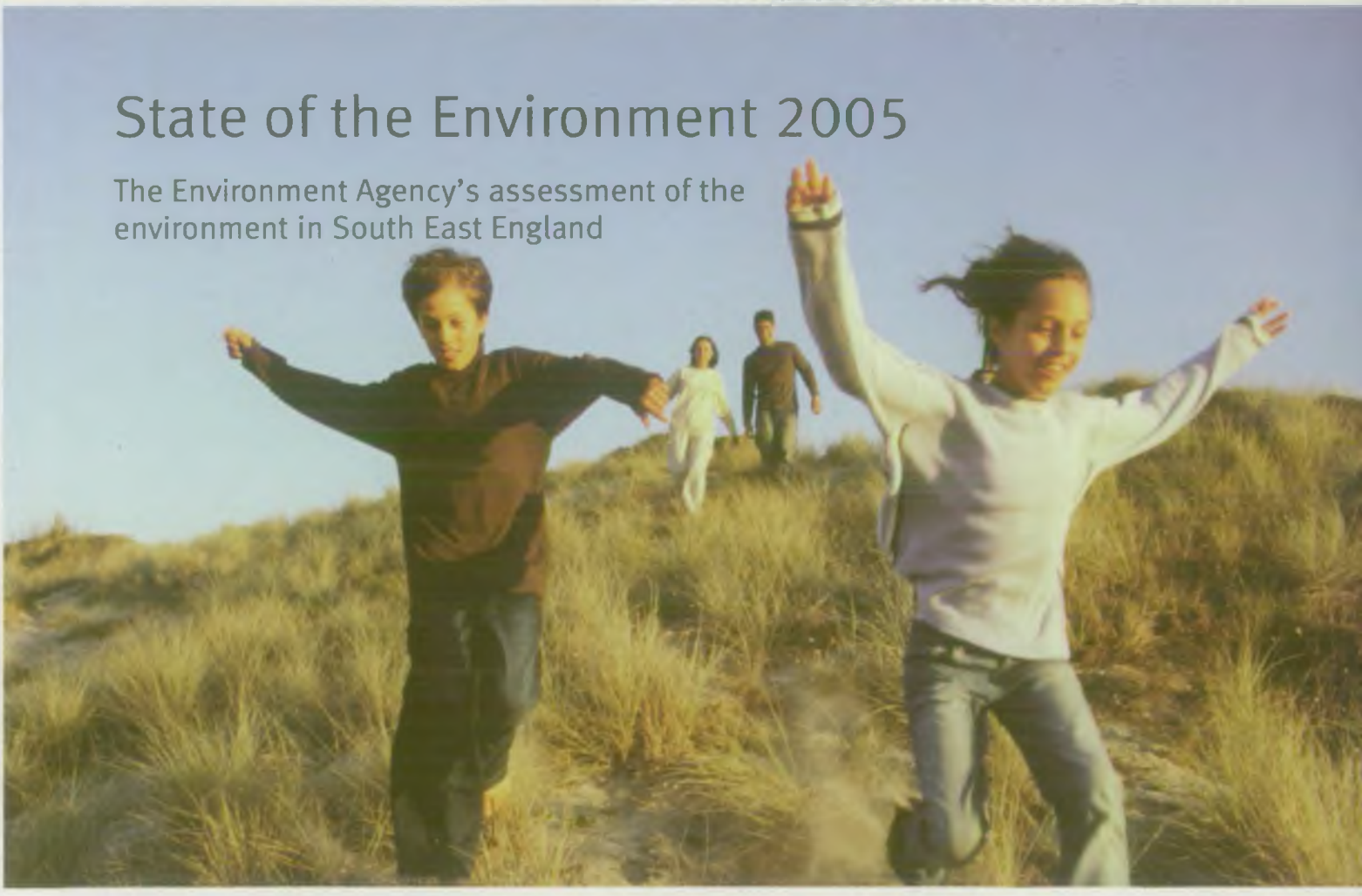
Environment Agency

creating a better place

State of the Environment 2005

The Environment Agency's assessment of the environment in South East England



We are the Environment Agency. It's our job to look after your environment and make it a better place – for you, and for future generations.

Your environment is the air you breathe, the water you drink and the ground you walk on. Working with business, Government and society as a whole, we are making your environment cleaner and healthier.

The Environment Agency. Out there, making your environment a better place.

Published by:

Environment Agency (Southern Region)
Guildbourne House
Chatsworth Road, Worthing
West Sussex BN11 1LD

Environment Agency (Thames Region)
Kings Meadow House
Kings Meadow Road
Reading RG1 8DQ

Customer Services: 08708 506 506
Email: enquiries@environment-agency.gov.uk
www.environment-agency.gov.uk/regions/southern
www.environment-agency.gov.uk/regions/thames

Howard Davidson

Howard Davidson
Regional Director
Southern Region

Robert Runcie

Robert Runcie
Regional Director
Thames Region

Foreword

The South East has one of the finest environments in the United Kingdom. Recent decades have seen dramatic improvements in the cleanliness of its rivers, its air and its land. This high quality environment is one of the reasons why so many of its eight million inhabitants enjoy a good quality of life.

This report shows that our environment has continued to improve.

By cleaning up and stopping pollution from industry and sewage treatment works, our rivers are as clean as they have been since the industrial revolution. Species like the otter are returning to our rivers. Our beaches are among the cleanest in Europe and our bathing waters are enjoyed by millions of tourists each year. More people are protected against flooding and little new development goes ahead in areas at significant risk of flooding. More waste is recycled than ever before. Our air is cleaner as pollution from industry has been cut and as exhaust emissions from individual cars and lorries have improved.

But this report also highlights growing problems.

Increased development is putting pressure on our environment across the region. More homes mean more people. More people mean more rubbish, more demand for water, more sewage, more energy demand and more transport.

The construction of more homes – set to be at the rate of over 28,000 per year – means lots more construction waste. And more homes mean more pressure to build in areas at risk of flooding. The impacts of climate change are going to add to these pressures, as it promises to bring more intense stormier rainfall, wetter winters, hotter drier summers and sea level rise.

We hope this State of the Environment report will inform those planning for the future and inform those who care about the environment in the South East.

Our prosperity and quality of life depends on a healthy environment.

And to preserve and protect our environment for the future, it has to be put at the heart of plans for future growth.

Introduction

The South East region (see Figure 1) is an area defined by the Government Office for the South East and covers a total of 19,400 km^2, encompassing 19 county and unitary authorities and 55 district authorities.

Its environment is an important asset with over 47 per cent of the region protected by some form of conservation designation:

- One third of the region is designated as Area of Outstanding Natural Beauty, nearly one third of the total in England.
- There are over 700 Sites of Special Scientific Interest covering over 134,000 hectares or nearly seven per cent of the region.
- The region has one National Park, the New Forest, with another one proposed for the South Downs.
- The South East is the most wooded of all English regions with over 14 per cent of the region covered by woodland, including nearly 40 per cent of England's total ancient woodlands.
- Sixteen per cent of land is designated as green belt.

Main pressures on the South East's environment

With the exception of London, the South East has the greatest development pressures and natural resource challenges of all regions in England.

These pressures include the demand for new development, increasing demand for water and energy supplies, and the disposal of waste – all of which are exacerbated by increasing population, the scale of economic activity, relatively low rainfall, and the impacts of climate change.

European legislation will also change how we deal with major social and environmental issues in the region. Government, business and the wider community need to take these issues into account now, so that we can successfully build a better, cleaner and healthier environment in the future.

The main pressures on our environment are:

- **New development:** The South East is one of the fastest growing regions and is targeted for further long-term development. This includes three intended growth areas in the region - the Thames Gateway and Milton Keynes-South Midlands, both of which are only partly located in the South East, and Ashford. The South East Plan expects 580,000 new homes in the region by 2026.

  The environment needs to be at the heart of these planned developments – which will require water resources, sewage treatment capacity, suitable waste management facilities,

The South East region (see Figure 1) is an area defined by the Government Office for the South East and covers a total of 19,400 km2, encompassing 19 county and unitary authorities and 55 district authorities.

Photo by Steve Limbrey

protection of biodiversity, flood risk management and consideration of the likely impacts of climate change. To minimise their impact on the environment, all new homes should be built to high environmental standards which incorporate water and energy efficiency measures.

- **Water resources:** Our water supplies are already in a delicate balance with relatively low levels of rainfall in the South East and increasing public consumption. Water resources must be managed to ensure the security of water supply and protect the environment.

  The pressures on water resources are set to increase through additional demands from population growth and new housing, and the impacts of future climate change which is predicted to reduce water availability during the summer months. Greater water efficiency, especially within existing and future housing stock, is essential for the sustainable management of water resources.

- **Maintaining river quality:** Population growth will result in increased sewage and more treated effluent will be discharged into rivers and coastal waters. Some rivers – especially in their upper reaches – will not be able to take more effluent without damaging their quality.

  As pollution from industrial sources has been cleaned up, water pollution from unregulated sources has become proportionately more important. Agricultural and urban runoff contains pollutants such as nutrients, pesticides and other chemicals, sediment, oils and litter.

  Water quality measures are also evolving. The EU Water Framework Directive will require us to manage rivers so that human activity does not damage either the quality or amount of water available for the environment. By 2015, all waters should reach the standard of "good ecological status".

- **More waste:** We produce too much waste – and its disposal is a growing problem. Construction of new homes will generate a massive amount of waste. Increased population will also significantly increase the amount of household waste. Physical limits and legislative changes mean that we cannot continue to landfill most of our waste in the South East. The EU Landfill Directive sets targets to reduce the amount of waste going to landfill and to increase the amount of waste being recycled and re-used.

  Waste minimisation, recycling, reuse, and treatment needs to increase for household and

other waste. Because the production and disposal of household waste is mainly influenced by our lifestyles and the way we manage our households, waste targets will only be achieved by changing our attitudes towards waste.

- **Increased energy use:** Energy use adds to carbon emissions and so adds to climate change. The UK aims to cut carbon emissions by 60 per cent by 2050. This will be a challenge for the South East, where the energy used in construction, and occupying and operating new buildings will add to our emissions. We need greater energy efficiency in the construction process as well as more energy-efficient homes.
- **Flood risk:** Development on or close to flood plains will be vulnerable to flooding and may increase the risk of flooding elsewhere. There are already around 235,000 properties in the South East at risk of flooding.

  Climate change will increase the likelihood and magnitude of river and coastal flooding. The likelihood of flooding will also be affected by changes in land management – such as more development in flood risk areas. The economic cost of flood damage to residential and commercial properties has tripled in the past 10 years. Local planning authorities need to consider flood risk when determining planning policies and assessing applications for planning permission.
- **Increased road traffic and vehicle emissions:** Road traffic presents the greatest threat to air quality in the South East. The increase in transport emissions shows that improvements in vehicle energy efficiency have been outweighed by the overall increase in road traffic. And road traffic is predicted to increase by more than a third over the next 20 years. To minimise air quality impacts, we need to increase the use of public transport and other forms of transport. Public and alternative transport should be incorporated into all proposed development in the region.

The environment needs to be at the forefront of planning and management in the South East.

Sustainable development will only be achieved through the effective protection of the environment and the prudent use of natural resources. Industry, organisations, houses, and consumer behaviour and lifestyles must all become more sustainable in the South East. This will benefit the environment and will provide a high quality of life for the people of the South East.

Figure 1: The South East England region **Source:** Environment Agency

people and lifestyles

Photo by Robert Beasley

The way we live has consequences for the environment. By making simple changes to our day to day activities we can significantly reduce the consumption of resources and the waste and pollution we produce. This will greatly benefit the environment and our own quality of life by improving air, water and land quality, and protecting biodiversity.

People and lifestyle trends in the South East

- **Population:** The South East has the largest population of any Government region with over 8 million people. It is also one of the fastest growing regions with the population projected to increase by over 800,000, or 10.3 per cent, between 2003 and 2021.
- **Water Resources:** Some parts of the South East have a supply-demand deficit in dry years (see Figure 2). This puts significant pressure on the environment and the ability to meet water supply demands during periods of below average rainfall. Total water abstraction is increasing. Public water supply and electricity production are the biggest users of water. The region has some of the highest per capita consumption of water in the UK. Forecasts show that water demand will increase significantly in the future, mostly due to new housing development. Water efficiency measures are key to managing water resources in the South East.
- **Energy:** There has been an overall increase in the UK's energy use since 1980. Consumption by industry has fallen but these reductions have been more than offset by a significant increase in the transport sector and to a lesser extent in the domestic and service sectors. Renewable energy sources generated only 1.5 per cent of the UK's energy sources in 2003, and less than 1 per cent of electricity in the South East.
- **Waste:** Municipal waste increased by over 14 per cent between 1996/1997 and 2003/2004. Although recycling and composting is increasing, the overall growth in waste still exceeds any gains made by recycling in the region. Over 70 per cent of waste still goes to landfill (see Figure 3). We need a significant diversion of waste away from landfill disposal because of new legislation and a shortage of landfill sites in the South East. We have to reduce the amount of waste requiring disposal, and increase the level of waste re-use and recycling in the region.

- **Road Traffic:** The South East has the most road traffic of any region. The heavy road traffic contributes substantially to local air pollution, particularly nitrogen oxides, and contributes to climate change through carbon dioxide emissions. Travel by car is the major form of personal transport in the South East. Other forms of transport need to be encouraged to reduce the impacts of road traffic.

Photo Environment Agency

Photo by Andrew Molyneux

Photo Environment Agency

To influence people and reduce lifestyle impacts in the South East, we will

- **Water resources**
  - Work with the water companies on their plans to deal with droughts and longer term management for new water resources
  - Promote water conservation measures, such as water efficient toilets, and encourage new and existing development to incorporate them
  - Encourage water companies to improve their leakage rates
  - Encourage water companies to increase the use of water meters in households and get a high level of metering by 2025
  - Help reduce environmentally-damaging water demand through abstraction licensing and the strategic management of water abstraction in all catchments in the South East
- **Energy**
  - Promote energy efficiency and renewable energy in the South East
  - Encourage the reduction of greenhouse gas emissions
  - Encourage 'carbon neutral' development and encourage new and existing development to incorporate measures to reduce energy use
- **Waste management**
  - Work with local authorities and industry to reduce waste, increase re-use and recycling, and other waste management options that divert waste away from landfills
  - Provide help and advice to help meet the requirements of the EU Landfill Directive
  - Continue to develop and undertake risk-based regulation of waste handling sites to protect the environment and human health
  - Provide regular and comprehensive information on the amount and type of waste being produced and managed in the South East to highlight the progress against waste targets
- **Road traffic**
  - Work with the South East England Regional Assembly to ensure that road and air transport have a reduced impact on air quality in the region

Water resources surplus/deficit forecast for 2005 map

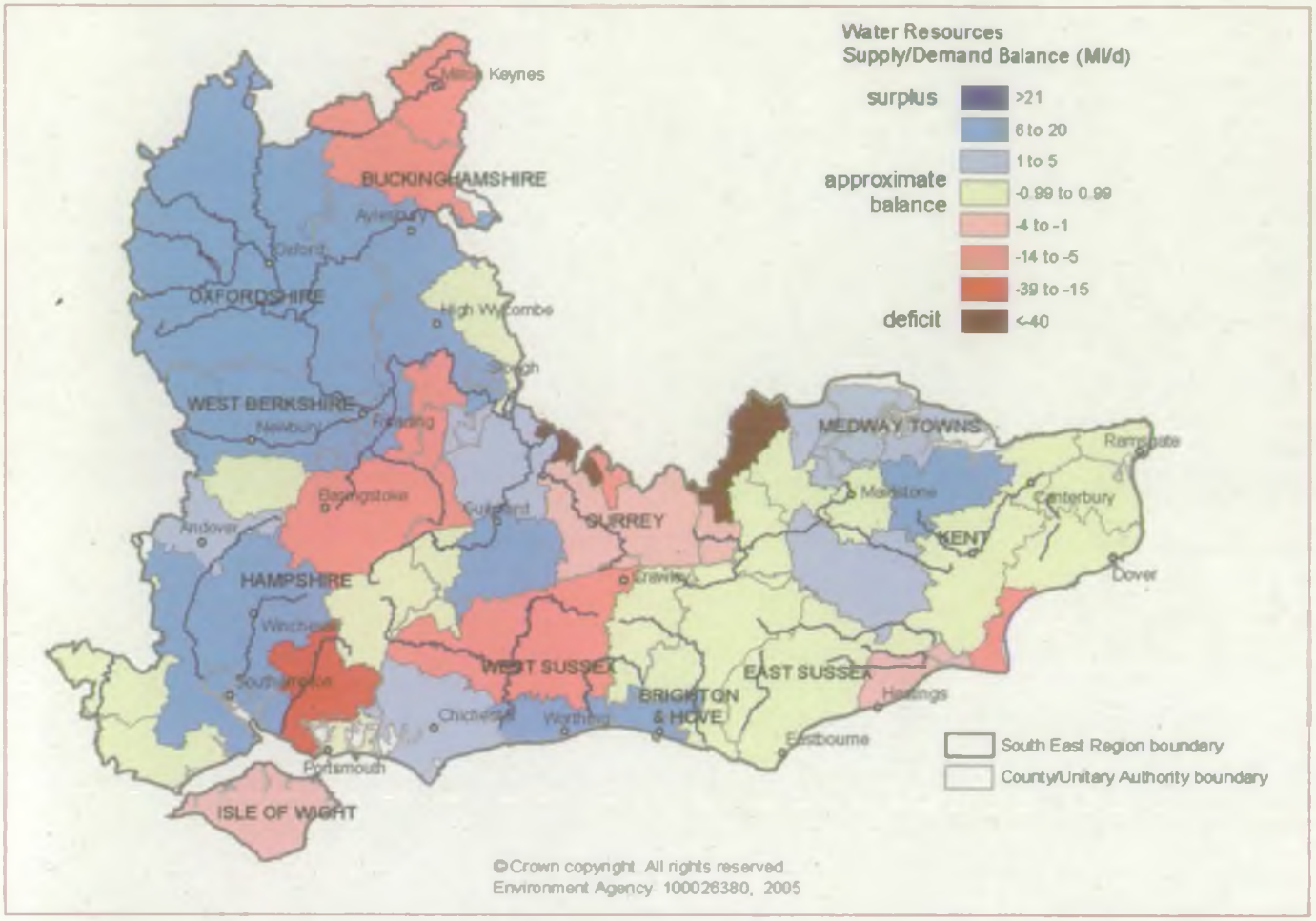


Figure 2: The water resources surplus/deficit forecast for 2005 shows great variation across the region. Demand in some water resource zones is greater than water supply. **Source:** Environment Agency

Municipal waste arisings and main disposal methods in the South East

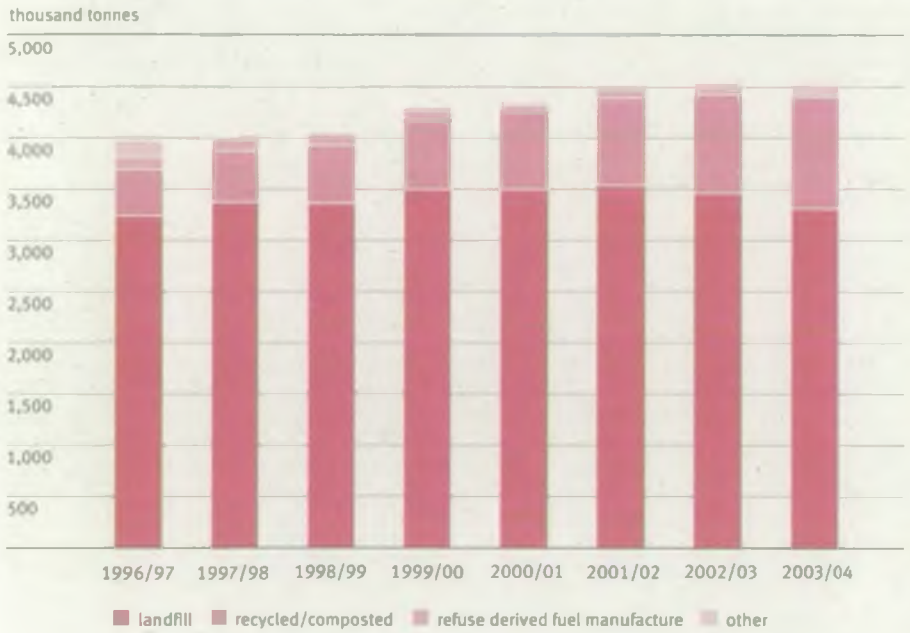


Figure 3:
The amount of municipal waste being recycled or composted is increasing but landfill remains the main disposal method. The overall growth in waste exceeds any gains made by recycling in the region.

Source: Department for Environment, Food and Rural Affairs

air quality

Photo by Sheila Crosswaite

Air pollution can affect human health and the environment, and contributes to greenhouse gas emissions which cause climate change. A reduction in industrial pollution emissions has significantly improved South East air quality over recent decades. Today the vast majority of air pollutants come from non-industrial sources such as transport and agriculture.

Air quality trends in the South East

- Overall air quality continues to improve with measured air pollutants either compliant with annual Air Quality Strategy objectives or remaining lower than annual levels recorded in the early 1990s.
- Most air quality problems in summer are caused by higher concentrations of ozone, generated by hot and sunny conditions, especially in rural areas. This caused a marked increase in poor air quality recorded in 2003.
- Most air quality problems in winter are caused by particulate matter and nitrogen oxides, mainly from road traffic emissions.
- Although some air quality problems are caused by pollutants transported into the region by air masses moving across Europe and elsewhere in the UK, pollution emissions within the region contribute significantly to air pollution problems.
- Heavy road traffic in the region contributes substantially to local air pollution, particularly nitrogen oxides (see Figure 4), and also contributes to climate change through carbon dioxide emissions. The high level of car use must be addressed if air quality is to be improved.
- There are 76 Air Quality Management Areas declared to address air quality problems in the South East (as at 23rd September 2005). All but two of these are for nitrogen dioxide or particulate pollution from road transport.
- Overall air pollution from processes regulated by the Environment Agency has been substantially cut. However, for regulated processes in the South East, emissions of 1-3 butadiene, lead, nitrogen oxides, volatile organic compounds, carbon dioxide and greenhouse gases were higher in 2002 than in 1998.

To improve air quality in the South East, we will

- Improve air quality in the South East through the regulation of industrial processes
- Highlight the need for action in areas of poor air quality and work with local and regional government to develop policies to tackle it
- Work with the South East England Regional Assembly to reduce the impact of road and air transport on air quality in the region
- Advise local authorities on locations of sensitive sites so that they can take air quality into account in their planning strategies and planning decisions
- Contribute to the Kent and Medway Air Quality Partnership, Sussex Air Quality Steering Group, and the Air Quality Strategy review and assessment process carried out by local authorities
- Study the effects of industrial processes in Air Quality Management Areas to identify what actions will improve air quality
- Liaise with the Health Protection Agency, Primary Care Trusts and other health experts to investigate the impact of pollutants and the links between air quality and health

Estimated annual average emissions of nitrogen dioxide in the South East, 2001

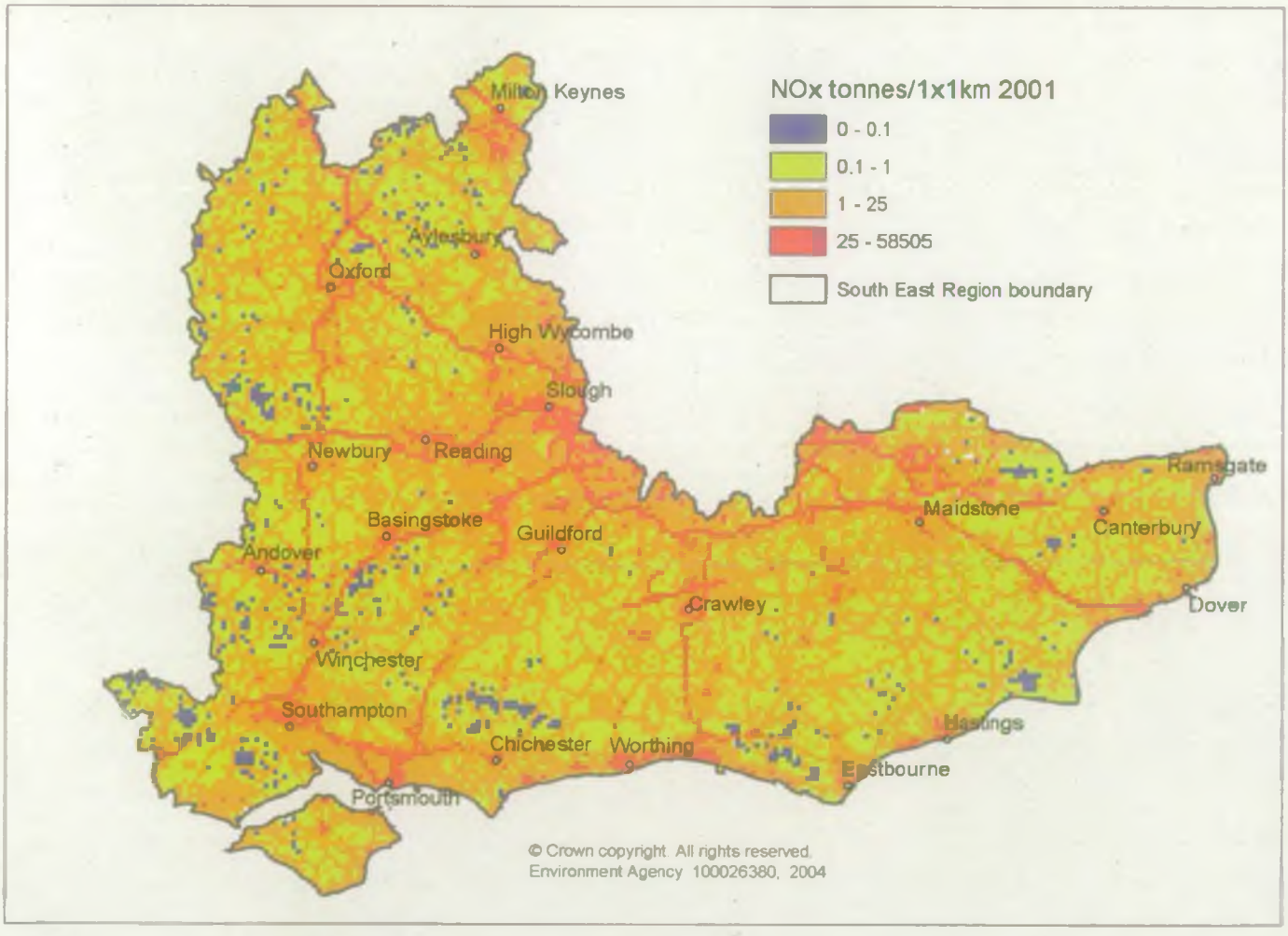


Figure 4:
Heavy road traffic in the region causes a lot of local air pollution. This map of nitrogen dioxide levels looks like a map of motorways, trunk roads and main towns. **Source:** National Atmospheric Emissions Inventory

water quality and resources

Photo by Sheila Crosswaite

Water is a finite resource and is vital to all life. An adequate supply of good quality surface and ground water is fundamental to public health as well as the environment. Water also plays an essential role in many industrial and agricultural processes and in recreation activities such as swimming, fishing and boating. Water resources must be managed effectively to ensure the security of water supply and to protect water quality and the environment.

Water quality and resource trends in the South East

- The water environment in the South East is subject to numerous pressures including industrial pollution, run-off from farms and road traffic, habitat degradation, and low flows caused by drought, over-abstraction and climate change.
- Drought returned to the South East after the second driest winter in 100 years. Eight consecutive months of below average rainfall required water companies to impose hosepipe bans for the first time since 1996. Rivers across the region had below average flows of water – putting their fish and other wildlife at increased risk (see Figure 5).
- The chemical and biological quality of South East rivers has improved significantly over the last decade due to the effective regulation of industry and significant investment by water companies, although this rate of improvement has slowed in recent years.
- Unregulated sources such as agricultural and urban runoff, combined with the likely impacts of new development in the region, threaten continued improvements in water quality.
- Bathing water quality has improved significantly with no beaches in the South East consistently failing the European Union's minimum standards since 1998 (see Figure 6).
- The South East is reliant on groundwater for up to 75 per cent of its public water supply. Nitrate concentrations in some of the region's aquifers have sometimes breached the permissible standards for drinking water. Groundwater is also threatened by other pollutants such as pesticides, hydrocarbons, bacteria and pathogens, and sewage treatment discharges.
- Around 50 per cent of the South East is designated as a surface or ground water Nitrate Vulnerable Zone.

- River flows and groundwater levels are highly variable across the South East. This is mainly due to variations in rainfall across the region and the volume of abstractions for water supply. River flows and groundwater levels can fall quickly during periods of below average rainfall. This places pressure on water resources and can degrade the environment.
- Climate change is predicted to reduce South East summer rainfall by 15 to 60 per cent by the 2080's. This is likely to increase the frequency of drought and degrade water quality.

To improve water quality and the management of water resources in the South East, we will

- Continue to work with water companies to improve water quality
- Run pollution prevention campaigns to reduce pollution from diffuse and point sources
- Contribute to nitrate reduction programs by monitoring nitrate levels and assisting in the review of Nitrate Vulnerable Zones
- Expand our network of groundwater sampling points across the South East to improve groundwater monitoring and to ensure that the requirements of the Water Framework Directive are met
- Continue to improve recreational water quality so that none of our bathing beaches fail the EU's minimum standards
- Cut abstraction in areas where it is damaging the environment
- Work with water companies to sustainably reduce their water abstractions and improve the cleanliness of treated sewage effluent

Classification of winter river flows

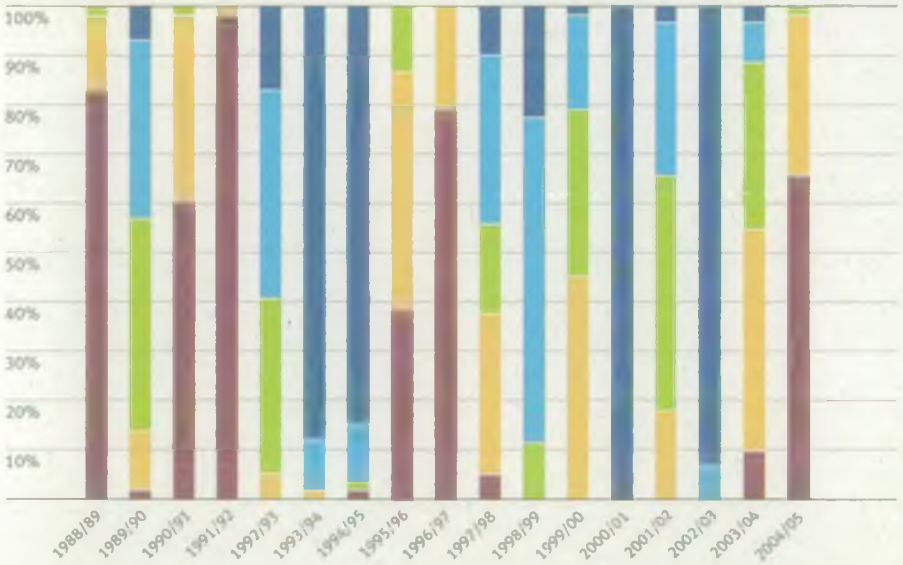


Figure 5:
Winter river flows in the South East, 1988/1989 to 2004/2005.

Source: Environment Agency

Note: Winter flow period from October to March

Compliance with the EC Bathing Water Directive in the South East

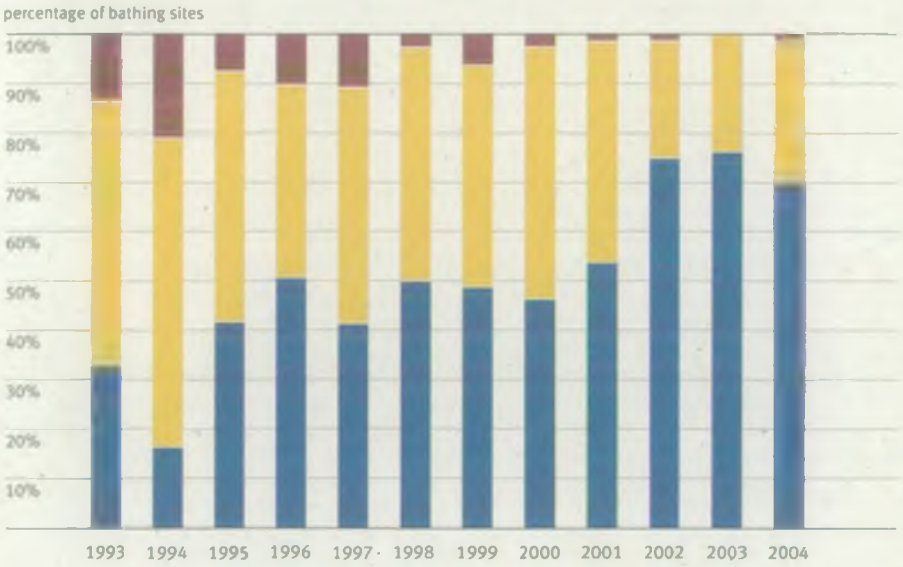


Figure 6:
Bathing water quality has improved significantly. No beaches in the South East have consistently failed the EU's minimum standards since 1998. Most now pass the EU's higher "guideline" standards. The biggest improvements are due to the clean up of discharges from coastal sewage treatment works.

Source: Environment Agency

land quality

Photo by Andrew Molyneux

Land conservation and enhancement requires careful management. It can enhance the environment for wildlife, protect soils, and protect fresh and marine waters. Although some 47 per cent of the South East is protected by some form of conservation designation, land quality is under pressure from inappropriate agricultural practices, development, and from waste and industrial sites.

Land quality trends in the South East

- Agriculture is the dominant land use in the South East and some farming practices continue to have a major influence on the environment.
- Agriculture is now a major polluter of water. Agricultural sources account for most of the nutrients, sediment, pesticides, bacteria and pathogens in UK waters.
- The area of land covered by agri-environment schemes has risen significantly over the past decade (see Figure 7). Areas under agri-environment schemes benefit from improved land management practices which protect and restore biodiversity, soil and water quality.
- Inappropriate urban and agricultural land management practices are increasing soil erosion and degradation, diffuse water pollution, habitat and biodiversity destruction, flooding and land contamination.
- Soil, surface water and groundwater quality are being degraded by chemicals such as pesticides and fertilisers, and organic wastes applied to land, particularly in intensive agricultural and horticultural systems.
- Climate change will impact on agricultural practices including changes in crop types, cropping patterns, growing seasons, pesticide and other chemical usage, and demand for water.
- Development for housing has a major impact on land quality in the South East. Population growth and the demand for rural living increase the pressure for housing development in greenfield areas. Housing and other development needs to be concentrated on previously developed sites and housing density increased.

To improve land quality in the South East, we will

- Support sustainable redevelopment of previously developed land
- Advise local authorities on their development plans and major planning applications
- Continue to work with local authorities and the South East England Development Agency to restore contaminated land and promote good management of contaminated land
- Promote the use of sustainable land management practices across the South East, including best practice in farm management and agri-environment schemes
- Continue to minimise the impacts of pesticides on the environment including: developing the Environment Agency's Chemicals Strategy, participating in the Crop Protection Association's Voluntary Initiative and implementing the Water Framework Directive
- Continue to check compliance with relevant legislation

Environmentally Sensitive Areas and Countryside Stewardship Schemes in the South East, data as at 2004

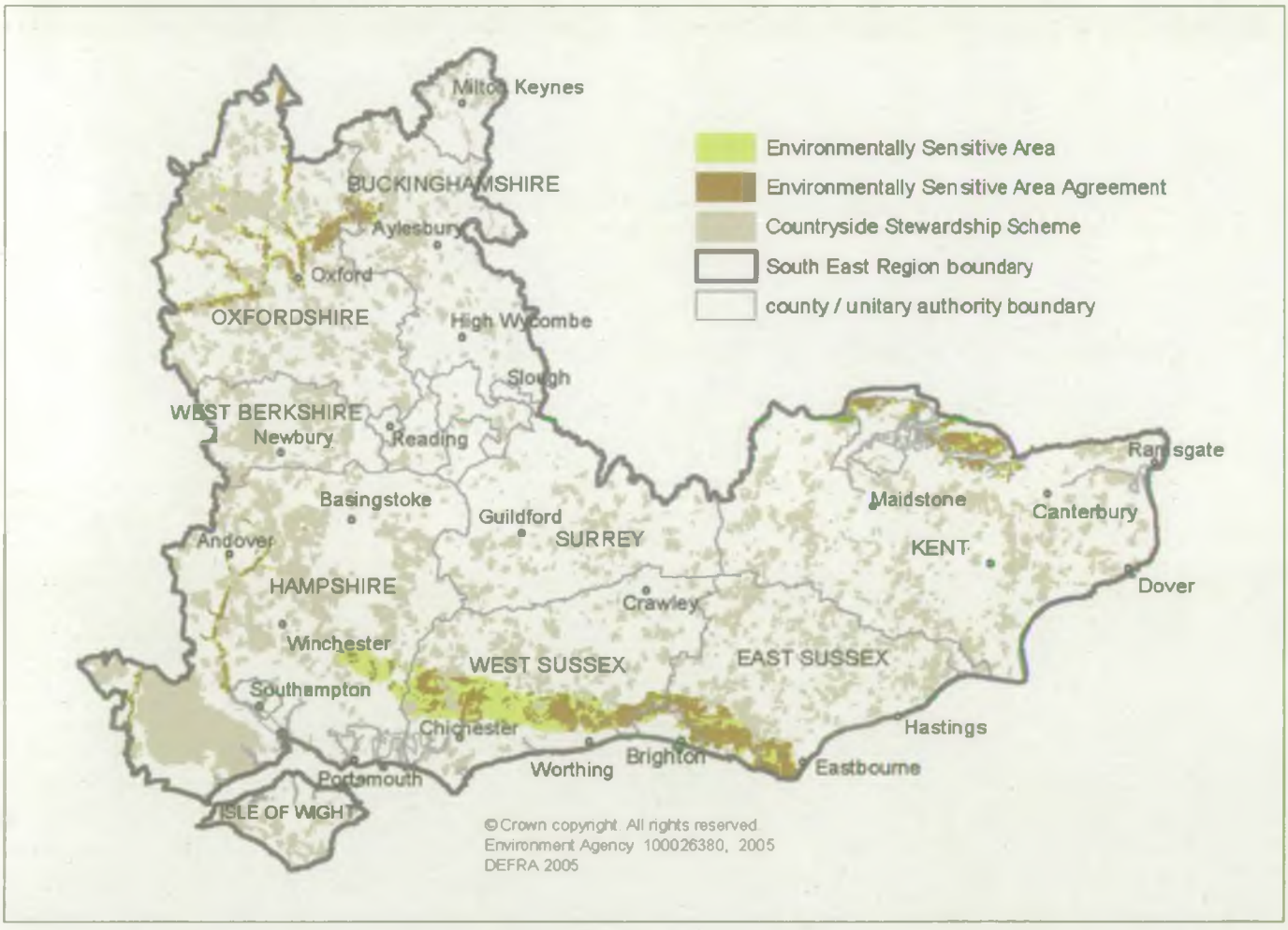


Figure 7: Areas covered by Environmentally Sensitive Area agreements and the Countryside Stewardship Scheme have increased over the last decade. The introduction of revised agri-environment schemes in 2005 should lead to further increases in the number of agreements. **Source:** Environment Agency

biodiversity

Photo by Martyn Crosswaite

Biodiversity is the variety of species, habitats and ecological systems that make up the living earth. The South East supports biodiversity and ecosystems of national and international significance. Biodiversity and healthy ecosystems are vital for water, land and air quality, and the cycling of nutrients and waste products. The productivity and sustainability of the fishing, agricultural and forestry industries also rely on biodiversity and healthy ecosystems. It is also important to tourism, recreational and cultural activities.

Biodiversity trends in the South East

- The main threats to biodiversity in the South East include habitat loss, incompatible land use and poor land management, introduced species, over-abstraction of water, drought, land degradation and pollution.
- The total area covered by Sites of Special Scientific Interest is increasing and their overall condition improving.
- Species such as water voles and salmon (see Figure 8) continue to decline with populations falling below their conservation limits in parts of the South East. If this trend continues they could become extinct in some areas of the region.
- Farmland and woodland bird populations continue to decline (see Figure 9).
- Otter and sea trout populations are slowly recovering in the South East, localised populations of water voles have shown signs of recovery in response to habitat enhancement, and farmland bird populations have increased in response to agri-environment measures.
- The South East is the most wooded of all English regions and contributes nearly 40 per cent of England's total ancient woodlands. The Forestry Commission estimate that 30% of woodlands in the region are "under managed" which can reduce their value for wildlife and amenity.
- Climate change is predicted to affect many species and habitats.

To improve biodiversity in the South East, we will

- Improve the quality of our most important wildlife sites and protect our most threatened species – for example by reducing the impact of water abstractions or effluent discharges on sites such as Sites of Special Scientific Interest, Special Protection Areas, Special Areas of Conservation, and Ramsar sites
- Promote measures to protect and enhance biodiversity in rural and urban development plans. The Environment Agency will seek mitigation and compensation measures where loss of habitat is unavoidable
- Continue to support collaborative biodiversity projects and ensure suitable conditions are provided for UK Biodiversity Action Plan species within the region
- Ensure the protection of coastal habitats and identify opportunities to increase the extent of these habitats
- Maintain healthy and sustainable fisheries by improving water quality, restoring and creating habitat, and ensuring appropriate channel management
- Continue to investigate the likely impacts of climate change on the region's biodiversity

Salmon rod catches for the Rivers Test, Itchen and Thames

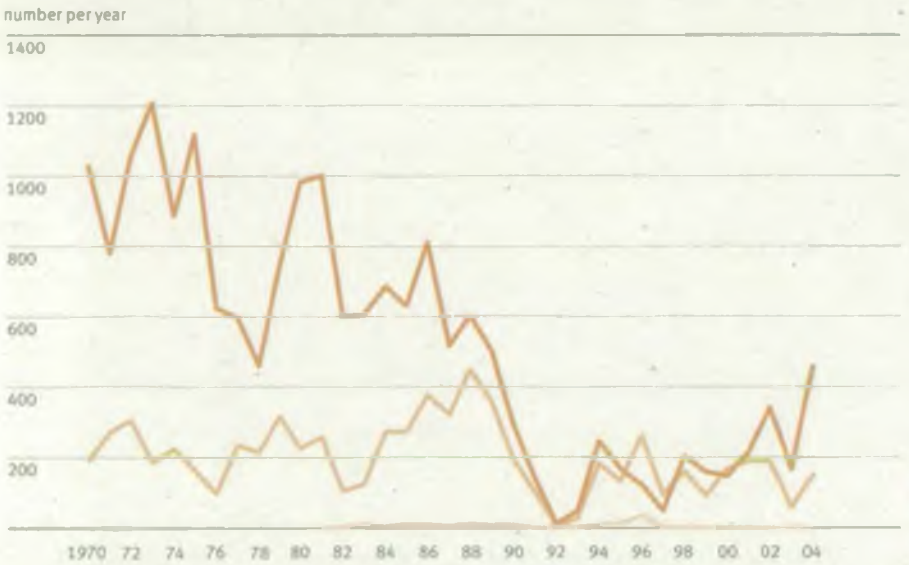


Figure 8:
Despite increase in 2004, the long term trend shows salmon numbers declining in the South East.

Source: Environment Agency

Percentage changes in farmland and woodland bird populations by region

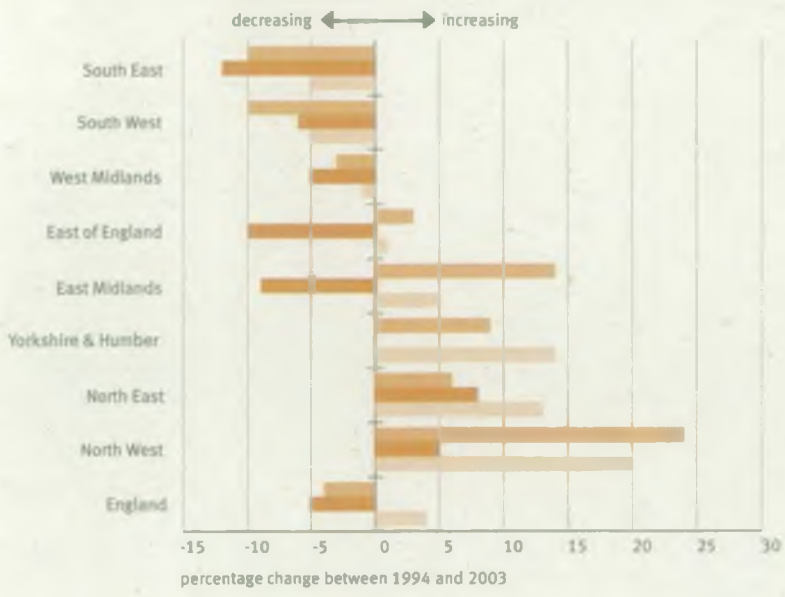


Figure 9:
Between 1994 and 2003, the South East recorded the highest decline in both farmland and woodland bird populations compared to other regions (equal highest with the South West for woodland birds).

Source: Defra

flood risk

Photo Environment Agency

Flooding can have severe impacts on people in terms of distress, injury, and loss of life. Considerable demands are also placed on the emergency and public services during flooding events, particularly in developed areas. Floods can cause significant damage to property and land developments, as well as disrupt business and other services. At the same time, floods are natural occurrences that help maintain many coastal and inland habitats such as wetlands, floodplains, coastal mudflats, saltmarshes and lagoons.

The South East will continue to be protected by significant investment in flood defences and warning systems designed to reduce the frequency and impact of flooding. But not all flooding can be prevented and individuals need to take preventative action to reduce the impacts of flooding.

Flood risk trends in the South East

- Flood risk areas make up 11 per cent of the total land area in the South East (see Figure 10).
- Over 235,000 properties are at risk from flooding in the South East.
- Assets at risk of flooding in the South East have a value in excess of £50 billion.
- The biggest flood risk in the region comes from coastal inundation caused by storms and tidal surges.
- The investment in flood defences and flood warning systems has significantly reduced the impact of heavy rainfall events.
- There is considerable pressure in the South East for new housing developments to be located within floodplains.
- Climate change is likely to increase flood risk in the South East through sea level rise and increased heavy rainfall events. Many flood alleviation schemes are based upon historic conditions that may not provide sufficient protection against the predicted future climate conditions.

To minimise flood risk in the South East, we will

- Continue to manage flood risk and provide flood warnings and advice to minimise the threat to human life and damage to property
- Continue to take a strategic approach to flood risk management by considering coastal areas and river catchments in a holistic way
- Move the emphasis away from traditional flood defences and seek the most appropriate and cost effective methods of minimising flood risk whilst enhancing biodiversity and the landscape
- Continue to maintain flood defences already in place
- Ensure that local planning authorities give appropriate importance to flood risk issues and continue to advise local authorities on the appropriate siting of new development in order to manage flood risk. We will also continue to contribute to reviews of Building Regulations associated with flood risk
- Improve flood risk mapping to enable the risks of flooding to be more accurately defined
- Contribute to the Government's review of its Planning Policy Guidance on Development and Flood Risk (PPG 25)
- Work with water companies, local authorities, highway authorities and the house building industry to promote sustainable drainage techniques
- Incorporate climate change in all flood risk strategies

Flood risk areas in the South East

Figure 10: Flood risk areas make up 11 per cent of the total land area in the South East. More than 235,000 properties and £50 billion worth of assets are at risk of flooding in the region. Much of the flood risk area is defended, reducing the residual risk to development in this area.

Source: Environment Agency Notes: The blue areas show the highest probability of flooding. The chance of flooding in any year is at least 1% for river flooding and 0.5% for coastal or tidal flooding.

climate change

Photo by Sean Furey

The Earth's average surface temperature has increased by 0.4°C to 0.7°C since the late 19th century, and the annual mean central England temperature warmed by almost 1°C during the 20th century. An increase in annual average surface temperature - or global warming - is accompanied by climate change. Possible impacts of climate change include loss of habitats and species, increases in storm damage, more frequent droughts, reduced water resources in summer, and increased flooding.

Most of the observed warming over the last 50 years is likely to have been caused by increasing concentrations of greenhouse gases largely from human activities, such as burning fossil fuels and deforestation. We need to reduce greenhouse gas emissions, accept the realities of climate change and adapt accordingly.

Climate change trends in the South East

- The impacts of climate change are predicted to be increasingly felt in the South East with wetter, stormier winters and drier, hotter summers.
- Decreased summer rainfall in the South East will place water supplies under increasing pressure in some areas (see Figure 11).
- Sea levels are rising around the region's coastline, threatening important coastal habitats and increasing the risk of coastal flooding (see Figure 13).
- UK emissions of greenhouse gases that cause climate change are falling.
- Transport has been the fastest growing source of carbon dioxide in the UK because of the increases in road traffic. Emissions from the increase in road traffic have outweighed improvements in vehicle efficiency.

The key challenges are:

Sector	Impacts
Biodiversity	Many valuable species and habitats will be affected by changes in temperature, rainfall and sea level rise.
Agriculture	Changes in temperature and rainfall will affect which crops can be grown and their yields, as well as crop and animal diseases.
Utilities and infrastructure	Climate changes will reduce the region's water supply and increase demand. Rising summer temperatures will increase energy use for air-conditioning and other purposes. Increased flood risk will test flood defences and will pose a greater threat to property and infrastructure.
Planning	Design will need to accommodate harsher average and extreme conditions and protect sensitive areas.
Emergency planning	Contingency plans will need to cater for more extreme and complex incidents.

Source: South East Climate Change Partnership

To reduce the severity of climate change and improve the management of climate change impacts in the South East, we will

- Raise awareness of climate change impacts and the need to mitigate and adapt to them.
- Encourage the reduction of greenhouse gas emissions.
- Continue to support the work of the South East Climate Change Partnership.
- Review and update the regional drought plan to take full account of climate changes.
- Support the South East England Regional Assembly's strategy for promoting energy efficiency and renewable energy in the South East.
- Incorporate climate change in all flood risk strategies and continue to advise local authorities on the appropriate siting of new development in order to manage flood risk.
- Encourage 'carbon neutral' development and promote new development incorporating measures to reduce water and energy use.
- Lead by example and reduce the impact of our own activities through reduced mileage, less energy consumption and greater efficiencies.

South East England percentage change in summer precipitation

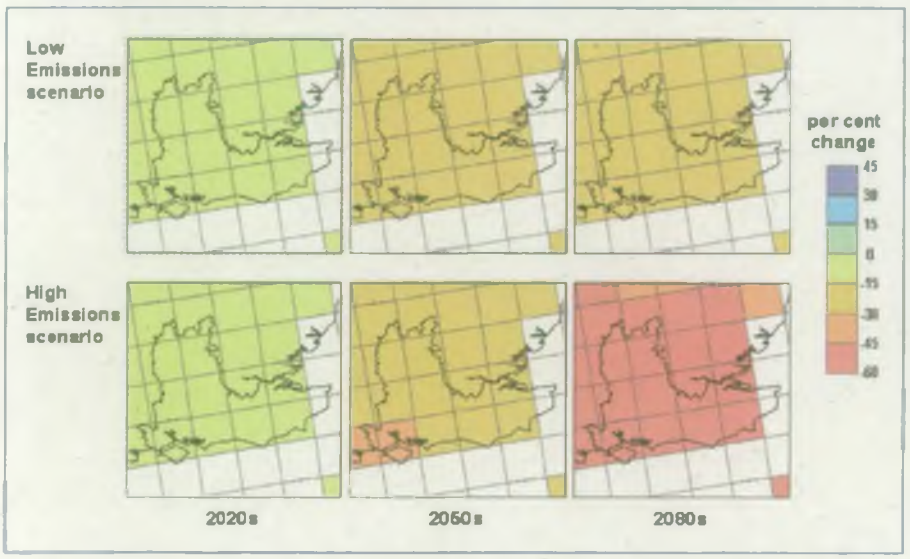


Figure 11: Under high emissions scenarios, summer rainfall will decrease by 60 per cent in the South East. This will significantly decrease summer water resources and reduce the amount of water available for public consumption and other uses when demand is the highest.

Source: UK Climate Impacts Programme

CO_2 emissions for the South East Region

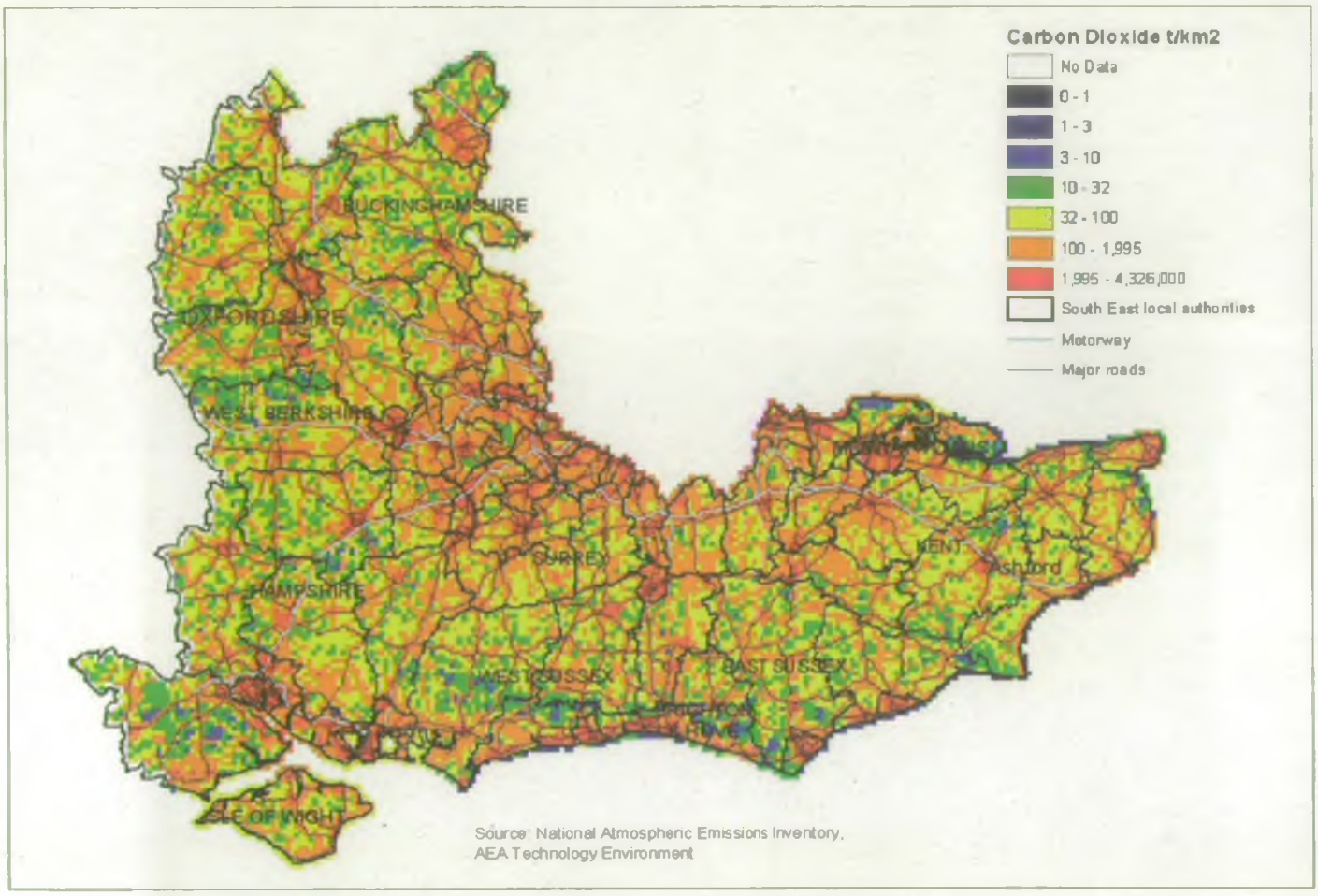


Figure 12: Estimated annual average emissions of CO_2 in the South East, 2002. **Source:** National Atmosphere Emissions Inventory, AEA Technology Environment.

Notes: Includes all emissions at point of release to the atmosphere including power stations. It does not include distributed electricity use emission equivalent.

Changes in mean sea level at Sheerness

Figure 13:
Mean sea level at Sheerness rose by 289 mm between 1834 and 2003, or 1.7 mm per year. This reflects rising sea level combined with geographic differences due to long-term geological movements whereby the south and east of England are sinking and Scotland rising.

Source: NERC Proudman Oceanographic Laboratory

Notes: Gaps indicate years with no data

south east region indicators

Photo by Ray Kemp

A summary of the indicators used in our assessment of the South East environment is presented in **Table 1**. The table shows where the environment is showing signs of improvement or deterioration, or where pressures on the environment are increasing or decreasing.

The overall trends are denoted by the following colours:

- Environment improving / environmental pressure decreasing
- Environment deteriorating / environmental pressure increasing
- No significant change in environment / environmental pressure
- Limited data to identify change or trend not applicable

An 'environment improving' status does necessarily mean the indicator is meeting relevant targets/ objectives or sustainability criteria, but only that improvements are occurring.

Table 1:
Long term trends and status of South East State of the Environment indicators.

Notes: Years in brackets show the most recent data used in the assessment of indicators. Status descriptions refer to the South East unless otherwise stated.

Further information

You can find more in depth information on South East environmental issues, indicators, data and trends on the following websites:

www.environment-agency.gov.uk/regions/southern
www.environment-agency.gov.uk/regions/thames

Indicator	Trends	Status
		People and Lifestyles
Indicator 1 Population (2003 with projection to 2021)		The South East has the largest population of any region with over 8 million people in 2003. This is projected to increase by over 10 per cent between 2003 and 2021.
Indicator 2 Water demand and availability		
• **Supply-demand balance** (2005)		Supply-demand balance varies across the region. In dry years, water demand is greater than water supply for some areas.
• **Annual abstraction by use** (2003)		Total water abstraction is increasing with public water supply and electricity production accounting for the majority of water use.
• **Household per capita consumption** (2004/05)		Per capita consumption has increased by around 10 to 12 per cent over the last 10 years. The region has some of the highest consumption values in the UK.
• **Predicted water demand** (2005 with projection to 2030)		Water demand is predicted to increase by more than 10 per cent between 2004/2005 and 2030.
• **Leakage** (2004/05)		While six of the region's eight water companies have reduced leakage rates since 1999/2000, the average leakage is still over 100 litres per property per day.
• **Household water metering** (2004/05 with projection to 2030)		There has been an increase in the number of households receiving metered water supply. Metering is forecast to significantly increase in the future.
Indicator 3 Energy consumption (2003)		There has been an overall increase in UK energy use since 1980, mainly because of increased demand from transport and households. Transport has been the biggest single energy user in the UK since 1988.
Indicator 4 Waste arisings and disposal methods (2004)		
• **Waste arisings**		Municipal waste increased by over 14 per cent between 1996/1997 and 2003/2004. There was a slight decrease between 2002/2003 and 2003/2004, which may indicate that efforts to reduce waste are being successful.
• **Waste disposal**		Recycling of municipal solid waste has doubled since 1996/1997, with nearly one quarter of the total produced recycled or composted in 2003/2004. Landfill remains the main disposal method of municipal waste accounting for over 70 per cent of the total produced. The overall growth in waste still exceeds any gains made by recycling in the region.
Indicator 5 Road traffic (2003)		Road transport is higher in the South East than in any other region and is increasing. Cars are the major means of transport with nearly 70 per cent of trips undertaken as a car driver or passenger. Road traffic presents the greatest threat to air quality in the South East and is a major contributor to greenhouse gas emissions.

Indicator	Trends	Status
		Air Quality
Indicator 6 Days when air pollution is moderate or higher (2004)		Although overall air quality continues to improve, periods of increased air pollution still occur. These are mainly the result of elevated concentrations of ozone caused by hot and sunny conditions, and elevated concentrations of particulate matter. Heavy road traffic contributes substantially to local air pollution.
Indicator 7 Sulphur dioxide concentration (2004)		Over the last decade there have been substantial reductions in the concentrations of sulphur dioxide.
Indicator 8 Nitrogen dioxide concentration (2004)		There is generally a decreasing trend in nitrogen dioxide concentrations, which have been compliant with air quality objectives since 2000. Concentrations are higher in urban areas because of road traffic emissions.
Indicator 9 Particulate concentration (2004)		Particulate matter (PM10) concentrations are generally decreasing or remaining consistent, and are compliant with air quality objectives. However, air quality problems caused by elevated PM10 concentrations continue to occur from specific air pollution events, mostly originating from outside the South East.
Indicator 10 Emissions to air from processes regulated by the Environment Agency (2002)		Many South East regulated emissions increased between 1998 and 2002, although these emissions remain low compared to the total UK regulated emissions and other sources in the UK.
		Water Quality and Resources
Indicator 11 River water quality		
• **Chemical** (2004)		River water quality is generally good, although there has been a slight decline in recent years. However, compared to results achieved in the early 1990s, water quality has shown an underlying trend of improvement.
• **Biological** (2004)		The biological quality of rivers has improved since 1990.
Indicator 12 Compliance with River Quality Objectives (2004)		Compliance with River Quality Objectives has fallen in recent years. After low flows caused by drought conditions in 2003, we saw some recovery in 2004.
Indicator 13 Compliance with the EU Bathing water Directive (2004)		Bathing water quality has improved significantly with no beaches consistently failing the imperative standards since 1998.
Indicator 14 Nutrient status of freshwaters (2004)		
• **Phosphate**		Phosphate levels have significantly improved compared to results in the early 1990s, showing an underlying trend in decreasing phosphate levels.
• **Nitrate**		There has been little change in nitrate concentrations in freshwaters.

Indicator	Trends	Status
		Water Quality and Resources
Indicator 15 Nitrate status of groundwater (2004)		Nitrate concentrations pose a major problem to groundwater quality with around 50 per cent of the South East designated as either a groundwater or surface water Nitrate Vulnerable Zone.
Indicator 16 Water pollution incidents (2004)		There has been a reduction in water pollution incidents.
Indicator 17 River flows and groundwater levels (2005)		River flows and groundwater levels are dependent on weather patterns so are naturally highly variable. During extended periods of below average rainfall, river flows and groundwater levels can significantly fall leading to water supply/demand deficits and environmental impacts.
		Land Quality
Indicator 18 New homes built on previously developed land (2002)		Although the percentage of new homes built on previously developed land has increased, the area of derelict land and vacant buildings has also increased. This illustrates the potential for more efficient use of previously developed land in the region.
Indicator 19 Area under agri-environment schemes (2004)		The area of land under Environmentally Sensitive Area agreements and Countryside Stewardship Schemes is increasing.
Indicator 20 Land pollution incidents from agriculture and other sources (2004)		There has been a reduction in pollution incidents affecting the land.
Indicator 21 Use of pesticides in agriculture and horticulture (2003)		Although there has been a decline in the amount of pesticides used, there has been an increase in spray area. This reflects a gradual move towards more frequent treatments and more complex tank mixtures of chemicals.
		Biodiversity
Indicator 22 Condition of Sites of Special Scientific Interest (2005)		The condition of Sites of Special Scientific Interest is improving with 70 per cent in favourable or recovering condition in 2005.
Indicator 23 Area of woodland (1996)		The South East is the most wooded of all the English regions. Woodland area increased by 7 per cent between 1980 and 1996.
Indicator 24 Distribution of otters (2002)		Although otters remain rare, distribution has increased significantly.
Indicator 25 Distribution of Water voles (1998)		Whilst some strongholds remain, water voles are rare in around half of the region. In the last decade, water voles have disappeared from three quarters of their previously known sites across the South East. They may become extinct in the region if this trend continues.

Environment Agency
South East of England State of the Environment Report 2005

We want to hear your feedback on our SE England State of the Environment 2005 Report.

Please detach this card and take a few moments to complete the questions below and return it to us.

How do you rate the SE England State of the Environment 2005 report:

- Excellent
- Good
- Average
- Poor
- Very poor
- Didn't read

Please score the following questions on a scale of 1 to 5, with 5 being the best score (please circle)

Is the report easy to understand?	1	2	3	4	5
Is the report useful to you?	1	2	3	4	5

What changes and improvements would you like to see in future?

Any other comments:

It would be useful for us if you could provide the following information:

Name of organisation:
Name:
Address:
Email:

Thank you for helping us make our report a better read.

To order further copies of this report, please phone 08708 506 506 (Mon–Fri 8–6)

Information gathered in this exercise will be used solely for our research purposes and any personal details will not be shared with any other party.

Business Reply
Licence Number
RLYG-CGSZ-BTLB

Environment Agency
Corporate Affairs
Guildbourne House
Chatsworth Road
WORTHING
West Sussex
BN11 1LD

we value your feedback...

Please complete and return the reply card at the back of this report

Indicator	Trends	Status
		Biodiversity
Indicator 26 **Numbers of salmon and sea trout** (2004)		
• **Salmon**		Salmon numbers are generally declining with stocks in the Rivers Test and Itchen at dangerously low levels, and the River Thames still failing to maintain a sustainable salmon population.
• **Sea trout**		With the exception of the River Thames, sea trout populations appear to be recovering as a result of improvements in river management.
Indicator 27 **Wild bird populations** (2003)		Between 1994 and 2003, the South East recorded the highest decline in both farmland and woodland bird populations compared to other regions. The decline is believed to be the result of agricultural intensification and the resulting habitat loss and degradation.
		Flood Risk
Indicator 28 Number of properties at risk from flooding (2004)		Eleven per cent of the land area and more than 235,000 properties are at risk from flooding. There is still significant demand to build within flood risk areas.
Indicator 29 Change in beach volume (2002)		Although there are areas where coastal erosion is occurring, there is not enough long term data to determine trends at the present time.
		Climate Change
Indicator 30 Future climate change in the South East (2004)		Climate change scenarios for the South East show that temperatures will rise, summer rainfall will decrease, and winter rainfall will increase. These changes will have significant impacts on biodiversity and water resources, and increase flood risk.
Indicator 31 Quantity of rainfall (2004)		Rainfall data suggests a decline in summer rainfall since the 1970s and an increase in winter rainfall since the 1990s. Although these trends are consistent with climate change predictions for the South East, without further data these results cannot be attributed to man-made climate change.
Indicator 32 Sea level change at Sheerness, Kent (2003)		Since 1834, sea levels have been rising at Sheerness by 1.7mm per year. The rise in sea level places the region under greater threat of coastal flooding and erosion.
Indicator 33 UK greenhouse gas emissions (2004)		Greenhouse gas emissions fell by 13 per cent between 1990 and 2003, and carbon dioxide emissions fell by 21 per cent between 1970 and 2002. However, these improvements are threatened by carbon dioxide emissions from the transport sector, which rose by 88 per cent between 1970 and 2002 as a result of increases in road traffic.

Would you like to find out more about us, or about your environment?

Then call us on

08708 506 506 (Mon-Fri 8-6)

email

enquiries@environment-agency.gov.uk

or visit our website

www.environment-agency.gov.uk

incident hotline 0800 80 70 60 (24hrs)
floodline 0845 988 1188

Environment first: This publication is printed on paper made from 100 per cent previously used waste. By-products from making the pulp and paper are used for composting and fertiliser, for making cement and for generating energy.

GESO1005BJQL-E-P