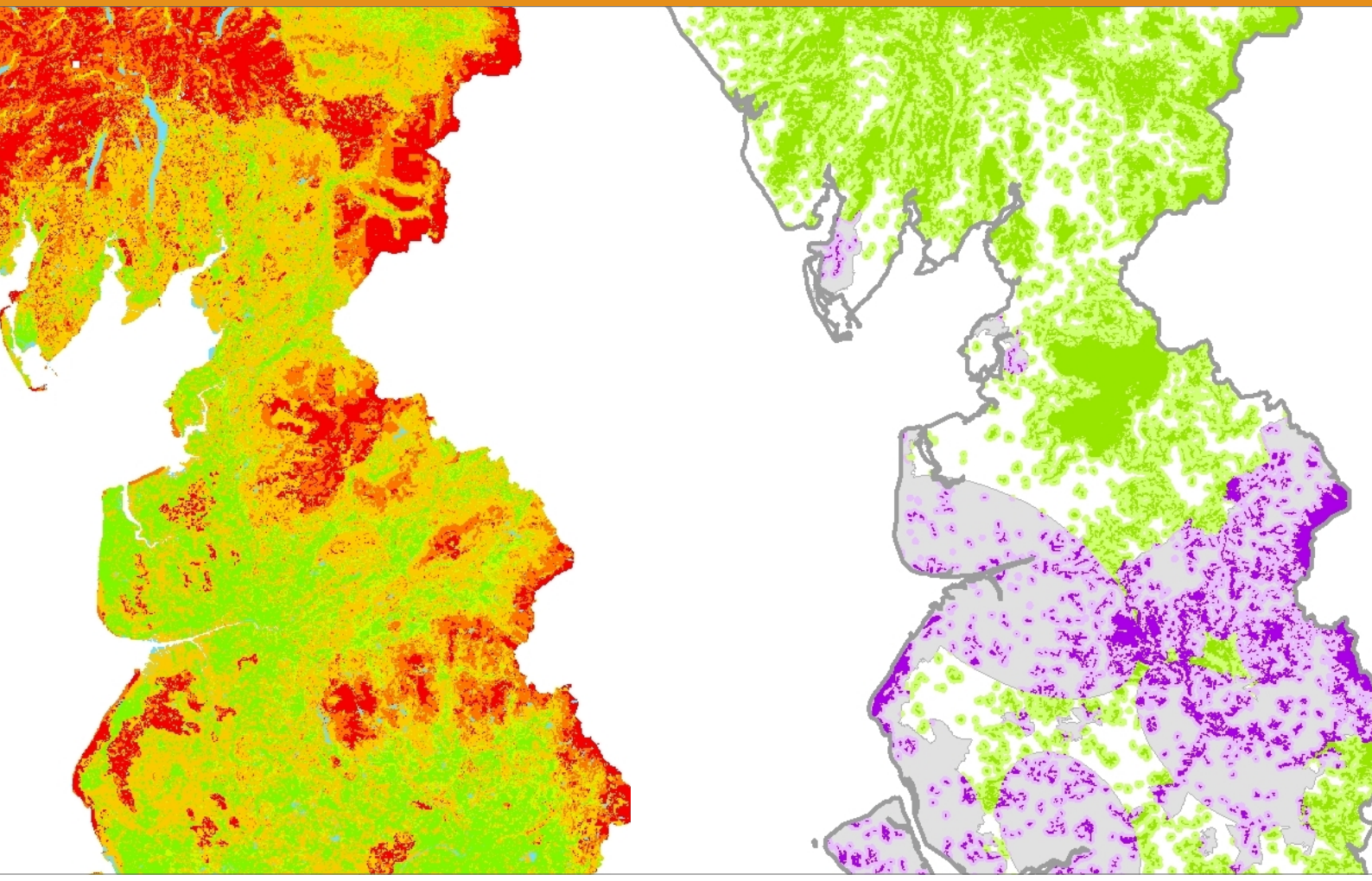
GREEN INFRASTRUCTURE SOLUTIONS
TO PINCH POINT ISSUES IN NORTH WEST ENGLAND

How can green infrastructure enable sustainable development?

EXECUTIVE SUMMARY



Northwest REGIONAL DEVELOPMENT AGENCY

NATURAL ENGLAND

THE MERSEY FOREST more from trees

Investing in Opportunities

This project has received European Regional Development Funding through INTERREG IV B.

nwe INTERREG IVB

ForeStClim

EXECUTIVE SUMMARY

1.1. This study highlights where green infrastructure assets are critical to enabling investment in the North West. This is carried out by identifying investment 'pinch points' across the region.

1.2. The term 'pinch point' has been interpreted to mean a place where significant investment is expected to occur over the next three to five years, yet where there are issues (the pinch) that green infrastructure can help to solve. Each pinch constitutes a risk to the success of a project or investment.

1.3. For example, part of Salford can be seen as a pinch point. It has been identified as a housing market renewal area with significant restructuring and development taking place, yet it is also subject to flood risk – a pinch that may restrict the potential of the planned levels of investment. This study looks at the options for how green infrastructure can help to overcome this pinch.

1.4. The study provides an information base that can help inform the new Regional Strategy 2010 and support the work by sub-regional partnerships to develop green infrastructure plans and frameworks. The RS 2010 Principles and Issues paper recently issued identifies opportunities for green infrastructure;

"A regionally distinctive natural and marine environment which has rich biodiversity" and "good quality green infrastructure and pubic open space/parks accessible to all."[1]

1.5. The North West Regional Spatial Strategy has a specific Green Infrastructure Policy (EM3), taking forward the information and recommendations set out in this study will help the delivery of this regional policy[2].

1.6. This document provides an evidence base that can be used by a wide range of organizations, sectors and individuals including those involved in developing sub regional or local development frameworks, investment plans, growth point plans, flood and coastal plans and green infrastructure plans and departments seeking to target funding for environmental improvement that will provide additional economic and social benefits.

1.7. Green infrastructure has been defined as "the region's life support system – the network of natural environmental components and green and blue spaces that lies within and between

[1] RS 2010 Regional Strategy for England's North West, Principles and Issues paper, NWDA, 2009.

[2] North West Regional Spatial Strategy, NWRA, 2008.

the North West's cities, towns and villages which provides multiple social, economic and environmental benefits."[3]

1.8. Key principles of green infrastructure planning include:

- Engage diverse people and organisations from a range of sectors
- Design green infrastructure systems that function at different scales and across boundaries
- Green infrastructure activity must be grounded in good science and planning practice
- Emphasise green infrastructure is multifunctional and benefits are afforded to all: to nature and people.

1.9. The Natural Economy North West (NENW) programme has helped to collate an extensive and growing body of evidence to support the basis for green infrastructure interventions to overcome the types of pinch identified in this study. In particular this study provides more detailed information to support the NENW study that set out the case for integrated grey/green infrastructure planning[4].

1.10. Recent work undertaken by SQW looked at the 'traditional' critical infrastructures or water, waste, transport and energy[5]. It is proposed that green infrastructure is a fifth critical infrastructure, providing a range of benefits that underpin our society.

1.11. Figure 1 below sets out the pinches that have been identified. The pinches have been prioritized at a regional level through a consultation exercise. However the main report emphasises the need for prioritisation to be made at a local level when investment decisions are being made.

1.12. The pinches are also categorized into three types:

1.12.1. Pinches that will cause direct damage to an investment.

1.12.2. Pinches that may not directly damage the investment but will affect the quality of place.

1.12.3. Pinches that are policy driven ie. they must be considered but will not directly damage an investment.

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3 North West Green Infrastructure Guide, Green Infrastructure Think Tank, 2007.

[4] Developing an outline strategy for linking green and grey infrastructure, IBIS, Natural Economy NW, 2008.

[5] "The Environmental Considerations of Sustainable Economic Growth" (NWDA, 2008)

Figure 1 North West pinches that green infrastructure can help alleviate

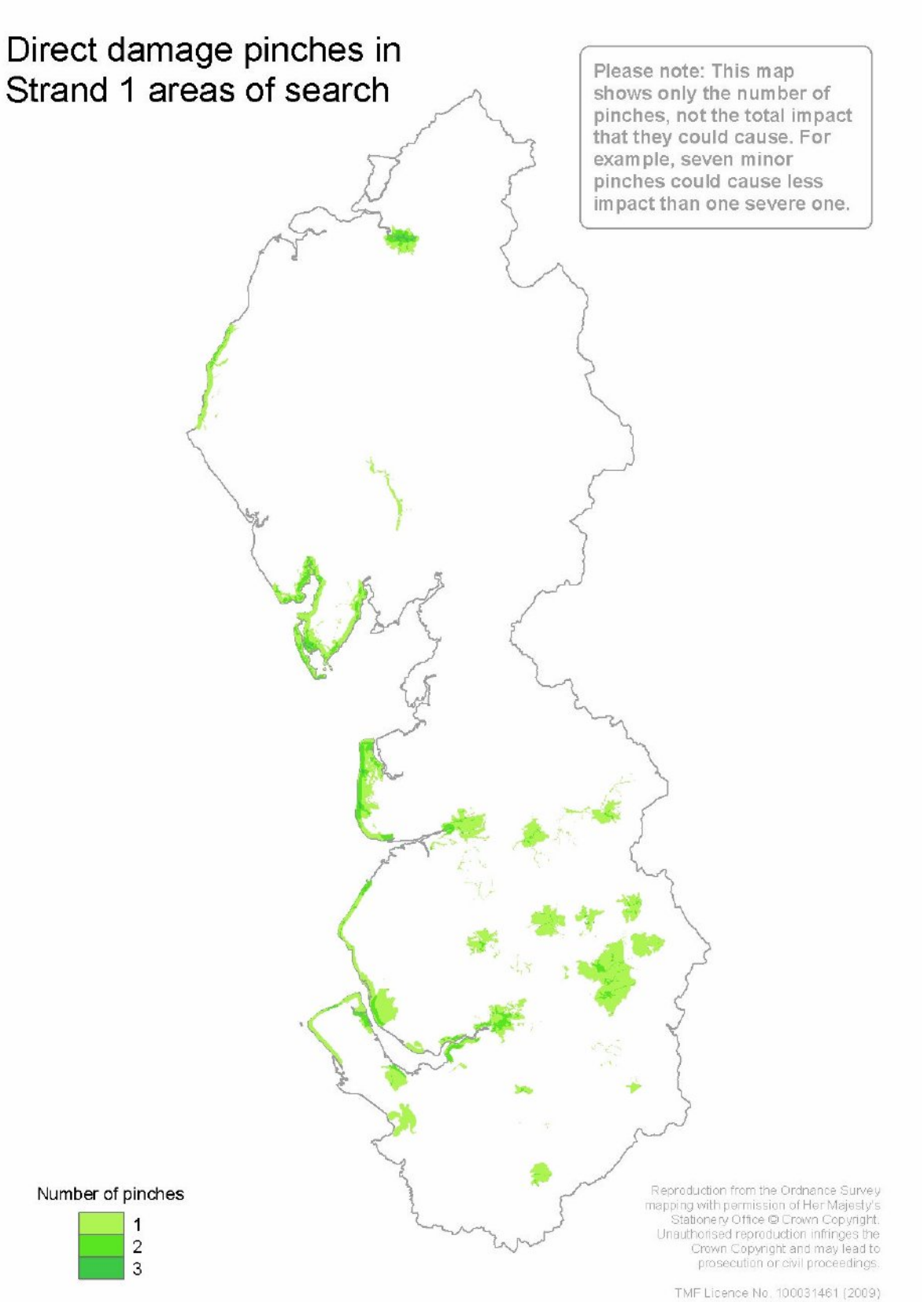
Priority	Pinch	Pinch type
HIGH	Risk of flooding	Direct damage
	Risk of inadequate water supply	Direct damage
	Risk of urban heat island effect	Direct damage
	Risk of loss of biodiversity	Policy
	Risk of loss of carbon storage	Policy
	Risk of poor air quality	Quality
	Risk of coastal storms	Direct damage
	Risk of poor tourism, recreation, culture & heritage	Quality
	Risk of soil erosion	Policy
	Risk of poor aesthetic	Quality
	Risk of little green travel	Quality
LOW	Risk of noise	Quality

1.13. These pinches are mapped in a variety of ways along with areas of search for pinch points. Two strands of search were used:

- Strand 1 - areas where there were definite boundaries for investment. These were identified from sub-regional economic strategies.
- Strand 2 - areas that were less specific as to where investment would take place, eg. Growth Point Partnership Areas.

1.14. Map 1 below shows the number of ‘direct damage’ pinches at each point in the Strand 1 areas of search, and Map 2 shows the number of high priority pinches: the direct damage pinches plus risk of loss of biodiversity and risk of loss of carbon storage.

Map 1


Direct damage pinches in Strand 1 areas of search
Please note: This map shows only the number of pinches, not the total impact that they could cause. For example, seven minor pinches could cause less impact than one severe one.
Number of pinches
1
2
3
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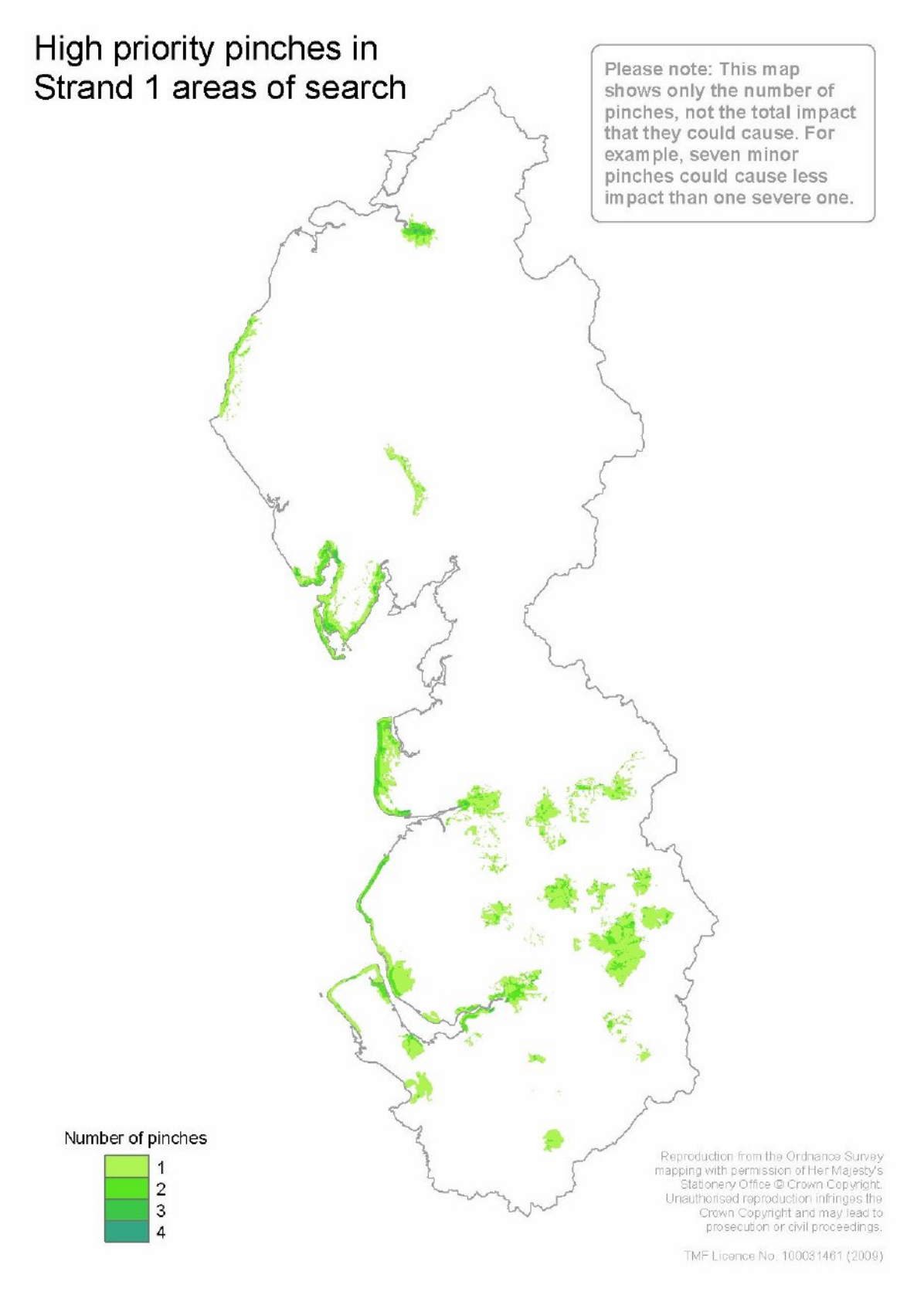
Map 2


High priority pinches in Strand 1 areas of search
Please note: This map shows only the number of pinches, not the total impact that they could cause. For example, seven minor pinches could cause less impact than one severe one.
Number of pinches
1
2
3
4
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1.15. Having identified the location of pinches within these two areas of search, the study sets out a range of green infrastructure actions that can be undertaken to help to overcome the pinch.

1.16. The actions that have been identified are either:

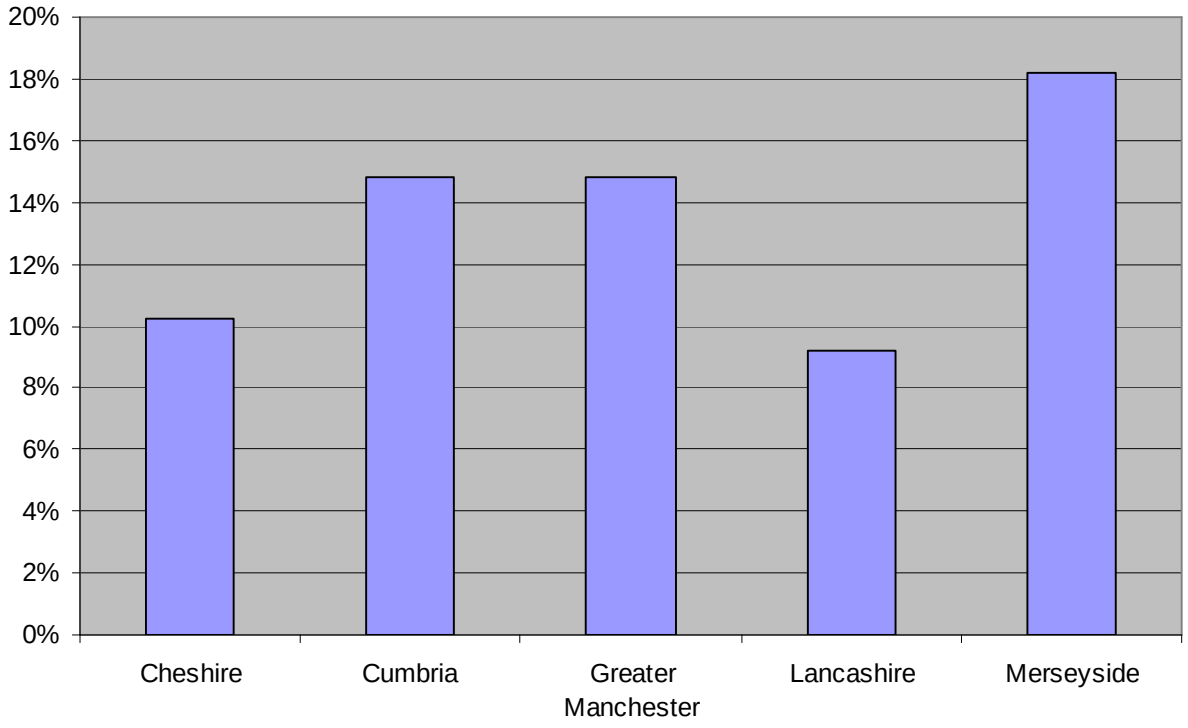
- Safeguarding actions - protecting green infrastructure to provide essential functionality
- Enhancing - requiring additional functionality to be created through land management in a variety of ways.

1.17. There is a clear policy framework that requires action to be taken to overcome issues such as flood risk, poor air quality and poor aesthetic, all identified as pinch issues. Whilst the policy may not stipulate that a green infrastructure approach has to be taken, it is clear that a grey/green infrastructure approach should be considered.

1.18. This study has identified that each sub-region has a distinct 'signature' in terms of the range and extent of the pinches that exist. This reinforces the need to look at these issues at the sub-regional level and to build the type of analysis carried out in this study into the emerging green infrastructure frameworks.

1.19. We can assess in a somewhat crude manner the degree of pinch within each sub-region by calculating the total proportion of land in the areas of search that are subject to pinch. Figure 2 sets this out. The y-axis is a measure of the extent of coverage of the areas of search by pinch issues.

Figure 2



1.20. Green infrastructure should also be used in areas of new investment not just to overcome pinches but also to add value to the investment and improve quality of place.

1.21. For each sub-region we have developed a 'storyline' based on the unique mix and extent of pinches found. We also suggest a number of actions that can be taken forward to overcome the pinch.

1.22. The menu cards at the end of this executive summary provide a visual representation of the extent (in area terms) of each pinch in each area of search. The information is provided separately for each sub-region.

1.23. It is important to highlight that this study only looks at specific areas and issues and is not a holistic view of green infrastructure across the region. It is vital that we look not only at how green infrastructure impacts on areas of investment and change, but also its role in providing the life support system for the region that enables society to function.

1.24. There is some urgency in tackling some of the issues identified. Not only will investment be undermined by the pinches, the degree of impact of several of the pinches is likely to increase as projected climate change will exacerbate the pinch. Current projections suggest increasing risk

of both fluvial and coastal flooding and increase in the impacts of the urban heat island, all current pinch issues.

1.25. Aspects of this work will also be taken forward through the NW Climate Change Action Plan (Action 4.3 Green Infrastructure for Climate Change Adaptation and Mitigation) and the Interreg 4b ForestClim project, but there is a need for more coherent region and sub regional interventions. This is perhaps even more pressing in a time of economic downturn so that the conditions for new development in a policy environment that is likely to be very different (e.g. low carbon, focus on well being and providing an outstanding quality of place to attract new investment in the knowledge economy), can start to be met.

1.26. This study shows that green infrastructure can provide solutions to issues that affect future investment and the ability to develop our economy in a different way. The work can be used as a starting point for identifying issues that affect specific places (using the menu cards), initiate discussion on the potential solutions and indicate appropriate action that is relevant to each sub region.

RECOMMENDATIONS

1. Whilst some of the pinch issues can be tackled at a sub-regional or local level (eg. lack of green travel routes, air pollution) we recommend that six of the pinch issues require coordinated and strategic response to build green infrastructure into the plans to adapt to the pinch due to their nature, priority and likely increase in severity with projected climate change.

- Risk of flooding
- Risk of urban heat island effect
- Risk of loss of biodiversity
- Risk of loss of carbon storage
- Risk of coastal storms
- Risk of poor tourism, recreation, culture and heritage

These key themes may form one element of a regional approach to grey/green infrastructure planning and implementation. Of these six, two are policy driven. Maps 1 and 2 above show the locations of the four direct damage pinches and of all six pinches respectively.

2. Many of these issues do already have plans and strategies in place; our recommendation is that green infrastructure planning is incorporated into these strategies. Whilst planning is important, it is crucial that this work is used as the basis for action to start to address the pinches.

3. The evidence base provided in this study should be incorporated into sub-regional green infrastructure frameworks and district level Local Development Frameworks.

4. This study should be used to support existing green infrastructure guidance such as that produced by NENW and that which is currently being developed by NWDA.

5. Information in this study should be used to support the implementation of the recently published work by CABE on Sustainable Cities. The work also has a clear role in assisting delivery of the North West Climate Change Action Plan.

MENU CARDS

The following sections provide a series of 'menu cards', high level information from the study set out for each sub-region in a standard format.

The menus are provided for both Strands 1 and 2 areas of search for pinch. The menus provide information on the extent (area) of the pinch, its regional priority and the confidence we have in the data available to identify the pinch. The menus provide an at a glance impression of the pinch issues in each sub-region.

More detailed information about each sub-region is provided in Section 10 of the study.

The first menu card is a guide card. This sets out how the information is set out for Strand 1 and 2 in each sub-region.

The menu cards are presented in order:

Strand 1

- Cumbria
- Lancashire
- Greater Manchester
- Merseyside
- Cheshire and Warrington

Strand 2

- Growth Points
- Tourism
- Agriculture
- Mersey Corridor

Explanation

A pinch is an issue that could inhibit economic growth and that GI could help to solve.

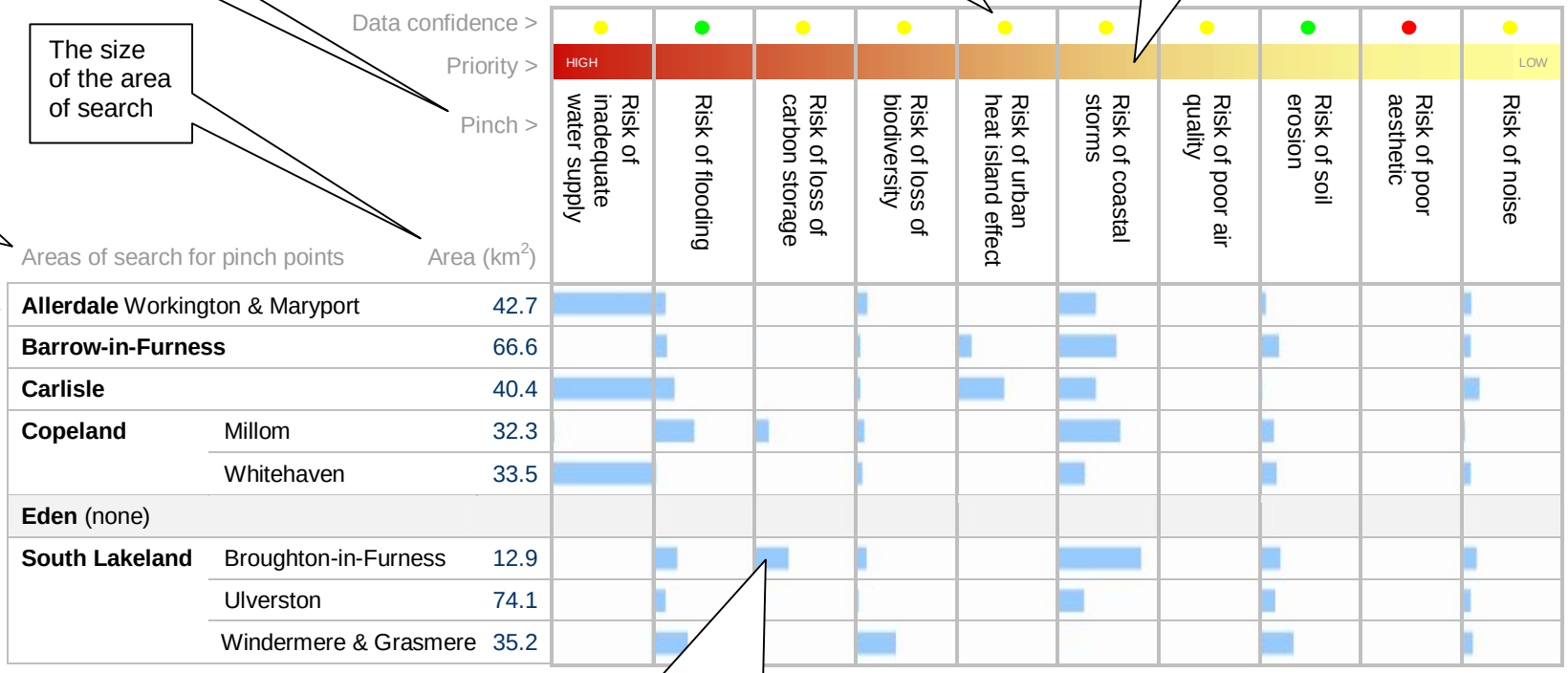
Level of confidence in the dataset(s) and how they have been used, based on the questions in section 3.5.3.

- High
- Medium
- Low

The pinches have been arranged in order of priority for the region according to consultation with partners. Consultees were asked the question “on average at a strategic and regional level which pinches if they were present would have most slowing or stopping effect on investment?”

Pinch points are to be found in areas where significant development, investment and/or change are expected over the next three to five years. These are called ‘areas of search’ and are organised into districts.

The size of the area of search



Where the name of the area of search is different from that of the district in which it is found, both names are given.

Districts may contain any number of areas of search, including zero.

Blue bars indicate the proportion of the area of search that is covered by the pinch. This may give some idea how important the pinch is there, but doesn’t give the full story.

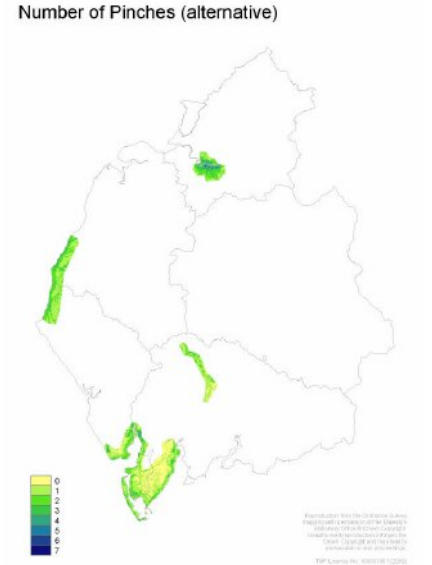
Cumbria

Description

Cumbria has pinch points in the ancient city of Carlisle, on the west coast and on the Furness peninsula where there are towns home to significant industry, and around the smaller inland towns and villages near the lakes of Windermere and Grasmere. The water supply system is less flexible in the north and west of Cumbria than elsewhere in the region, which could cause a pinch for any significant new development. Flooding, coastal storms and soil erosion could be other key pinches.

Areas of search for pinch points		Area (km²)	Risk of flooding	Risk of inadequate water supply	Risk of urban heat island effect	Risk of loss of biodiversity	Risk of loss of carbon storage	Risk of poor air quality	Risk of coastal storms	Risk of soil erosion	Risk of poor aesthetic	Risk of noise
Data confidence >			●	●	●	●	●	●	●	●	●	●
Priority >			HIGH									LOW
Pinch >												
Allerdale Workington & Maryport		42.7										
Barrow-in-Furness		66.6										
Carlisle		40.4										
Copeland	Millom	32.3										
	Whitehaven	33.5										
Eden (none)												
South Lakeland	Broughton-in-Furness	12.9										
	Ulverston	74.1										
	Windermere & Grasmere	35.2										

Example	
Location:	Carlisle
Pinch:	Risk of coastal storms
Potential actions:	Protect dune and salt marsh systems between the city and the coast



Top: Windermere (Moira Allen)

Bottom: Carlisle Castle

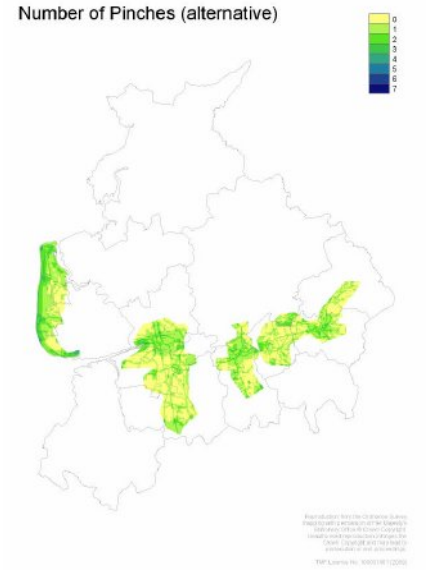
Lancashire

Description

The pinch points of Lancashire can be found in the string of urban areas across the middle of the sub-region. There are a wide variety of important pinches including flooding, biodiversity, the urban heat island effect and aesthetic considerations.

Areas of search for pinch points	Area (km²)	Risk of flooding	Risk of inadequate water supply	Risk of urban heat island effect	Risk of loss of biodiversity	Risk of loss of carbon storage	Risk of poor air quality	Risk of coastal storms	Risk of soil erosion	Risk of poor aesthetic	Risk of noise
Data confidence >		●	●	●	●	●	●	●	●	●	●
Priority >		HIGH									LOW
Blackburn with Darwen	53.5										
Blackpool	34.9										
Burnley	39.6										
Chorley	51.3										
Fylde Lytham St Anne's	20.4										
Hyndburn Accrington	46.6										
Lancaster (none)											
Pendle Colne & Nelson	22.2										
Preston	44.9										
Ribble Valley Simonstone	7.0										
Wilpshire	6.4										
Rossendale (none)											
South Ribble Bamber Bridge & Leyland	66.5										
West Lancashire (none)											
Wyre Fleetwood	34.8										

Example	
Location:	Simonstone
Pinch:	Risk of loss of biodiversity
Potential actions:	Protect existing ecological network and create new habitat to fill gaps, with particular attention paid to north-south connectivity



Top: Blackpool (Steve McN)

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Bottom: barn owl (Lancashire County Council)

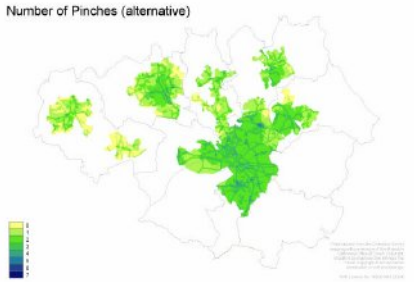
Greater Manchester

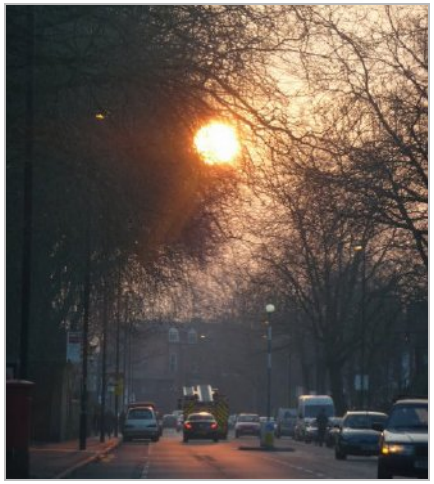
Description

Greater Manchester is a highly urbanized part of the region, with most pinch points located around the many urban centres. Trafford Park is an exception, being a dense industrial development on the outskirts of Manchester. The key pinches are the urban heat island effect, air quality and noise.

Areas of search for pinch points		Area (km²)	Risk of flooding	Risk of inadequate water supply	Risk of urban heat island effect	Risk of loss of biodiversity	Risk of loss of carbon storage	Risk of poor air quality	Risk of coastal storms	Risk of soil erosion	Risk of poor aesthetic	Risk of noise
Data confidence >			●	●	●	●	●	●	●	●	●	●
Priority >			HIGH									LOW
Pinch >												
Bolton		52.6										
Bury		30.4										
Manchester		80.6										
Oldham		35.5										
Rochdale	Middleton	12.1										
	Rochdale	21.5										
Salford		30.5										
Stockport (none)												
Tameside (none)												
Trafford Trafford Park		7.0										
Wigan	Leigh	14.4										
	Wigan	30.6										

Example	
Location:	Manchester
Pinch:	Risk of urban heat island effect
Potential actions:	Increase green cover in the most densely built-up areas, eg. Green Streets project, consisting especially of city centre parks and large-canopied street trees, and ensure that sufficient irrigation is provided





Top: St Ann's Square, Manchester (Susannah Gill)

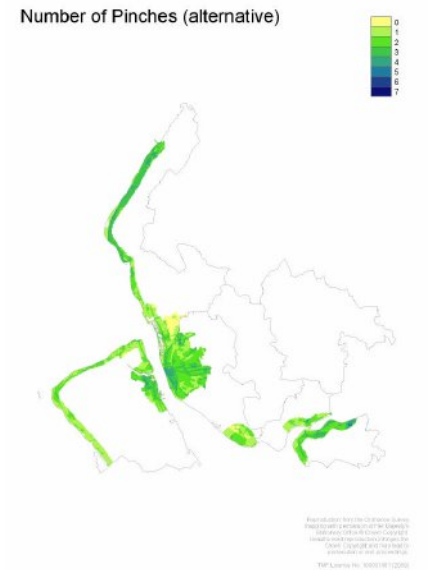
Bottom: Whalley Range, Manchester (Ben Greenaway)

Merseyside

Description

There are a wide variety of pinch points in Merseyside, from the urban centre of Liverpool to the unique, treasured habitat mix of the Sefton coast, and from the industry growing up around Liverpool's John Lennon Airport to the bird-watchers' paradise of the Wirral coast and the Mersey estuary. Key pinches are similarly wide ranging, encompassing nearly all of the possibilities that have been identified.

Areas of search for pinch points		Area (km²)	Risk of flooding	Risk of inadequate water supply	Risk of urban heat island effect	Risk of loss of biodiversity	Risk of loss of carbon storage	Risk of poor air quality	Risk of coastal storms	Risk of soil erosion	Risk of poor aesthetic	Risk of noise
Data confidence >			●	●	●	●	●	●	●	●	●	●
Priority >			HIGH									LOW
Halton Upper Mersey Valley		15.3										
Knowsley (none)												
Liverpool	Liverpool	31.7										
	Liverpool Airport	7.4										
Sefton Sefton Coast		30.2										
St Helens (none)												
Wirral Birkenhead & Wirral Coast		29.5										



Example	
Location:	Sefton Coast
Pinch:	Risk of soil erosion
Potential actions:	Encourage suitable agricultural practices, establish and maintain suitable vegetation

Top: wildflower meadow (Creative Concern)

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Bottom: Blackbrook Bypass (St Helens Council)

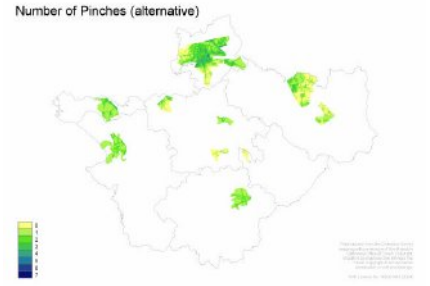
Cheshire and Warrington

Description

Cheshire and Warrington has five strategic areas for future investment, including Warrington Crossroads and Chester City. The pinch points of Cheshire and Warrington are largely to be found in small towns, many of which are home to active regeneration initiatives, but also in the city of Chester and the larger town of Warrington. Key pinches are flooding, biodiversity and the urban heat island effect, all of which can be alleviated through effective green infrastructure planning and implementation.

Areas of search for pinch points		Area (km²)	Risk of flooding	Risk of inadequate water supply	Risk of urban heat island effect	Risk of loss of biodiversity	Risk of loss of carbon storage	Risk of poor air quality	Risk of coastal storms	Risk of soil erosion	Risk of poor aesthetic	Risk of noise
		Data confidence >	●	●	●	●	●	●	●	●	●	●
		Priority >	HIGH									LOW
		Pinch >										
Chester		21.5										
Congleton East Middlewich		2.7										
Crewe and Nantwich Crewe		15.0										
Ellesmere Port & Neston Ellesmere Port		17.0										
Macclesfield	Macclesfield	11.2										
	Wilmslow	35.4										
Vale Royal	Frodsham	8.2										
	Northwich	4.7										
	Winsford	5.5										
Warrington		74.5										

Example	
Location:	Northwich
Pinch:	Risk of flooding
Potential actions:	Floodplain restoration and woodland creation upstream, SUDS



Top: Chester (Bruno Girin)

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Bottom: Ashton's Flashes, Northwich (TMF)

Growth Point Partnership Areas

Districts	Area (km²)	Risk of flooding	Risk of inadequate water supply	Risk of urban heat island effect	Risk of loss of biodiversity	Risk of loss of carbon storage	Risk of poor air quality	Risk of coastal storms	Risk of soil erosion	Risk of poor aesthetic	Risk of noise
Data confidence >		●	●	●	●	●	●	●	●	●	●
Priority >		HIGH									LOW
Pinch >											

Cheshire and Warrington

Chester	272.6
Congleton	
Crewe and Nantwich	32.7
Ellesmere Port & Neston	83.2
Macclesfield	0.7
Vale Royal	248.2
Warrington	120.5

Cumbria

Allerdale	
Barrow-in-Furness	
Carlisle	18.9
Copeland	
Eden	
South Lakeland	

Greater Manchester

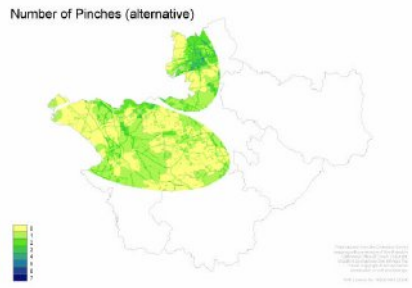
Bolton	105.2
Bury	63.5
Manchester	87.0
Oldham	1.2
Rochdale	6.3
Salford	78.9
Stockport	9.1
Tameside	3.3
Trafford	38.6
Wigan	43.7

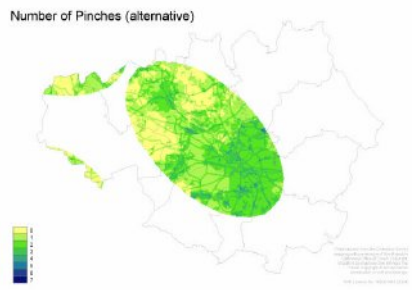
Lancashire

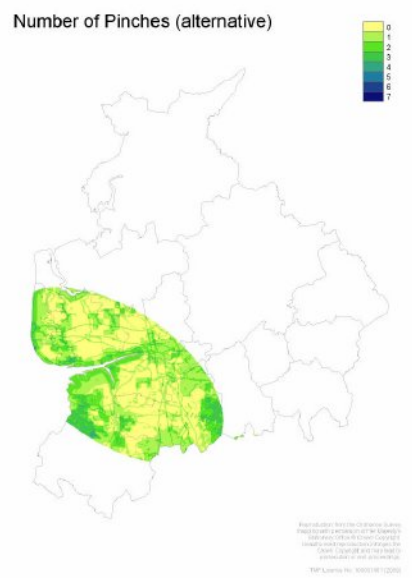
Blackburn with Darwen	4.8
Blackpool	33.6
Burnley	
Chorley	198.4
Fylde	159.6
Hyndburn	
Lancaster	
Pendle	
Preston	70.6
Ribble Valley	
Rossendale	
South Ribble	100.7
West Lancashire	136.2
Wyre	30.3

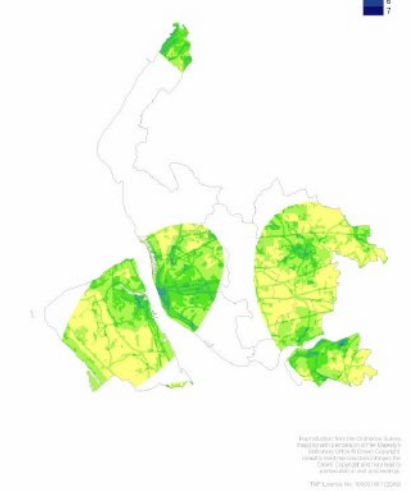
Merseyside

Halton	67.5
Knowsley	26.3
Liverpool	72.4
Sefton	27.1
St Helens	116.7
Wirral	130.4









Areas of Tourism Significance

Districts	Area (km²)	Risk of flooding	Risk of inadequate water supply	Risk of urban heat island effect	Risk of loss of biodiversity	Risk of loss of carbon storage	Risk of poor air quality	Risk of coastal storms	Risk of soil erosion	Risk of poor aesthetic	Risk of noise
Data confidence >		●	●	●	●	●	●	●	●	●	●
Priority >		HIGH									LOW
Pinch >											

Cheshire and Warrington

Chester	31.2
Congleton	38.3
Crewe and Nantwich	135.9
Ellesmere Port & Neston	13.9
Macclesfield	101.7
Vale Royal	176.5
Warrington	12.6

Cumbria

Allerdale	1083.1
Barrow-in-Furness	74.2
Carlisle	279.4
Copeland	679.5
Eden	1027.2
South Lakeland	1183.3

Greater Manchester

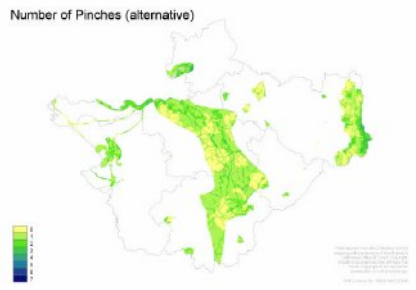
Bolton	18.8
Bury	28.4
Manchester	77.8
Oldham	27.7
Rochdale	2.6
Salford	20.8
Stockport	1.0
Tameside	7.9
Trafford	3.2
Wigan	55.5

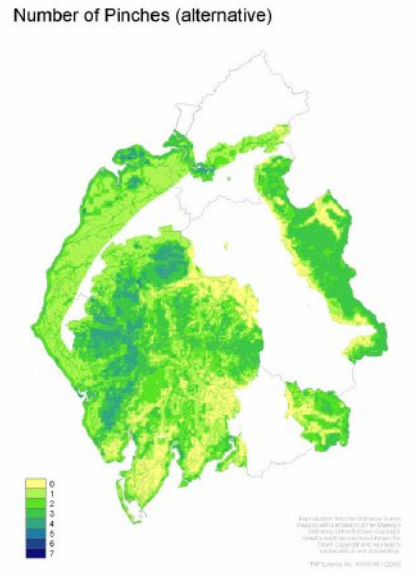
Lancashire

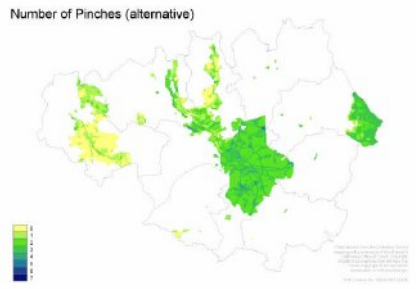
Blackburn with Darwen	137.1
Blackpool	26.9
Burnley	110.5
Chorley	4.5
Fylde	43.7
Hyndburn	73.0
Lancaster	412.6
Pendle	169.1
Preston	24.8
Ribble Valley	582.0
Rossendale	138.0
South Ribble	39.3
West Lancashire	114.5
Wyre	142.8

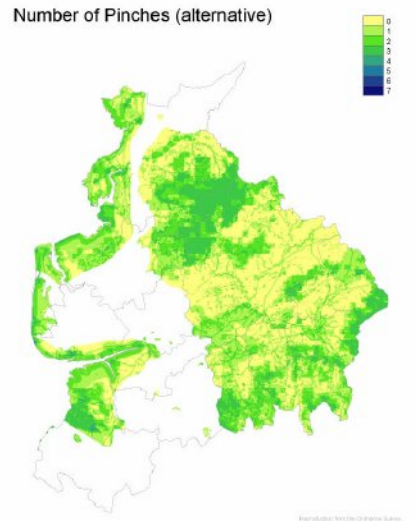
Merseyside

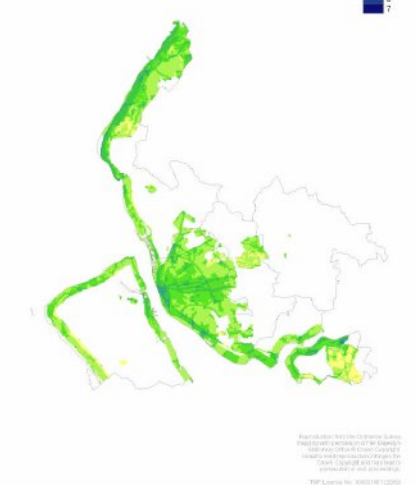
Halton	37.7
Knowsley	18.0
Liverpool	93.8
Sefton	67.8
St Helens	0.3
Wirral	36.7











Areas of High Quality Agricultural Land

Districts	Area (km²)	Risk of flooding	Risk of inadequate water supply	Risk of urban heat island effect	Risk of loss of biodiversity	Risk of loss of carbon storage	Risk of poor air quality	Risk of coastal storms	Risk of soil erosion	Risk of poor aesthetic	Risk of noise
Data confidence >		●	●	●	●	●	●	●	●	●	●
Priority >		HIGH									LOW
Pinch >											
Cheshire and Warrington											
Chester	169.3										
Congleton	77.9										
Crewe and Nantwich	175.7										
Ellesmere Port & Neston	24.2										
Macclesfield	149.9										
Vale Royal	125.3										
Warrington	66.5										
Cumbria											
Allerdale	185.5										
Barrow-in-Furness	6.8										
Carlisle	229.9										
Copeland	87.4										
Eden	251.7										
South Lakeland	28.7										
Greater Manchester											
Bolton	2.7										
Bury	8.9										
Manchester	1.0										
Oldham	2.4										
Rochdale	17.0										
Salford	24.9										
Stockport	0.5										
Tameside	2.3										
Trafford	27.2										
Wigan	17.4										
Lancashire											
Blackburn with Darwen	5.8										
Blackpool	2.5										
Burnley											
Chorley	58.3										
Fylde	94.4										
Hyndburn	2.3										
Lancaster	30.8										
Pendle	0.3										
Preston	16.7										
Ribble Valley	10.8										
Rossendale											
South Ribble	22.4										
West Lancashire	260.9										
Wyre	98.1										
Merseyside											
Halton	20.4										
Knowsley	33.9										
Liverpool	5.6										
Sefton	51.5										
St Helens	51.4										
Wirral	15.5										

Mersey Corridor

Districts	Area (km²)	Risk of flooding	Risk of inadequate water supply	Risk of urban heat island effect	Risk of loss of biodiversity	Risk of loss of carbon storage	Risk of poor air quality	Risk of coastal storms	Risk of soil erosion	Risk of poor aesthetic	Risk of noise
Data confidence >		●	●	●	●	●	●	●	●	●	●
Priority >		HIGH									LOW
Pinch >											
Cheshire and Warrington											
Chester	20.9										
Congleton											
Crewe and Nantwich											
Ellesmere Port & Neston	40.9										
Macclesfield	78.9										
Vale Royal	129.6										
Warrington	178.5										
Cumbria											
Allerdale											
Barrow-in-Furness											
Carlisle											
Copeland											
Eden											
South Lakeland											
Greater Manchester											
Bolton	1.0										
Bury	23.5										
Manchester	114.5										
Oldham	25.2										
Rochdale	17.9										
Salford	88.2										
Stockport	35.1										
Tameside	22.3										
Trafford	106.0										
Wigan	13.7										
Lancashire											
Blackburn with Darwen											
Blackpool											
Burnley											
Chorley											
Fylde											
Hyndburn											
Lancaster											
Pendle											
Preston											
Ribble Valley											
Rossendale											
South Ribble											
West Lancashire	11.0										
Wyre											
Merseyside											
Halton	79.1										
Knowsley	86.2										
Liverpool	109.8										
Sefton	71.3										
St Helens	54.8										
Wirral	62.9