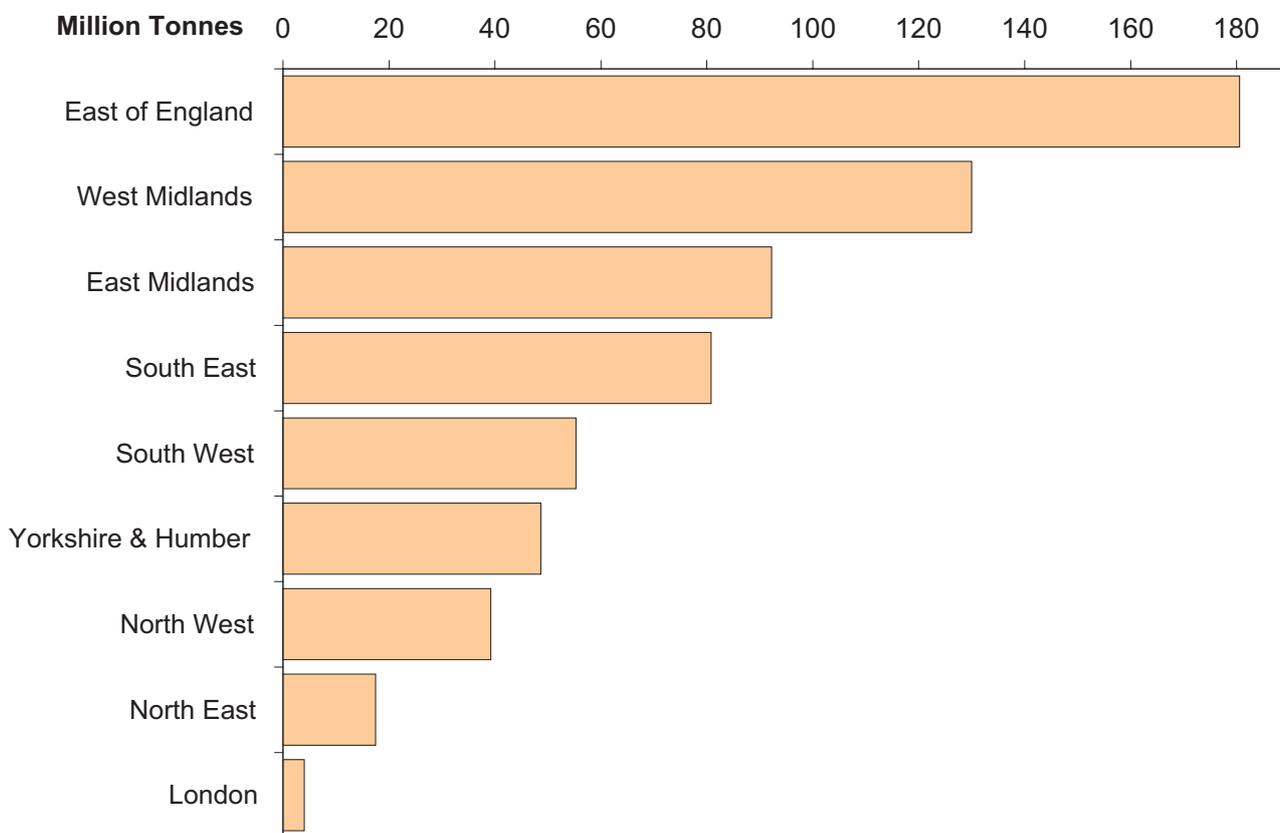
The reasons for these shortfalls are varied, but in the South East there has been a reduction in planning applications as well as permissions granted. This is probably the result of issues regarding the identification of suitable locations for sand and gravel extraction in a region where there are many competing pressures for land use.

For crushed rock by far the most significant shortfall was in the East Midlands where more than 69 million tonnes were sold and not replaced by new permissions, representing 23 per cent of sales. However this is also the region with the largest crushed rock reserves. In percentage terms the North West had a greater shortfall of 37 per cent, or 40 million tonnes. These shortfalls were offset by regions where new planning permission tonnages exceeded sales. Most notable were the North East, where planning permissions exceeded sales by nearly 55 million tonnes (89 per cent higher than sales), and the South West where planning permissions exceeded sales by 21 million tonnes (9 per cent higher than sales).

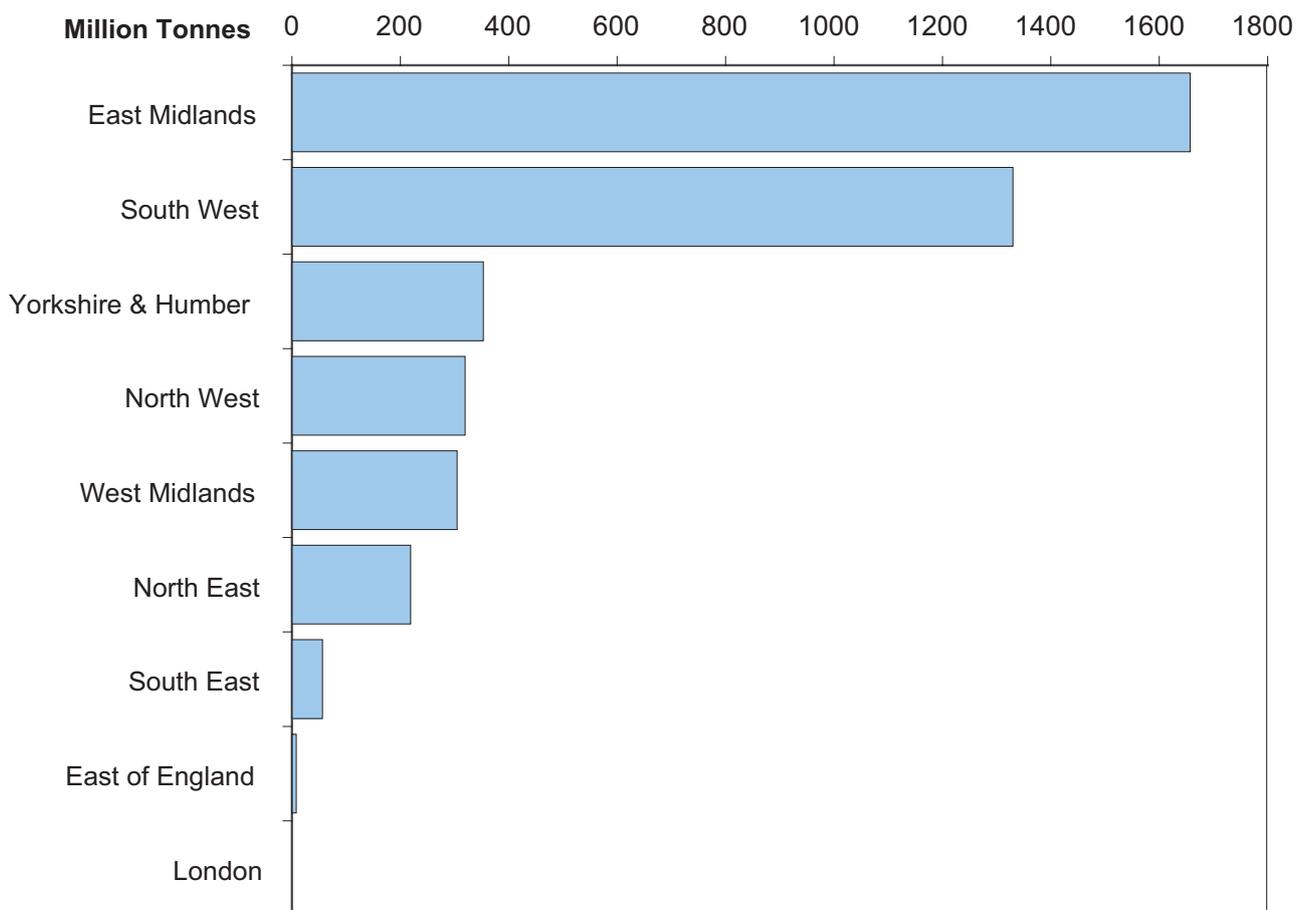
Issues surrounding competing land uses also apply to crushed rock quarries. Many of the potential sources for crushed rock are located in upland areas and often these are the same areas that society wishes to protect for their landscape quality.

However, a simple comparison of new permissions with sales ignores the size of pre-existing reserves. These are very substantial for crushed rock in some regions, notably the East Midlands and the South West. In regions with large reserves some decline may be acceptable, particularly if this is due to reserves being relinquished at 'dormant' sites that are unlikely to be worked in future. The relative size of permitted reserves of crushed rock and sand and gravel by region are shown in Figures 28 and 29.

Gross figures for the size of permitted reserves can also be misleading. Particular applications may require aggregates of a specific quality and it may be that only a much smaller part of the reserve is suitable for that use.



**Figure 28** Reserves of land-won sand and gravel by region for 2004.



**Figure 29** Reserves of crushed rock by region for 2004.

Similarly, if a large reserve is confined to only a few locations there may be limitations on production capacity, which results in insufficient reserve being accessible in the required period of time.

It must also be remembered that if regions with a surplus of aggregates reserves are to supply those with a deficit, then there are other supply constraints that need to be considered. There needs to be sufficient capacity on the railways, for example, and enough rail depots with sufficient stocking space to receive the material. In addition, it will be vital for quarries with large reserves to be rail connected. Therefore, whilst a large reserve in one or two regions may appear to be satisfactory, it may not in

fact be possible to supply the needs for England as a whole from that reserve. A detailed study of inter-regional flows of aggregate is beyond the scope of this report.

There can be many reasons for declining permitted reserves: a lack of physical resources, a variety of planning constraints, a lack of provision in local plans, planning refusal and, very significantly – a lack of planning applications being submitted by the industry. The latter could be due to a perception of the likelihood of an application being refused – the capital involved in acquiring a site, evaluating its potential and undertaking the associated environmental and sustainability appraisals can be very substantial.

### 3.12 Guidelines for aggregates provision in England 2001–2016

Revised guidelines for aggregates provision in England for the period 2001 to 2016 inclusive were published by the former ODPM in 2003. These guidelines replaced those published in MPG6 (Mineral Planning Guidance 6). They indicate how provision for the supply of aggregates should be made to meet anticipated need to 2016.

DCLG is committed to keeping these guidelines under review. The Department monitors them on an annual basis and they will be revised when necessary.

The national and regional guidelines for land-won primary aggregates are reproduced in Table 18, together with permitted reserves at the end of 2001 and 2004. Although they cannot be directly compared, the figures would seem to show that for sand and gravel additional permitted reserves will be required if the anticipated need is to be met.

Mineral Planning Authorities (MPAs) are required to maintain a landbank of reserves from which to meet the anticipated need for aggregates. This is normally expressed as a number of years supply remaining from the total permitted reserves, at both active and inactive sites, at an average rate of expected provision.

In England, planning guidance (Minerals Policy Statement 1: Planning and Minerals (MPS1), Annex 1: Aggregates) requires a minimum length of landbank of seven years for sand and gravel and ten years for crushed rock. This reflects the approximate time required to obtain planning permission and to bring replacement operations into full production. A longer period may be appropriate to take account of the need to supply a range of types of aggregates, locations of permitted reserves relative to markets, and productive capacity of permitted sites.

Regions	Guidelines for land-won production, 2001 - 2016		Permitted aggregate reserves, end 2001		Permitted aggregate reserves, end 2004	
	Land-won sand & gravel	Land-won crushed rock	Land-won sand & gravel	Land-won crushed rock	Land-won sand & gravel	Land-won crushed rock
	Million tonnes		Million tonnes		Million tonnes	
South East	212	35	130	53	81	56
London	19	0	6	0	4	0
East of England	256	8	198	10	181	8
East Midlands	165	523	103	1741	92	1657
West Midlands	162	93	144	309	130	305
South West	106	453	66	1377	55	1330
North West	55	167	48	333	39	319
Yorkshire & the Humber	73	220	50	380	49	353
North East	20	119	22	264	17	219
<b>ENGLAND</b>	<b>1068</b>	<b>1618</b>	<b>766</b>	<b>4466</b>	<b>648</b>	<b>4247</b>

**Table 18** National and regional guidelines for aggregates provision 2001–2016, with permitted reserves for 2001 and 2004.

Regions	Landbank based on Annualised Guidelines		Landbank based on Average Sales 2002-2004	
	Land-won sand & gravel	Land-won crushed rock	Land-won sand & gravel	Land-won crushed rock
	Years		Years	
South East	6	26	7	41
London	3	0	4	0
East of England	11	16	13	18
East Midlands	9	51	9	57
West Midlands	13	52	14	58
South West	8	47	12	61
North West	11	31	13	33
Yorkshire & the Humber	11	25	11	27
North East	14	29	14	35
<b>ENGLAND</b>	10	42	11	49

**Table 19** Calculated landbanks for 2004 by region.

Notes on calculations

- For the first two columns, the guidelines by region were divided by 16 to make annualised figures. These were then divided into the permitted reserves for 2004.
- For the second two columns, the sales figures for 2002, 2003 and 2004 were averaged together. These were then divided into the permitted reserves for 2004.

The landbank can be calculated in two ways:

- by dividing permitted reserves by the average annual regional apportionment, as described in the Practice Guide accompanying MPS1; or
- by dividing permitted reserves by the average of the preceding three years' sales.

Table 19 shows the landbank figures by region for 2004, calculated using both the above methods.

This report has not attempted to quantify 'consumption' of aggregates by region because this would require more detailed information on inter-regional flows of material that are currently not available on an annual basis.

## 4 Comparisons with other surveys

There are currently three types of survey that present statistical information on primary aggregates in England. Two of these are annual and the other is carried out at four-yearly intervals.

### 4.1 Annual Minerals Raised Inquiry (AMRI)

This annual survey is carried out by the Office for National Statistics (ONS), on behalf of the Department for Communities and Local Government (DCLG) and Department for Trade and Industry (DTI). It is a statutory survey and is the principal source of data on non-energy minerals production in Great Britain. The survey collects data on extractors' sales of aggregates and other non-energy minerals, such as silica sand and brick clay, and the results are published in Business Monitor PA 1007 *'Minerals Extraction in Great Britain'*.

Table 20 shows how the sales information collected on aggregates in England as part of AMRI compares with the sales figures collected by the RAWPs and used in this report.

### 4.2 Annual Monitoring Surveys

These surveys are carried out annually by the Regional Aggregate Working Parties (RAWPs) in both England and Wales. They include information on sales, permitted reserves and planning permissions as well as progress on development plans and other events of interest affecting their region. The results are published in the Annual Reports of each RAWP, and these are the main source of data for this study.

Unlike AMRI, these surveys are voluntary and this sometimes allows more comprehensive data to be presented. In general these annual surveys have shown larger totals for aggregate sales than AMRI for many years. This is probably because the RAWP surveys have a more comprehensive coverage of operational quarries. In an effort to increase the comprehensiveness of AMRI, the BGS, with the assistance of the MPAs and the RAWPs, provide the ONS with an annual updated list of operational quarries in Great Britain.

Million Tonnes	Land-won Sand and Gravel			Crushed Rock		
	Annual Monitoring Surveys by RAWPs	AMRI by ONS	Difference %	Annual Monitoring Surveys by RAWPs	AMRI by ONS	Difference %
1995	71.0	65.5	7.8	104.1	103.5	0.6
1996	64.7	59.1	8.7	95.5	89.4	2.3
1997	66.0	63.0	4.5	95.9	91.5	4.6
1998	63.8	61.2	4.0	93.4	88.7	5.1
1999	63.1	63.0	0.2	90.0	88.6	1.5
2000	61.7	63.2	-2.5	90.1	88.0	2.3
2001	63.1	62.2	1.5	94.8	94.6	0.2
2002	61.6	59.6	3.1	88.8	87.6	1.3
2003	59.8	58.5	2.3	86.2	84.0	2.6
2004	58.6	62.7	-7.1	83.7	85.7	-2.4

**Table 20** Comparison of sales figures between Annual Monitoring Surveys carried out by the RAWPs and those from the Annual Minerals Raised Inquiry carried out by the ONS.

### 4.3 Four-yearly Aggregates Minerals Surveys

These have been carried out every four years since 1973 and, in addition to providing data on sales, planning permissions and permitted reserves, they also provide in-depth information on inter-regional flows and consumption of aggregates in England and Wales.

The information presented is collected from aggregate producers by MPAs using standard forms. The information is subsequently collated at regional level by the relevant RAWP secretary, and then at a national level by a contractor on behalf of the DCLG and the Welsh Assembly Government.

The most recent published Aggregates Minerals Survey was in 2001 (AM2001) but AM2005 is currently being carried out and will be published in Spring 2007. The national collator for these two surveys was the British Geological Survey.

The results of the four-yearly surveys should be identical to those published by the RAWPs in their Annual Reports. However, this does not appear to be the case, suggesting that late returns and/or revised data are being used in the Annual Reports (see Table 21). In addition, there is often a lack of clarity as to whether the figures given for permitted reserves of aggregates also include reserves for non-aggregate uses.

The detailed four-yearly surveys of permitted reserves are the most comprehensive, however, and these are often used as the baseline data from which the following three years' reserves are estimated, taking into account any additional planning permissions that have been granted and a deduction for sales. In many regions there are noticeable changes in permitted reserves in the annual RAWP reports that coincide with the time of the four-yearly surveys.

Million Tonnes	Land-won Sand and Gravel			Crushed Rock		
	Annual Monitoring Surveys by RAWPs	4-Yearly AM Survey	Difference %	Annual Monitoring Surveys by RAWPs	4-Yearly AM Survey	Difference %
<b>Sales</b>						
1997	66.0	65.0	1.5	95.9	95.9	0.1
2001	63.1	62.7	0.6	94.8	95.7	-0.9
<b>Reserves</b>						
1997	869.0	859.0	1.2	4534.0	4507.0	0.6
2001	765.8	734.6	4.1	4466.4	5253.2	-17.6
<b>Permissions</b>						
1994-1997	267.2	na		693.1	na	
1998-2001	146.8	162.0	-10.3	234.3	283.4	-21.0

na = data not available

**Table 21** Comparison of figures obtained from Annual Monitoring surveys carried out by the RAWPs with the four-yearly Aggregate Minerals Survey.

Note: The figures in tables 20 and 21 are for England only.

## 5 Conclusions

Monitoring the size of England's permitted reserves of primary aggregates, and the extent that these are being supplemented by new permissions or depleted through sales, is a crucial element of the system of managed aggregates supply.

This information is monitored annually by the Regional Aggregate Working Parties, each of which publishes independently its regional data. A national survey (the Aggregate Minerals Survey), which publishes collated data on a national basis, is carried out every four years.

This report has collated the annually published RAWP data, providing a national overview for the period 1995 to 2004 and allowing longer term trends to be presented. The main conclusions are as follows:

England:

- Sand and gravel reserves in England have declined by 28.5 per cent, from 907 million tonnes in 1995 to 648 million tonnes in 2004. A major factor in this decline was a shortfall in new planning permission tonnages compared to sales tonnages of 27 per cent, or 171 million tonnes, in the same 10-year period. In the long term this rate of decline in reserves is not sustainable and needs to be addressed if security of supply is to be maintained.
- Crushed rock reserves in England were over 4247 million tonnes in 2004 and although this is lower than the reserves in 2001 (4466 million tonnes), it is still higher than it was 10 years ago (4140 million tonnes). In contrast to the situation for sand and gravel, the shortfall in planning permission tonnages for crushed rock was only 6 per cent of sales, or 52 million tonnes.

By Region:

- In the North East sand and gravel reserves have declined by 45 per cent from 1999 to 2004, primarily as a result of little or no new planning permission tonnages in these years. Crushed rock reserves in the North East have declined by 33 per cent since 1998.

- Sand and gravel reserves in the North West have declined by 32 per cent from 1993 to 2004 and crushed rock reserves have also declined by 33 per cent since 1994. Planning permission tonnages for crushed rock were 37 per cent lower than sales tonnages from 1995 to 2004.
- In Yorkshire and the Humber sand and gravel reserves have remained above 47 million tonnes since 1997. However, crushed rock reserves in this region have declined by 20 per cent since 1998.
- Sand and gravel reserves in the East Midlands have declined by 25 per cent from 1999. Crushed rock reserves in the East Midlands are the largest in England and have increased in recent years. However, this is primarily due to reassessment of reserves and not to new planning permission tonnages, which fell short of sales by 23 per cent between 1995 and 2004. The reserves still remained above 1600 million tonnes in 2004, the equivalent of 57 years' supply.
- In the West Midlands sand and gravel reserves have declined by 18 per cent since 1997, but crushed rock reserves have increased and, in 2004, were above 300 million tonnes.
- Sand and gravel reserves in the East of England are the largest in England and have declined by just 11 per cent since 1993. Crushed rock reserves in this region are very limited and have declined by 43 per cent from 1993 to 2004.
- Sand and gravel reserves have undergone the most significant decline in the South East of England with a decrease of 61 per cent since 1995. This is mainly due to a 54 per cent shortfall in planning permission tonnages compared to sales. Crushed rock reserves are limited in this region but have remained relatively constant since 1994, apart from a fall in 2001 due to a reassessment of ironstone reserves.
- In London sand and gravel reserves are much smaller than for other regions, and they have declined since 1998, despite being the only region where planning permission tonnages have exceeded sales in the period

1995 to 2004. There are no crushed rock reserves in this region.

- Sand and gravel reserves in the South West have declined by 34 per cent since 1992. However, this region has considerable crushed rock reserves, which have remained above 1200 million tonnes since 1996.

## 6 Recommendations

Information on planning applications for new primary aggregate extraction sites and extensions to existing sites, together with the tonnages within new permissions, is collated and published by the Regional Aggregate Working Parties. However, the data are not consistently comprehensive across England and, except for the four-yearly Aggregates Minerals Survey, are presented by region only with no national overview. We recommend that the RAWPs collect, collate and publish their regional information in a consistent and standardised way across the regions and that data on planning applications, permissions and refusals are collated annually on a national basis.

We also recommend that the new permissions be identified by a National Grid Reference so they can be spatially

related within a Geographical Information System (GIS) providing additional opportunities for relating new permissions to specific mineral resources and planning or other (e.g. environmental) designations. This information could then be readily delivered through an online GIS such as the BGS Regional Minerals Information Online on [www.mineralsUK.com](http://www.mineralsUK.com).

If such an annual collation of mineral planning decision data proved to be effective, consideration should be given to simplifying the survey of planning permissions and refusals carried out for the four-yearly Aggregates Minerals Survey.

## Appendix I

The Regional Aggregate Working Parties were established in the 1970s to provide technical information on aggregates, and informed comment on that information to DCLG, Regional Assemblies and Government Offices for the Regions. They were established due to the impacts of rising demand on environmentally sensitive areas and the uneven distribution of mineral resources, and associated impacts of extraction, between and within the regions.

The RAWPs annually collect, collate and present data on supply, uses, transportation and permitted reserves of aggregates. These data are used in the preparation and review of national and regional guidelines for aggregates

provision in England. RAWPs also provide technical commentary on trends in aggregates supply by region to the DCLG and other regional bodies, but do not provide policy advice. They meet at least annually.

The RAWPs are guided by a National Coordinating Group (NCG) convened by the DCLG and consisting of representatives from each RAWP and from national stakeholder organisations. This meets annually, except when supply policy is being updated when it meets more frequently. From time to time, the NCG convenes a technical sub-group drawn from its membership to advise it on technical issues. In addition the secretaries of each RAWP meet to discuss matters of common interest about three times per annum.

# Mineral and Waste Planning Authorities and RAWP Regions in England 2006

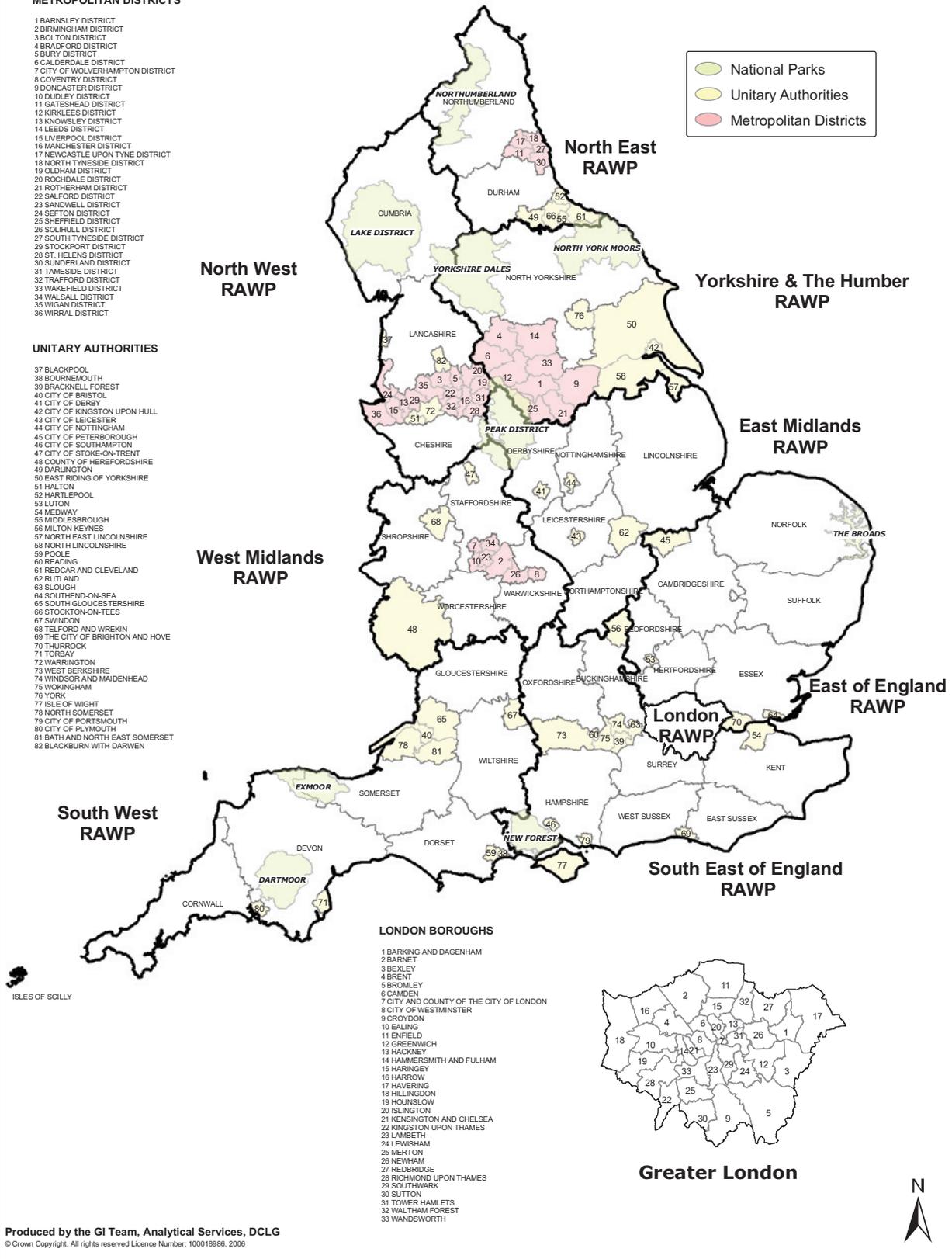
## METROPOLITAN DISTRICTS

- 1 BARNSELY DISTRICT
- 2 BIRMINGHAM DISTRICT
- 3 BOLTON DISTRICT
- 4 BRADFORD DISTRICT
- 5 BURY DISTRICT
- 6 CALDERDALE DISTRICT
- 7 CITY OF WOLVERHAMPTON DISTRICT
- 8 COVENTRY DISTRICT
- 9 DONCASTER DISTRICT
- 10 DUDLEY DISTRICT
- 11 GATESHEAD DISTRICT
- 12 KIRKLEES DISTRICT
- 13 KNOWLSLEY DISTRICT
- 14 LEEDS DISTRICT
- 15 LIVERPOOL DISTRICT
- 16 MANCHESTER DISTRICT
- 17 NEWCASTLE UPON TYNE DISTRICT
- 18 NORTH TYNESIDE DISTRICT
- 19 OLDHAM DISTRICT
- 20 ROCHDALE DISTRICT
- 21 ROTHERHAM DISTRICT
- 22 SALFORD DISTRICT
- 23 SANDWELL DISTRICT
- 24 SEPTON DISTRICT
- 25 SHEFFIELD DISTRICT
- 26 SOLIHULL DISTRICT
- 27 SOUTH TYNESIDE DISTRICT
- 28 STOOPORT DISTRICT
- 29 ST. HELENS DISTRICT
- 30 SUNDERLAND DISTRICT
- 31 TAMESIDE DISTRICT
- 32 TRAFFORD DISTRICT
- 33 WAKEFIELD DISTRICT
- 34 WALSHALL DISTRICT
- 35 WIGAN DISTRICT
- 36 WIRRAL DISTRICT

## UNITARY AUTHORITIES

- 37 BLACKPOOL
- 38 BOURNEMOUTH
- 39 BRACKNELL FOREST
- 40 CITY OF BRISTOL
- 41 CITY OF DERBY
- 42 CITY OF KINGSTON UPON HULL
- 43 CITY OF LEICESTER
- 44 CITY OF NOTTINGHAM
- 45 CITY OF PETERBOROUGH
- 46 CITY OF SOUTHAMPTON
- 47 CITY OF STOKE-ON-TRENT
- 48 COUNTY OF HEREFORDSHIRE
- 49 DARLINGTON
- 50 EAST RIDING OF YORKSHIRE
- 51 HALTON
- 52 HARTLEPOOL
- 53 LUTON
- 54 MEDWAY
- 55 MIDDLESBROUGH
- 56 MILTON KEYNES
- 57 NORTH EAST LINCOLNSHIRE
- 58 NORTH LINCOLNSHIRE
- 59 POOLE
- 60 READING
- 61 REDCAR AND CLEVELAND
- 62 RUTLAND
- 63 SLOUGH
- 64 SOUTHEND-ON-SEA
- 65 SOUTH GLOUCESTERSHIRE
- 66 STOCKTON-ON-TEES
- 67 SWINDON
- 68 TELFORD AND WREKIN
- 69 THE CITY OF BRIGHTON AND HOVE
- 70 THURROCK
- 71 TORBAY
- 72 WARRINGTON
- 73 WEST BERKSHIRE
- 74 WINDSOR AND MAIDENHEAD
- 75 WOKINGHAM
- 76 YORK
- 77 ISLE OF WIGHT
- 78 NORTH SOMERSET
- 79 CITY OF PORTSMOUTH
- 80 CITY OF PLYMOUTH
- 81 BATH AND NORTH EAST SOMERSET
- 82 BLACKBURN WITH DARWEN

- National Parks
- Unitary Authorities
- Metropolitan Districts



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Printed by: Hawthornes, Palm Street,  
New Basford, Nottingham NG7 7HT