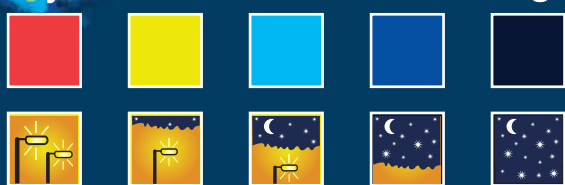


Night blight!

Rapidly spreading light pollution chases the stars from the night... closing our window to the universe

Key Satellite measurements of light at night



‘Can we see the whole of life or only know a hemisphere of it before death? I’ve no idea of the answer myself. But the sight of stars always sets me dreaming...’
Vincent Van Gogh

What’s happening about light pollution?

It’s growing fast. New satellite data published by CPRE shows a big increase in England and the rest of the UK over a period of just seven years. Light pollution is destroying one of our birthrights – the sight of countless numbers of stars.

The night sky has been enchanting and mystifying people since long before the dawn of civilisation. Nothing else in the natural world achieves quite such a combination of beauty and mystery. Nothing else has inspired so much art, science and religion.

On a dark, clear night you can see some 3,000 stars spread across the overturned bowl of the sky. You can gaze at the soft luminescence of the Milky Way – the great heart of our own galaxy – splashed across the heavens. With your naked eye you can see up to five planets and the Andromeda galaxy, the nearest outside of the Milky Way. The faint light we now see from this neighbouring city of stars has been hurtling towards us at 186,300 miles per second...but it has taken 2.2 million years to reach us across space.

You can see them provided there’s no light pollution – but, increasingly, there is. The night’s grandeur, awe and beauty are being blown away by our careless, wasteful use of electric light outdoors. When light pollution intrudes only a few dozen of the brightest stars are visible. More than half of us in Britain, and rising, will never see the Milky Way in the sky near our homes.

Darkness at night is one of the things that defines countryside and makes it so different from towns and cities. A moonlit rural landscape or the bare branches of a big, ancient tree silhouetted against a star filled sky are precious and now endangered things.

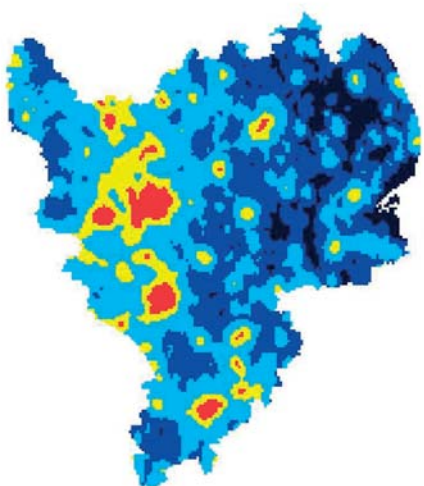
Light pollution is caused by

- Badly designed street and road lights
- Security lights which light up buildings and their surroundings (including those on homes)
- Floodlights used to illuminate games pitches, places of entertainment and buildings

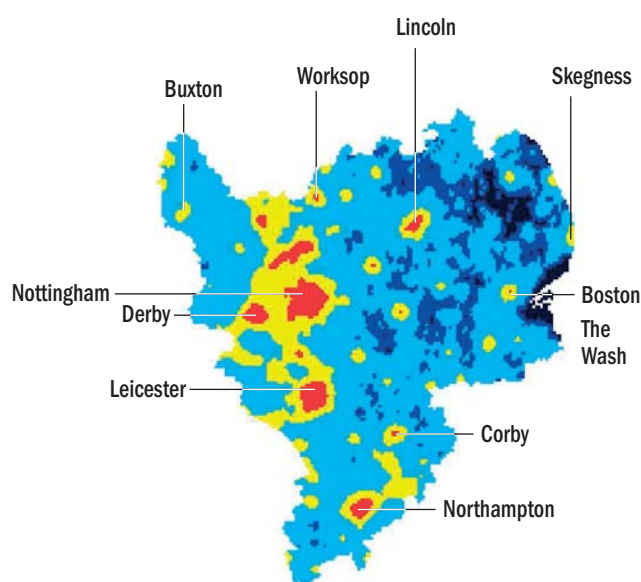
Light pollution consists of

- **Sky glow** - the pink or orange glow we see for miles around towns and cities, spreading deep into the countryside, caused by a scattering of artificial light by airborne dust and water droplets
- **Glare** - the uncomfortable brightness of a light source when viewed against a darker background
- **Light trespass** - light spilling beyond the boundary of the property on which a light is located, sometimes shining through windows and curtains

East Midlands 1993



East Midlands 2000



Key ■ 0 - 1.7 ■ 1.71 - 50 ■ 50.01 - 150 ■ 150.01 - 240 ■ 240.01 - 255
 (see text, right)

How light pollution is spreading

These maps show the brightness of night time lights in England’s East Midlands region in 1993 and 2000, using data collected by weather satellites. To make them we divided the land surface into small squares, or pixels, less than a mile across and gave each a value – from zero to 255 – according to the accumulated brightness of the lights within. This scale was then divided into five bands – from deep blue, through two lighter blue shades, to yellow and then red (see key).

In the red pixels, covering most of the larger towns and cities, the satellite’s light detecting instrument is very close to or at saturation – unable to register any further increase. In the darkest blue pixels, covering the most remote, thinly populated areas, virtually no light is detected. The yellow, surrounding and joining the red areas, corresponds to sprawling suburbs, medium sized towns and lit stretches of road.

On a clear, moonless night there’s a very good chance of seeing the Milky Way from within one of the deepest blue areas – provided you’re not next to a light! Our galaxy becomes harder and harder to view within the next two, lighter blue bands. There is no chance of seeing the Milky Way on even the clearest, darkest night within the red and yellow bands where most people live.

In seven years the darkest blue area shrunk by two thirds. The brightest, red area grew by 14% whilst the yellow area and the lightest blue area both expanded by 45%. Similar changes took place across the rest of England. See what happened in your area using the table on the back cover. The front cover shows all England in 2000.

What can we do about it?

There's not enough awareness about light pollution and no policies in place capable of halting its rapid growth. It's not recognised in law as a pollutant or a nuisance. Here's what we think needs to happen:

We can all

- Ensure we don't waste light outside our homes: angle outdoor lights downwards; use minimum wattage bulbs; fit hoods or shields to minimise light spill; ensure they are switched on only when needed.
- Approach neighbours – be they households or businesses – with overly bright security lights and politely ask them to angle them downwards, or shield them, or fit a passive infra red sensor or a lower wattage bulb.
- Contact local MPs, urging them to press the Government to act. Send them a copy of this leaflet.
- Lobby your local council. Contact officers and councillors responsible for highways and land use planning, make them aware of light pollution in their area (our satellite data is a starting point) and urge them to implement the measures and policies set out in this report. Send them a copy of this leaflet.
- Contact local DIY stores or write to their headquarters and ask them to stock security lights which minimise light pollution.
- Find out more. Read our full report, *Night blight!*, look at our website www.cpre.org.uk, see our satellite maps showing light pollution in your region and how it's growing.

DIY superstores and other retailers should

- Withdraw the more powerful, 300 to 500 watt security floodlights from their shelves – there's no need for these anti-social, environmentally-unfriendly products to be sold in the mass market. We suggest a maximum of 150 watts, in line with the Institution of Lighting Engineers' recommendation.
- Ensure information is available on installation methods that minimise light pollution – in signage next to the product on the shelves as well as in the packaging.

Property developers, owners of commercial premises, lighting manufacturers, specifiers and installers should

- Recognise that light pollution is everybody's problem, including theirs, and take the issue properly into account whenever exterior lighting is considered.

The Highways Agency, responsible for trunk roads and motorways, should

- Set a target date for replacing all existing road lighting with low light pollution, 'Full Cut Off' lighting which cuts out all light going upwards.



Well directed lights illuminate only the intended area

- Bring forward the replacement of lighting at the most over-lit junctions in both urban and rural areas and consider whether more rural stretches of its network currently lit with conventional road lighting could have solar-powered LED (light emitting diode) studs (rather like cat's eyes) installed instead.
- Consult communities affected by any necessary new road lighting schemes about its impact and how this may be minimised.
- Encourage more innovative approaches to lighting large, harshly lit areas like junctions. For example, one tall downward angled light may create less light pollution than several smaller lights.

Local Authorities light the rest of the road network and have an important influence as planning authorities. They should

- Introduce a policy to control light pollution in their local planning policies. This should include:
 - insisting on light pollution assessment at the planning application stage of new developments. Badly designed or over-lit schemes should be sent back to the applicant for modification;
 - setting limits on light pollution, including curfews, according to the remoteness, darkness or other special qualities of the area. There should be a strong presumption against any powerful and intrusive exterior lighting schemes in or on the edge of open countryside.
- Ensure the environmental statements required for major development schemes address light pollution.
- Set targets for replacing all their street and road lights with less light polluting types. Consider using solar powered LED studs (see above) instead of street lighting on rural roads. Local authorities should address these issues in their Local Transport Plan.
- Ensure consultation takes place with local residents when installing any new road lighting.
- Consider reducing the number of road and street lights in over lit areas as part of any replacement programme.

Government should

- Develop indicators of light pollution and set targets to prevent the problem getting worse. Satellite data such as that featured here could provide the basis for such indicators.
- Set up a cross-departmental group charged with drawing up the most cost effective and practical policies for halting the growth in light pollution.

Options should include 1) defining light pollution as a Statutory Nuisance and drawing up the regulations which would enable local authority Environmental Health Officers to deal with it; 2) introducing new regulations through land use planning legislation to allow planning authorities to control exterior lighting, for example by defining areas of special control over outdoors lighting; 3) amending Building Regulations to cover external lighting of buildings.

- Ensure the Government's proposed new Planning Policy Statements will include policies to control light pollution and acknowledge the importance of dark landscapes to countryside quality and character;
- Ensure policies of all Government departments and the policies and operations of public agencies take account of the need to tackle light pollution – including the Highways Agency and bodies such as the Millennium Commission and the sports councils for National Lottery-funded projects.
- Ensure highways authorities develop policies to minimise light pollution associated with road and street lights in the next revision of Full Local Transport Plans.

CPRE proposes that the Government should promote a public debate on the idea of a voluntary 'national switch off' for part of a night when there is a spectacular event in the heavens, such as a comet appearing at its brightest or a meteor shower. If all exterior lights were switched off between prearranged and extensively publicised hours, the nation could come together to gaze at the night sky. The switch-off could be cancelled if most of the country was covered in cloud on the night!



Full Cut Off lighting illuminate the road without lighting up the night sky



Badly mounted floodlight illuminates neighbouring premises, Peak District

Why should we care?

Light pollution is destroying our view of the night sky but there are other important reasons for curbing it.

Waste: Light pollution is wasted energy – electric light shining where it's not wanted or needed. The great majority of this electricity is made by burning fossil fuels in power stations. That produces air pollutants which cause acid rain and harm human health, plus carbon dioxide gas which is building up in the Earth's atmosphere, trapping heat, changing climates and raising the sea level.

Harm: When outdoor lights shine into people's homes this harms their quality of life and can rob them of sleep. Environmental Health Officers receive hundreds of complaints each year. People have sometimes been forced to move house. It's also likely that light pollution is harming animal and plant species in the UK. Sometimes the impact is obvious – for example when deciduous trees close to street lights retain their leaves in winter, or when a song bird sings a mis-timed dawn chorus beneath a street lamp.

Safety at night

Exterior lighting can enhance our finest buildings, make urban quarters more attractive and provide opportunities for sports and entertainment. It can give us a sense of security and make roads and pavements safer. CPRE and the British Astronomical Association don't advocate dark streets, nor are we opposed to exterior lighting. We are against its inconsiderate and wasteful use – which is what causes light pollution.

On the road: We want to see old, inefficient street lights replaced with lighting which illuminates the roads just as brightly but does not cast beams upwards causing light pollution.

Safe from crime: It's widely believed that exterior lighting reduces crime and there is evidence that street lights can sometimes do so. It certainly makes people feel safer from the crimes they fear most. We want lighting used for security to be efficient rather than overpowering and for it to be well shielded, so that it doesn't add to light pollution.

How light polluted are you?

The table shows how light polluted each part of England was in 2000, and how things have changed since 1993.

	Percentage of local area in each of the five light pollution bands in 2000 (see key inside leaflet)					Percentage of local area moving up or down a band between 1993 and 2000	
	Dark blue 0-1.7	Blue 1.71-50	Light blue 50.01 - 150	Yellow 150.01-240	Red 240 - 255	Increase by 1 band or more (getting brighter)	Decrease by 1 band or more (getting darker)
North East							
Durham	16%	22%	34%	25%	4%	28%	2%
Northumberland	45%	28%	22%	4%	1%	30%	1%
Teeside*	0%	0%	26%	37%	36%	24%	0%
Tyne and Wear*	0%	0%	1%	19%	80%	6%	0%
REGIONAL TOTAL	31%	23%	24%	13%	9%	28%	1%
North West							
Cheshire	0%	1%	52%	35%	12%	29%	0%
Cumbria	29%	32%	35%	3%	0%	40%	1%
Greater Manchester	0%	0%	5%	21%	74%	14%	0%
Lancashire	5%	14%	41%	32%	8%	20%	1%
Merseyside	0%	0%	3%	27%	70%	15%	0%
REGIONAL TOTAL	15%	19%	35%	17%	13%	30%	1%
Yorkshire and the Humber							
Humberside*	3%	17%	63%	13%	5%	35%	0%
North Yorkshire	19%	38%	38%	4%	0%	30%	2%
South Yorkshire	0%	0%	35%	46%	19%	17%	4%
West Yorkshire	0%	0%	29%	39%	32%	13%	3%
REGIONAL TOTAL	11%	25%	42%	14%	7%	27%	2%
East Midlands							
Derbyshire	0%	1%	66%	29%	4%	27%	2%
Leicestershire	0%	7%	62%	26%	5%	31%	1%
Lincolnshire	5%	27%	63%	5%	0%	46%	1%
Nottinghamshire	0%	2%	65%	22%	11%	25%	1%
Northamptonshire	0%	2%	79%	17%	2%	38%	1%
Rutland	0%	3%	94%	2%	0%	41%	0%
REGIONAL TOTAL	2%	12%	67%	16%	3%	37%	1%
West Midlands							
Hereford & Worcester	19%	18%	50%	12%	1%	30%	2%
Shropshire	18%	18%	58%	5%	1%	41%	2%
Warwickshire	0%	3%	70%	24%	3%	24%	1%
West Midlands	0%	0%	8%	15%	77%	6%	1%
Staffordshire	0%	1%	67%	26%	6%	30%	1%
REGIONAL TOTAL	11%	11%	56%	15%	7%	30%	1%
East of England							
Bedfordshire	0%	0%	69%	27%	5%	17%	1%
Cambridgeshire	0%	7%	78%	13%	2%	34%	1%
Essex	1%	3%	66%	23%	7%	20%	2%
Hertfordshire	0%	0%	47%	44%	9%	10%	3%
Norfolk	12%	33%	51%	4%	1%	26%	5%
Suffolk	7%	25%	59%	8%	1%	27%	5%
REGIONAL TOTAL	5%	16%	61%	15%	3%	25%	3%
South East							
Buckinghamshire	0%	0%	67%	26%	8%	17%	1%
Berkshire	1%	9%	47%	29%	13%	21%	1%
East Sussex	1%	12%	72%	13%	3%	21%	2%
West Sussex	3%	11%	67%	18%	2%	15%	5%
Greater London	0%	0%	1%	9%	91%	2%	0%
Hampshire	3%	10%	64%	15%	8%	22%	3%
Isle of Wight	9%	21%	55%	14%	0%	11%	5%
Oxfordshire	0%	5%	81%	13%	1%	27%	1%
Surrey	0%	0%	45%	37%	17%	13%	0%
Kent	1%	5%	68%	22%	5%	20%	2%
REGIONAL TOTAL	1%	7%	61%	19%	12%	19%	2%
South West							
Avon*	0%	0%	55%	31%	15%	18%	1%
Cornwall	18%	37%	39%	6%	0%	17%	5%
Devon	37%	24%	33%	6%	1%	18%	5%
Dorset	24%	21%	42%	9%	4%	16%	9%
Gloucestershire	2%	15%	74%	8%	2%	35%	1%
Somerset	18%	20%	58%	5%	0%	24%	3%
Wiltshire	12%	18%	61%	8%	1%	30%	5%
REGIONAL TOTAL	20%	22%	48%	8%	2%	22%	5%
ENGLAND TOTAL	11%	16%	51%	14%	7%	26%	2%
NORTHERN IRELAND	8%	27%	57%	6%	1%	50%	0%
WALES TOTAL	46%	16%	28%	8%	1%	19%	4%
SCOTLAND TOTAL	62%	17%	17%	3%	2%	17%	1%
UK TOTAL	31%	17%	38%	10%	4%	24%	2%

For each county, we show what proportion of its total area – as a percentage – was in each of the five different brightness bands (see the maps, key and text on the 2nd page of this leaflet). We also show what proportion of its area moved up a band – became brighter – between 1993 and 2000 and what proportion moved down a band towards darkness. In every part of England, the shift to brightness has far exceeded any shift towards darkness.

Across the nation, 26 per cent of the entire area moved to a brighter band while only two per cent moved into a darker band.

Light pollution has been discussed and publicised for more than a decade. Yet so far as most of us are concerned the issue is still not really on the map. We hope our maps and data can change that. To find out more and view or order a light pollution map of your region, visit our website www.cpre.org.uk. You can also order our background report, *Night blight!* from our website, or by contacting CPRE's national office (see below).

We've set out what we think should be done about the problem and how we can all get involved. It's not too late to turn the tide. Light pollution may still be getting worse, but as more and more people become aware of what we are losing so the momentum for change will grow. One day, later in this new century, our children and our children's children may thank us for bringing back the Milky Way.

JOIN US! If you support our campaign against light pollution, and want to support this and our other work to protect and enhance the English countryside, then becoming a CPRE member is one of the best ways to help. Call now on FREEPHONE 0800 163680 or visit our website, www.cpre.org.uk. Individual membership is £20, joint £27, family £33, organisation £25.

The British Astronomical Association is the UK's largest astronomical body, with some 3,000 members. Its Campaign for Dark Skies, which has 119 local officers across the UK, has worked since 1989 against light pollution. The simple aim of the campaign is: 'The right amount of light, and only where needed'.

Campaign for Dark Skies
38 The Vineries, Colehill, Wimborne, Dorset BH21 2PX
Website: www.dark-skies.org

Campaign to Protect Rural England

The Campaign to Protect Rural England promotes the beauty, tranquillity and diversity of rural England by encouraging the sustainable use of land and other natural resources in town and country. We promote positive solutions for the long-term future of the countryside and to ensure change values its natural and built environment.

Our Patron is Her Majesty The Queen. We have 59,000 supporters, a branch in every county, nine regional groups, over 200 local groups and a national office in central London. Membership is open to all.

Founded in 1926, CPRE is a powerful combination of effective local action and strong national campaigning. Our President is Sir Max Hastings.

CPRE
128 Southwark Street, London SE1 0SW
Tel: 020 7981 2800 Fax: 020 7981 2899
Email: info@cpre.org.uk Website: cpre.org.uk

We thank the National Geophysical Data Center of the National Oceanographic and Atmospheric Administration, Boulder, Colorado, USA, for providing us with data. Land Use Consultants and Nigel Press Associates used this data to prepare the maps and table. We thank the Countryside Agency for a grant towards the publication of this leaflet.

*former county boundary