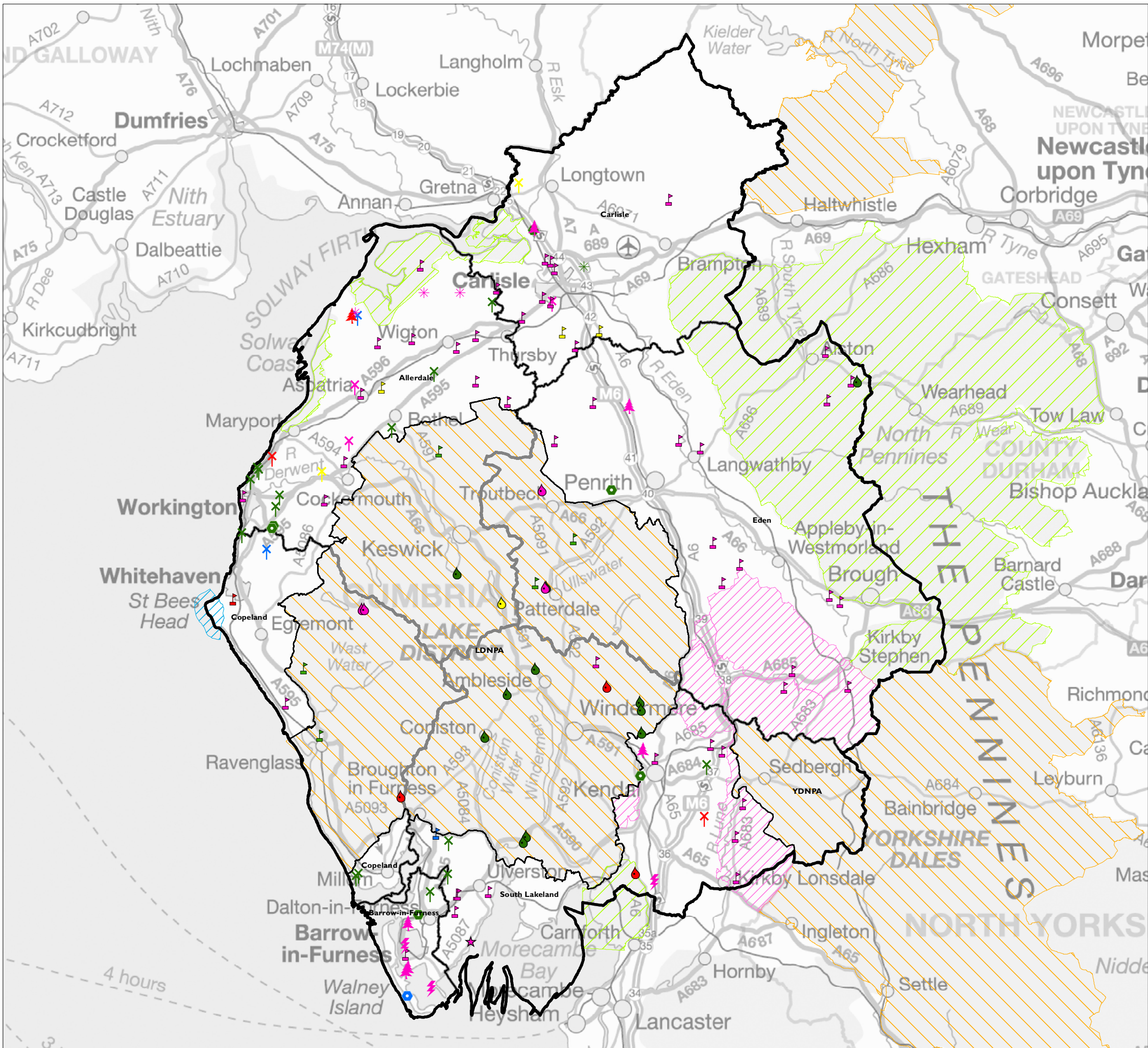




Cumbria Renewable Energy Capacity and Deployment Study

Map I: Existing renewable energy and low carbon deployment

Key

- Cumbria County Council
- Local Planning Authorities
- Local Authority boundaries
- Heritage Coast
- National Parks
- Areas of Outstanding Natural Beauty
- Potential extensions to protected landscapes (Consultation boundary 2009)

Technology

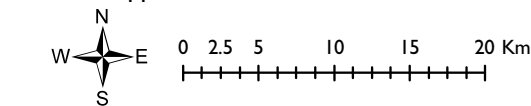
- Commercial Wind (onshore)
- Small-Scale/Micro Wind
- Biomass (unknown)
- Anaerobic Digestion
- Landfill Gas
- Small-Scale Hydro
- Building Integrated PV
- Solar Water Heating

Status

- Operational
- Under Construction
- Awaiting Construction
- Consented

Additional schemes (in planning process)

- Application Submitted



Source: Natural England, Restats, RenewableUK, British Hydropower Association, Envirolink, Cumbria CC

Date: 26/07/2011
Revision: E

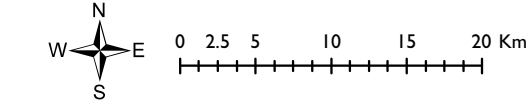


Cumbria Renewable Energy Capacity and Deployment Study

Map 2: Landscape and nature conservation designations

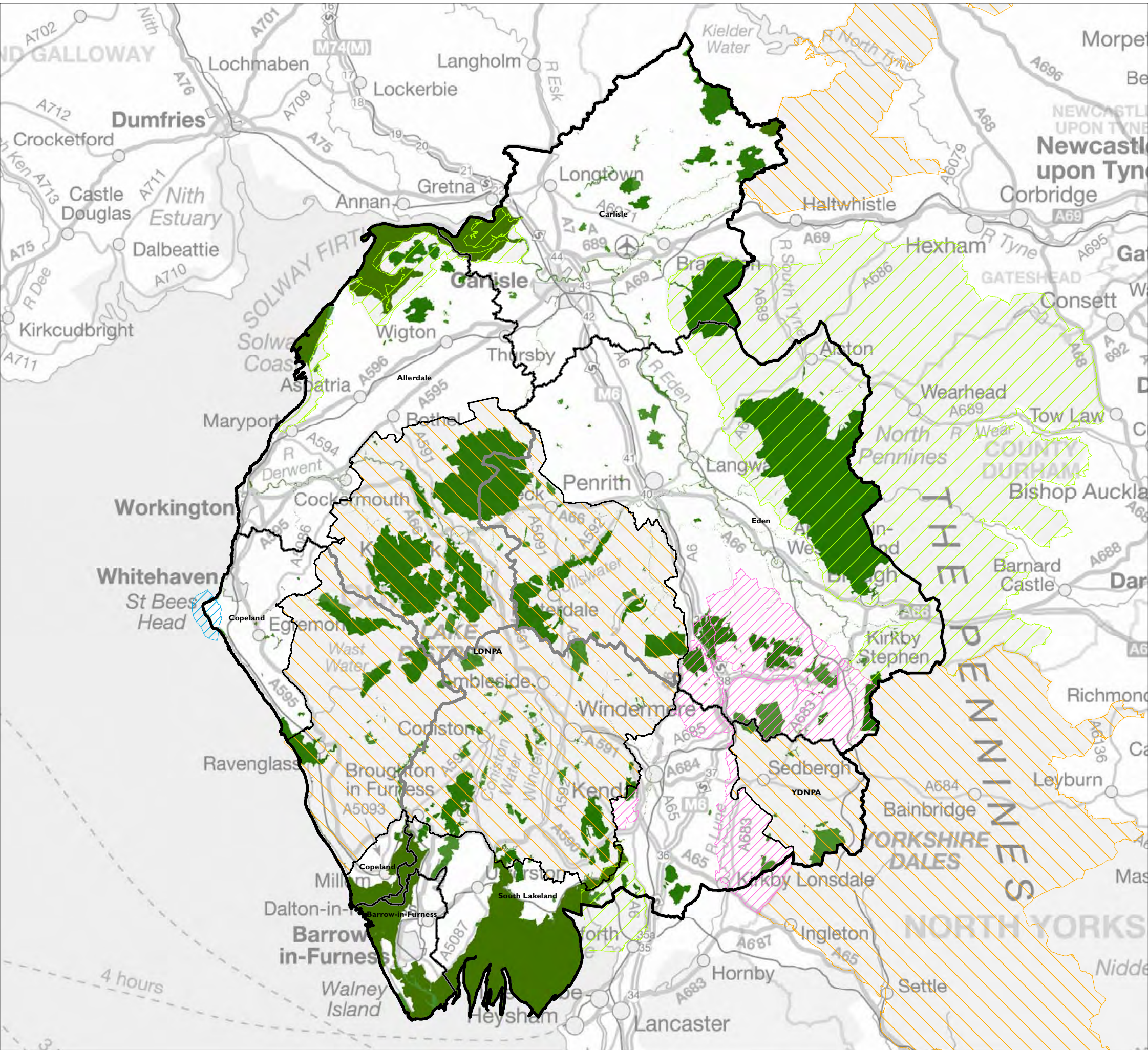
Key

- Cumbria County Council
- Local Planning Authorities
- Local Authority boundaries
- Heritage Coast
- National Parks
- Areas of Outstanding Natural Beauty
- Potential extensions to protected landscapes (Consultation boundary 2009)
- International and national nature conservation designations (SAC, SPA, Ramsar, NNR, SSSI)



Source: Natural England

Date: 26/07/2011
Revision: A



Cumbria Renewable Energy Capacity and Deployment Study

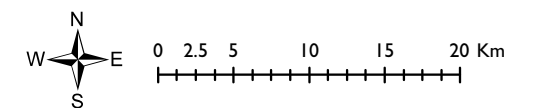
Map 3: Windspeed at 45m above ground level (agl)

Key

-  Cumbria County Council
-  Local Planning Authorities
-  Local Authority boundaries
-  Heritage Coast
-  National Parks
-  Areas of Outstanding Natural Beauty
-  Potential extensions to protected landscapes (Consultation boundary 2009)

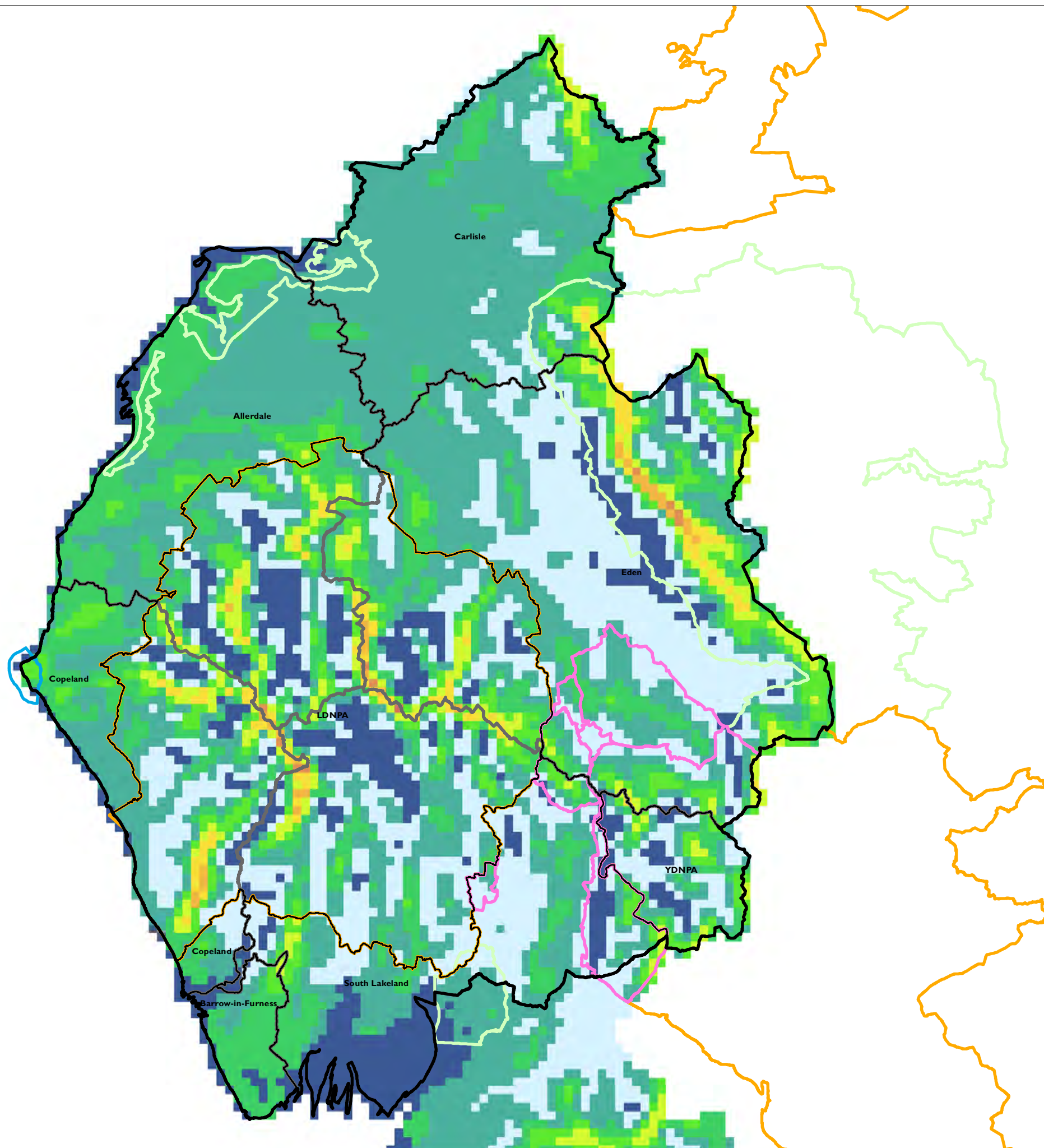
Windspeed (m/s) at 45m above ground level

-  0.0 - 4.9
-  5.0 - 6.0
-  6.1 - 7.0
-  7.1 - 8.0
-  8.1 - 9.0
-  9.1 - 10.0
-  10.1 - 11.0
-  11.1 - 12.0
-  12.1 - 13.0
-  13.1 - 14.0



Source: Natural England, NOABL

Date: 26/07/2011
Revision: A



Cumbria Renewable Energy Capacity and Deployment Study

Map 4: Bird sensitive areas and landscape capacity for wind

Key

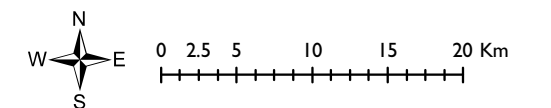
-  Cumbria County Council
-  Local Planning Authorities
-  Local Authority boundaries
-  Heritage Coast
-  National Parks
-  Areas of Outstanding Natural Beauty
-  Potential extensions to protected landscapes (Consultation boundary 2009)

Landscape capacity for wind

-  Low
-  Low-moderate
-  Moderate
-  Moderate-high
-  Urban

Map of sensitive bird areas in relation onshore wind farms in England

-  High
-  Medium



Source: Natural England, RSPB, Cumbria County Council

Date: 26/07/2011
Revision: A



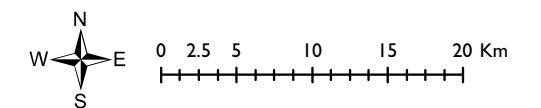
The Windfarm Sensitivity Map for England is reproduced with the permission of RSPB. © Crown Copyright. Ordnance Survey licence number 100021787 ([2011]) © Natural England [2010], reproduced with the permission of Natural England, <http://www.naturalengland.org.uk/copyright/>. © Crown Copyright and database right [2011]. Ordnance Survey licence number 100022021."

Cumbria Renewable Energy Capacity and Deployment Study

Map 5: Constraints for commercial-scale wind (excluding nature conservation and cultural heritage constraints)
Based on large turbines

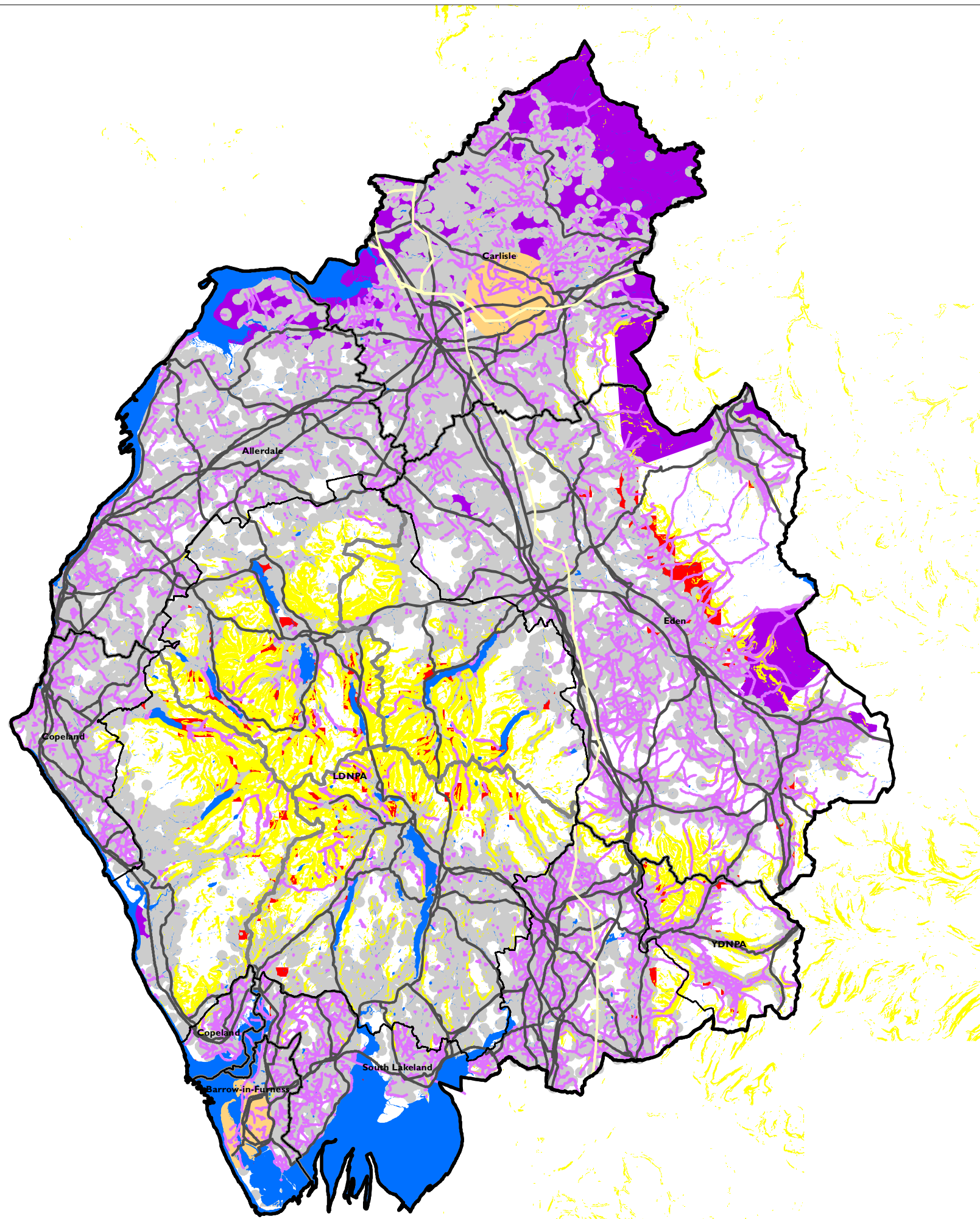
Key

-  Local Planning Authorities
-  Cumbria County Council
-  Local Authority boundaries
-  Roads and railways with topple distance
-  Transmission lines with topple distance
-  PROW with topple distance
-  Waterbodies and rivers
-  Slopes above 15 degrees
-  Property buffers
-  CAA airports with 5km buffer
-  MOD constraints
-  Windspeeds below 5m/s



Source: Natural England, NOABL, Ordnance Survey, MOD, Cumbria CC, National Grid, CAA

Date: 26/07/2011
Revision: A

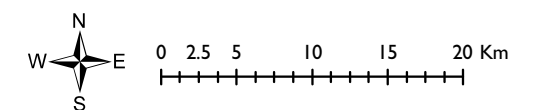


Cumbria Renewable Energy Capacity and Deployment Study

Map 6: Nature conservation and cultural heritage constraints for commercial-scale wind

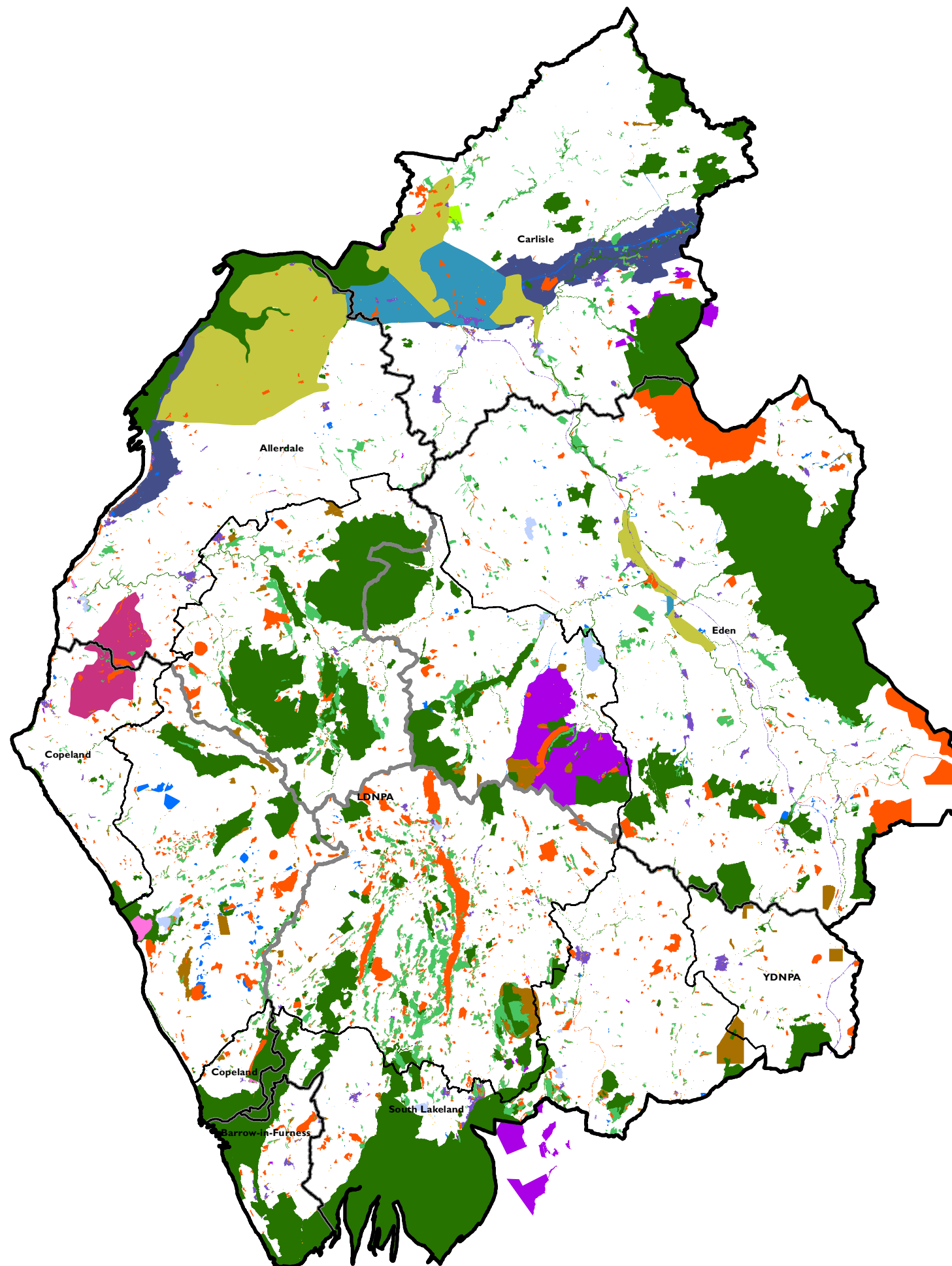
Key

-  Local Planning Authorities
-  Cumbria County Council
-  Local Authority boundaries
-  Ancient Woodland
-  Conservation Areas
-  County Wildlife Site
-  Flyway conductivity regions
-  Goose / swan sensitivity area
-  Hen harrier sensitivity area
-  Historic Parks and Gardens
-  Listed Buildings
-  Local Nature Reserves
-  Int'l and national nature designations
-  RIGGS
-  RSPB, WT, CWT Reserves
-  Registered Battlefields
-  Scheduled Ancient Monuments
-  World Heritage Sites (and buffer zone)



Source: Natural England, RSPB, English Heritage, CWT

Date: 26/07/2011
Revision: A

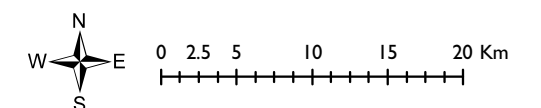


Cumbria Renewable Energy Capacity and Deployment Study

Map 7: Results of the technical assessment for commercial-scale wind

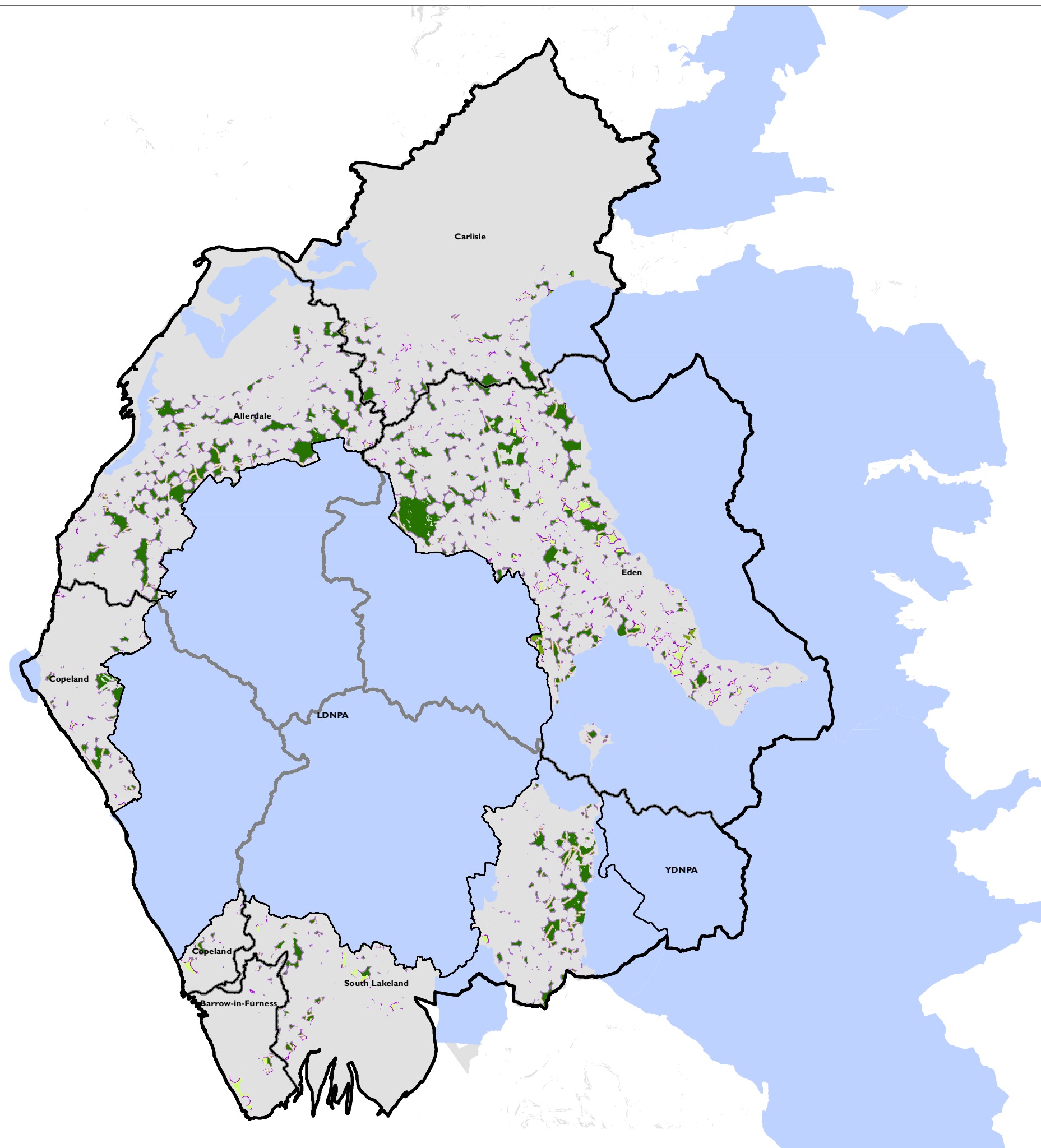
Key

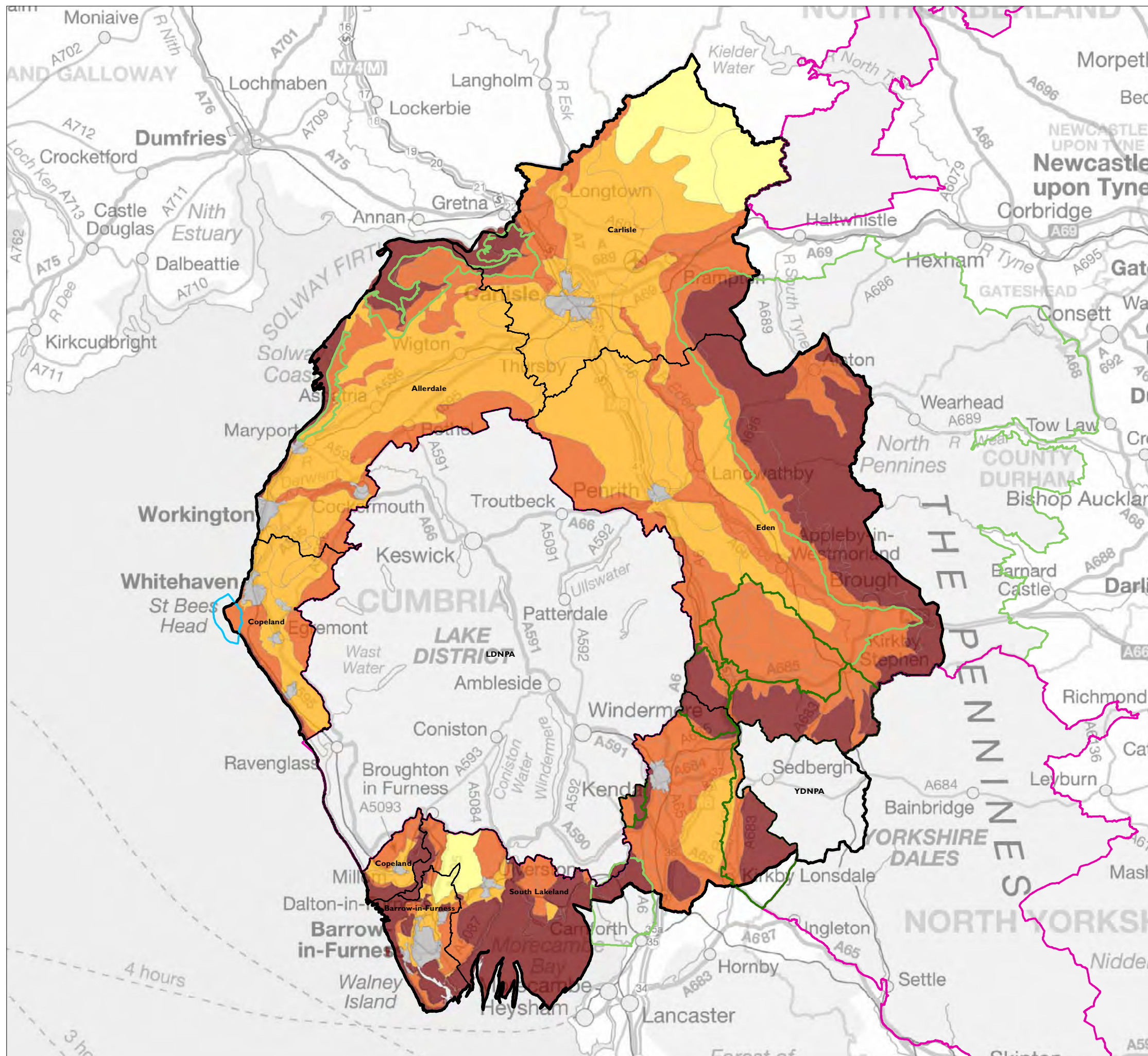
-  Cumbria County Council
-  Local Planning Authorities
-  Local Authority boundaries
-  Protected landscapes (and potential extensions)
- Results of commercial-scale wind assessment**
- Large turbines (2.5MW)**
 -  4 turbines/sq km
 -  2 turbines/sq km
 -  1 turbine/sq km
- Medium turbines (1MW)**
 -  10 turbines/sq km
 -  5 turbines/sq km
 -  2.5 turbines/sq km
- Small turbines (0.5MW)**
 -  20 turbines/sq km
 -  10 turbines/sq km
 -  5 turbines/sq km
-  Commercial-scale wind constraints



Source: Natural England, NOABL, Ordnance Survey, MOD, NATS/NERL, Cumbria CC, National Grid, CAA, English Heritage

Date: 26/07/2011
Revision: C





Cumbria Renewable and Low Carbon Energy Capacity and Deployment Study: Scoping

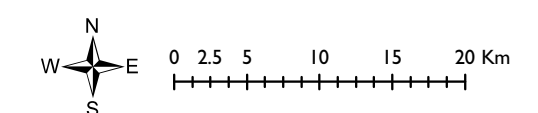
Map 8: Landscape Character Type capacity

Key

- Cumbria County Council
- Local Planning Authorities
- Areas of Outstanding Natural Beauty
- National Parks
- Boundary extensions
- Heritage Coast

LCT capacity

- Low
- Low-moderate
- Moderate
- Moderate-high
- Urban



Source: Natural England, Ordnance Survey, Cumbria CC

Date: 26/07/2011
Revision: B



Cumbria Renewable Energy Capacity and Deployment Study

Map 9: Results of the technical assessment for commercial-scale wind incorporating landscape capacity

Key

-  Cumbria County Council
-  Local Planning Authorities

Results of commercial-scale wind assessment

Large turbines (2.5MW)

-  4 turbines/sq km
-  3 turbine/sq km
-  2 turbines/sq km
-  1 turbine/sq km

Medium turbines (1MW)

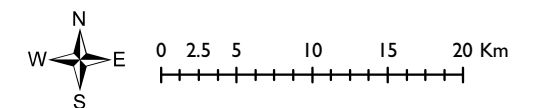
-  10 turbines/sq km
-  7.5 turbines/sq km
-  5 turbines/sq km
-  2.5 turbines/sq km

Small turbines (0.5MW)

-  20 turbines/sq km
-  10 turbines/sq km
-  5 turbines/sq km

 Protected landscapes (and potential extensions)

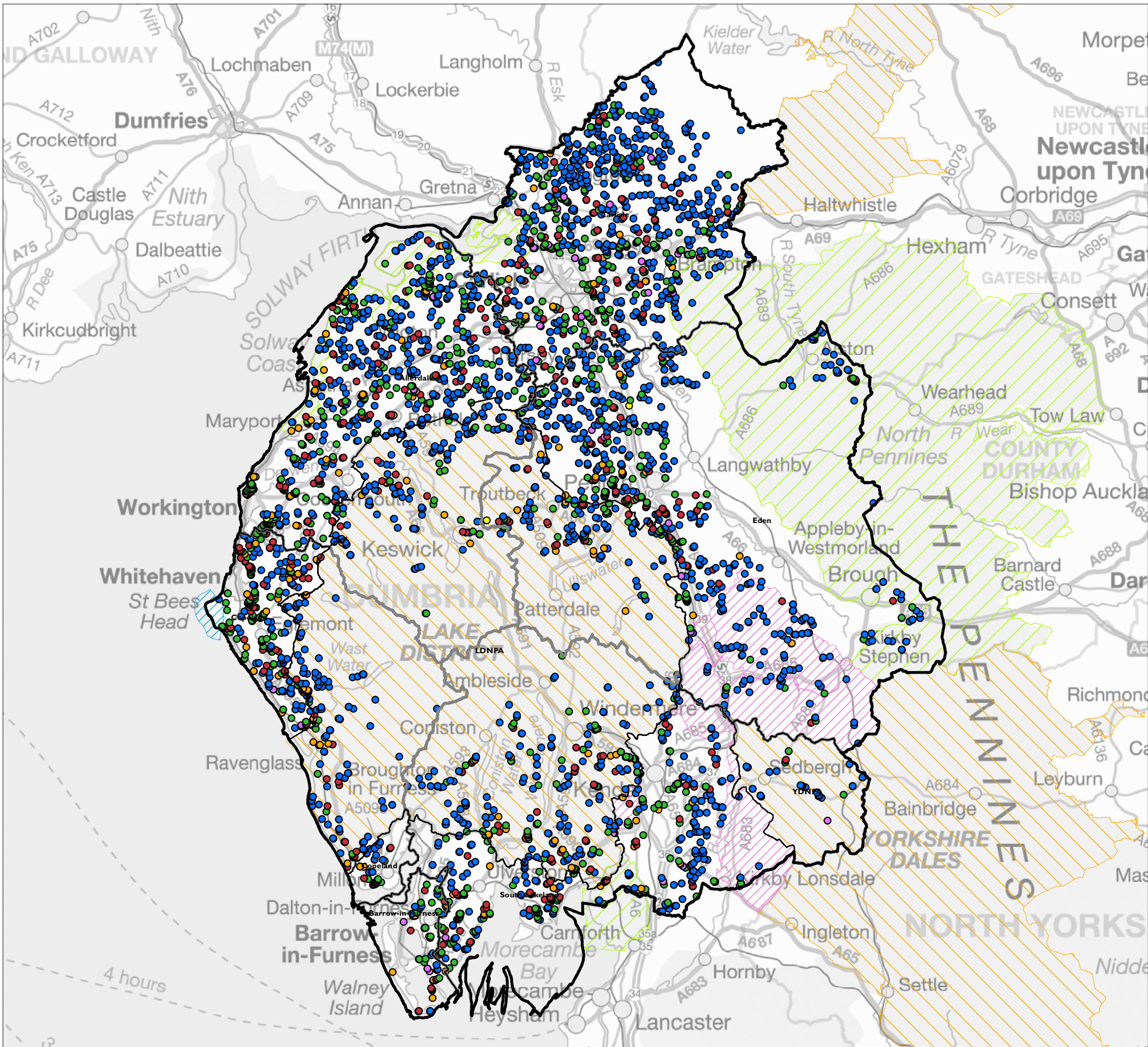
 Commercial-scale wind constraints



Source: Natural England, NOABL, Ordnance Survey, MOD, NATS/NERL, Cumbria CC, National Grid, CAA, English Heritage

Date: 26/07/2011
Revision: A





Cumbria Renewable Energy Capacity and Deployment Study

Map 10: Results of the technical assessment for small-scale wind

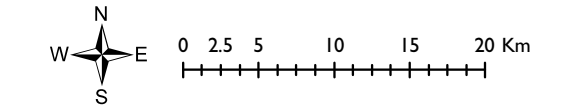
Key

- Cumbria County Council
- Local Planning Authorities
- Local Authority boundaries
- Heritage Coast
- Potential extensions to protected landscapes (Consultation boundary 2009)
- National Parks
- Areas of Outstanding Natural Beauty

Properties assessed as having potential

Type of property

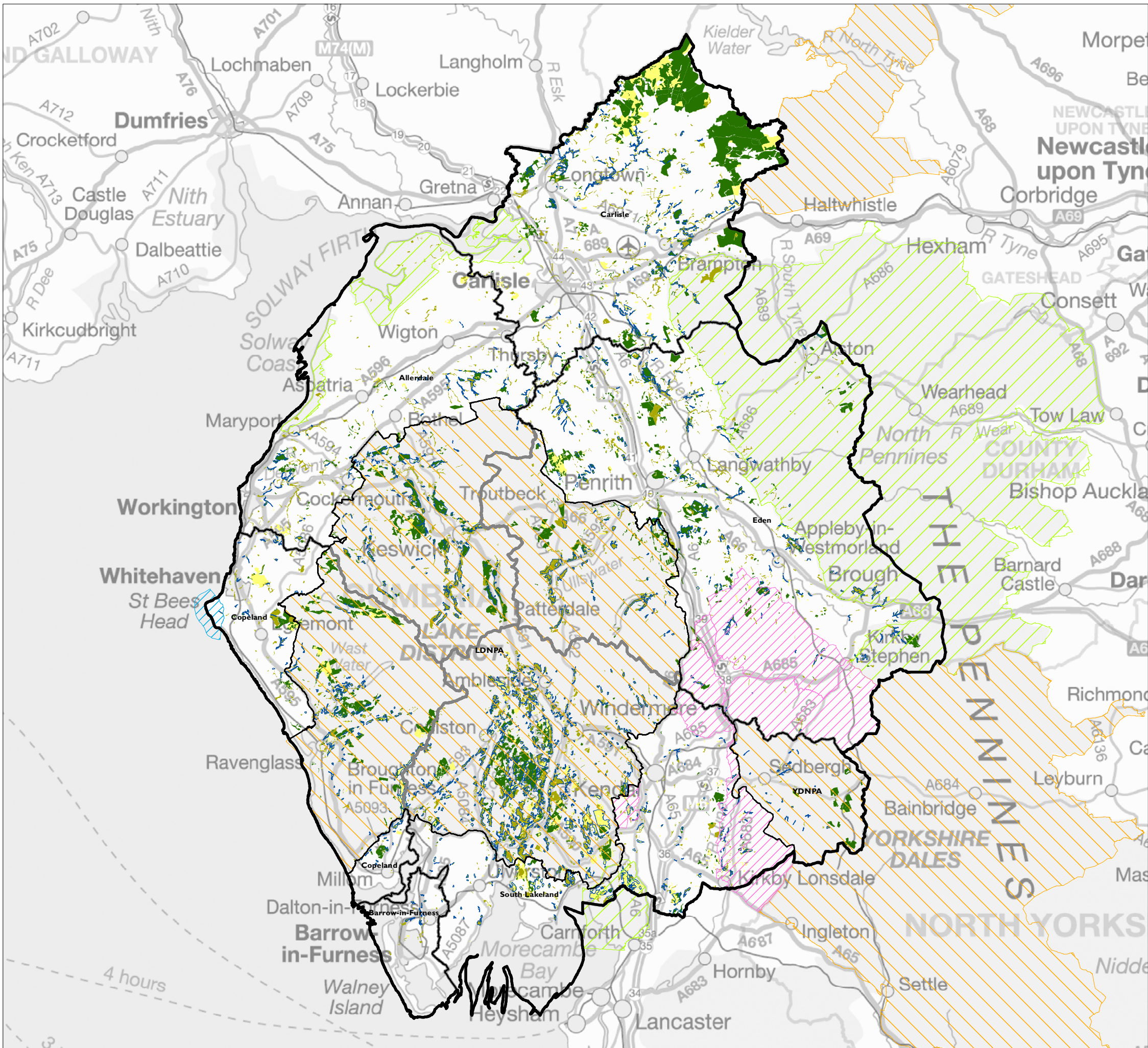
- Community
- Tourism
- Government offices
- Commercial
- Industrial
- Residential



Source: Ordnance Survey, Natural England

Date: 26/07/2011
Revision: A





Cumbria Renewable Energy Capacity and Deployment Study

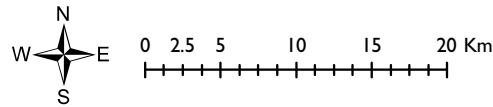
Map 11: Woodland included in the assessment by type

Key

- Cumbria County Council
- Local Planning Authorities
- Local Authority boundaries
- Heritage Coast
- National Parks
- Areas of Outstanding Natural Beauty
- Potential extensions to protected landscapes (Consultation boundary 2009)
- Ancient Woodland

Woodland type

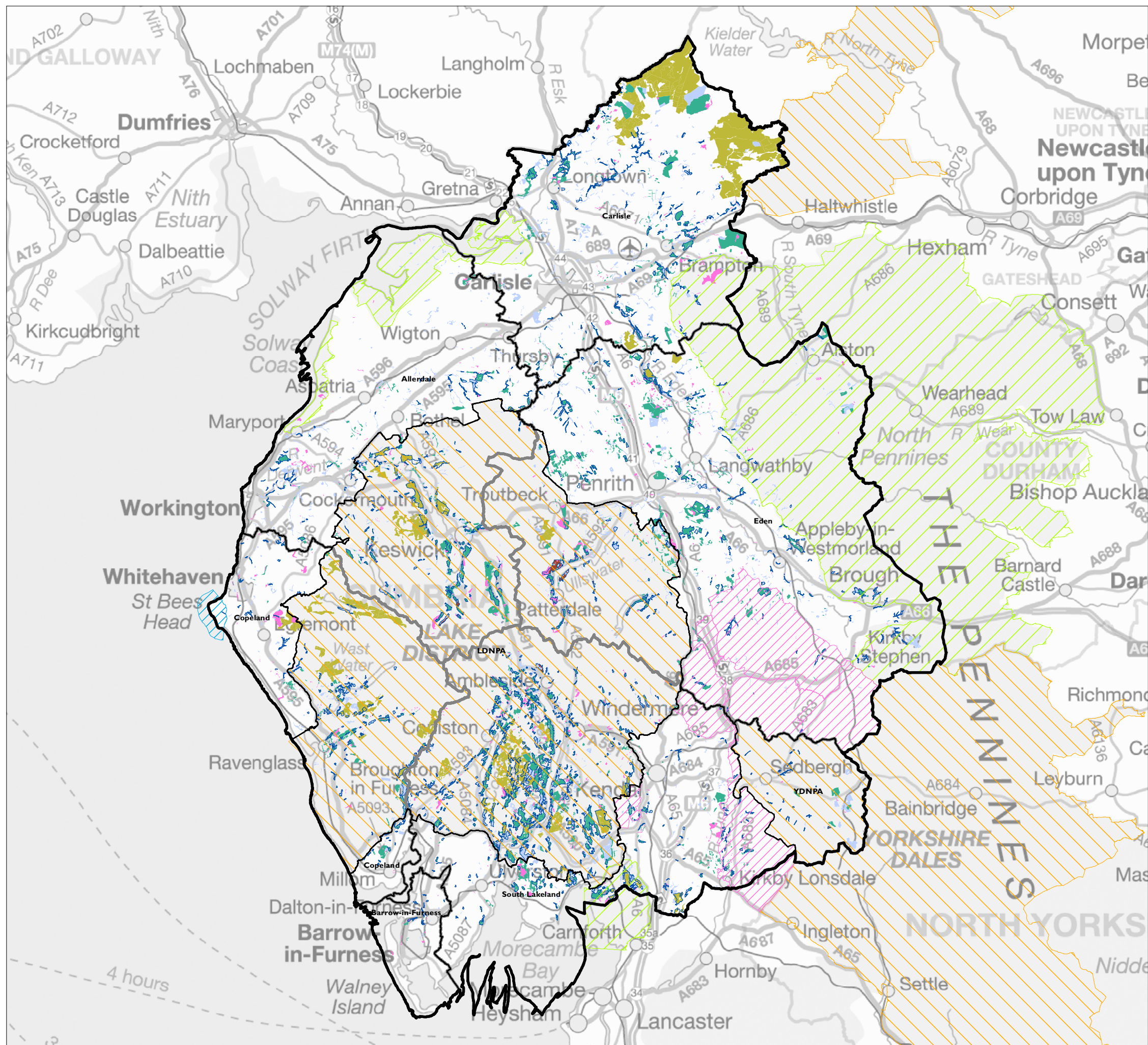
- Broadleaved
- Coniferous
- Mixed



Source: Ordnance Survey, Natural England, Forestry Commission

Date: 26/07/2011
Revision: A



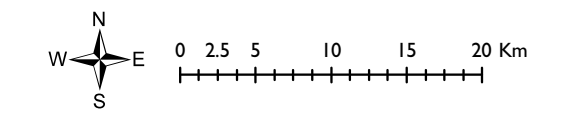


Cumbria Renewable Energy Capacity and Deployment Study

Map 12: Woodland included in the assessment by management

Key

- | | |
|---|---|
|  | Local Planning Authorities |
|  | Cumbria County Council |
|  | Local Authority boundaries |
|  | Heritage Coast |
|  | National Parks |
|  | Areas of Outstanding Natural Beauty |
|  | Potential extensions to protected landscapes (Consultation boundary 2009) |
|  | Ancient Woodland |
| Management | |
|  | FC managed |
|  | Non-FC managed woodland |
|  | Grants and Licencing Activity |
|  | Undermanaged |
|  | Ancient Woodland - assume unmanaged |



Source: Ordnance Survey, Natural England, Forestry Commission

Date: 26/07/2011
Revision: A



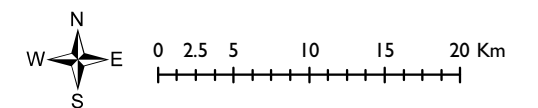
Cumbria Renewable Energy Capacity and Deployment Study

Map 13: Energy crop mapped constraints

Key

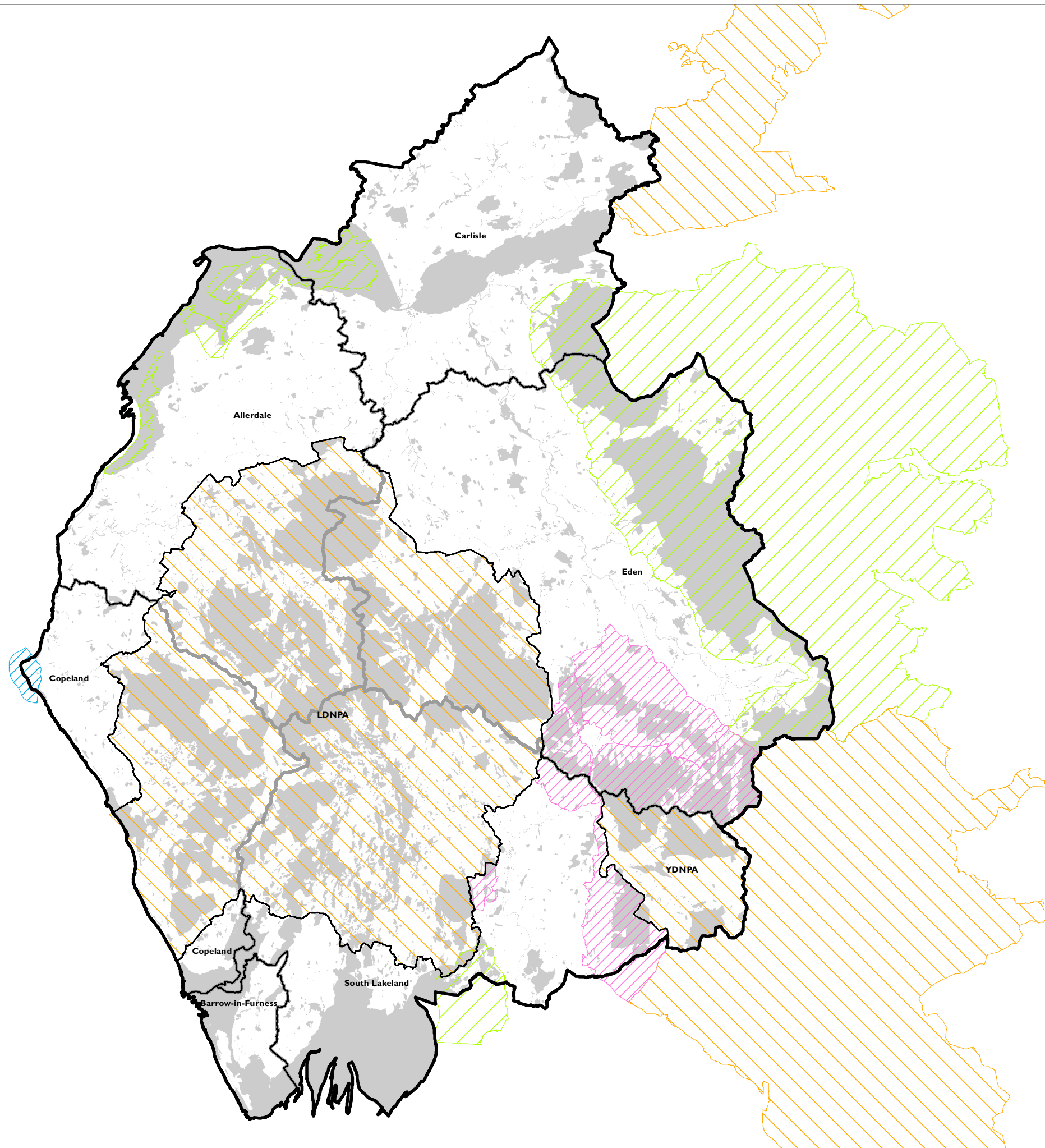
-  Local Planning Authorities
-  Cumbria County Council
-  Local Authority boundaries
-  Heritage Coast
-  National Parks
-  Areas of Outstanding Natural Beauty
-  Potential extensions to protected landscapes (Consultation boundary 2009)
-  Energy crop constraints (36% county)

Please note: It was not possible to obtain mapped data for all opportunities and constraints considered in this assessment.



Source: Ordnance Survey, Natural England, English Heritage, Natural England

Date: 26/07/2011
Revision: A



Cumbria Renewable Energy Capacity and Deployment Study

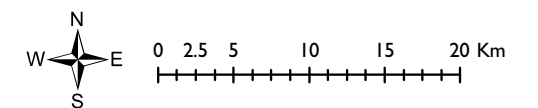
Map 14: Small-scale hydropower opportunities

Key

-  Local Planning Authorities
-  Cumbria County Council
-  Local Authority boundaries
-  Heritage Coast
-  Potential extensions to protected landscapes (Consultation boundary 2009)
-  National Parks
-  Areas of Outstanding Natural Beauty
-  Rivers
-  Sites identified in YDNP study
-  Sites identified in LDNP study

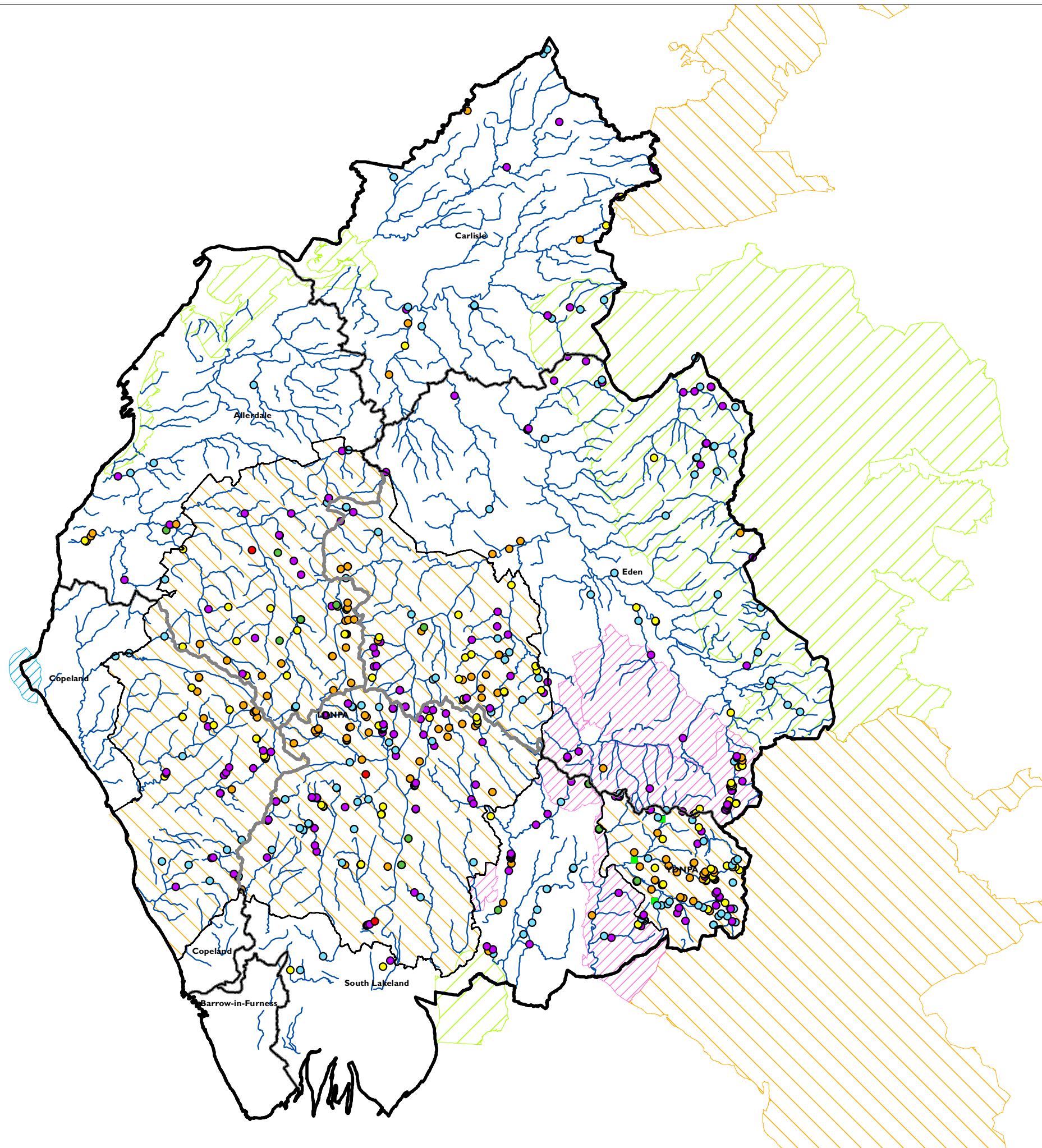
EA win-wins

-  10 - 20 kW
-  20 - 50 kW
-  50 - 100 kW
-  100 - 500 kW
-  500 - 1500 kW
-  > 1500 kW



Source: Ordnance Survey, Environment Agency, Cumbria CC

Date: 26/07/2011
Revision: A

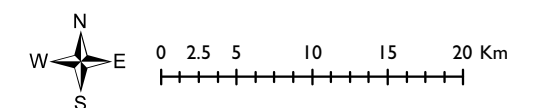
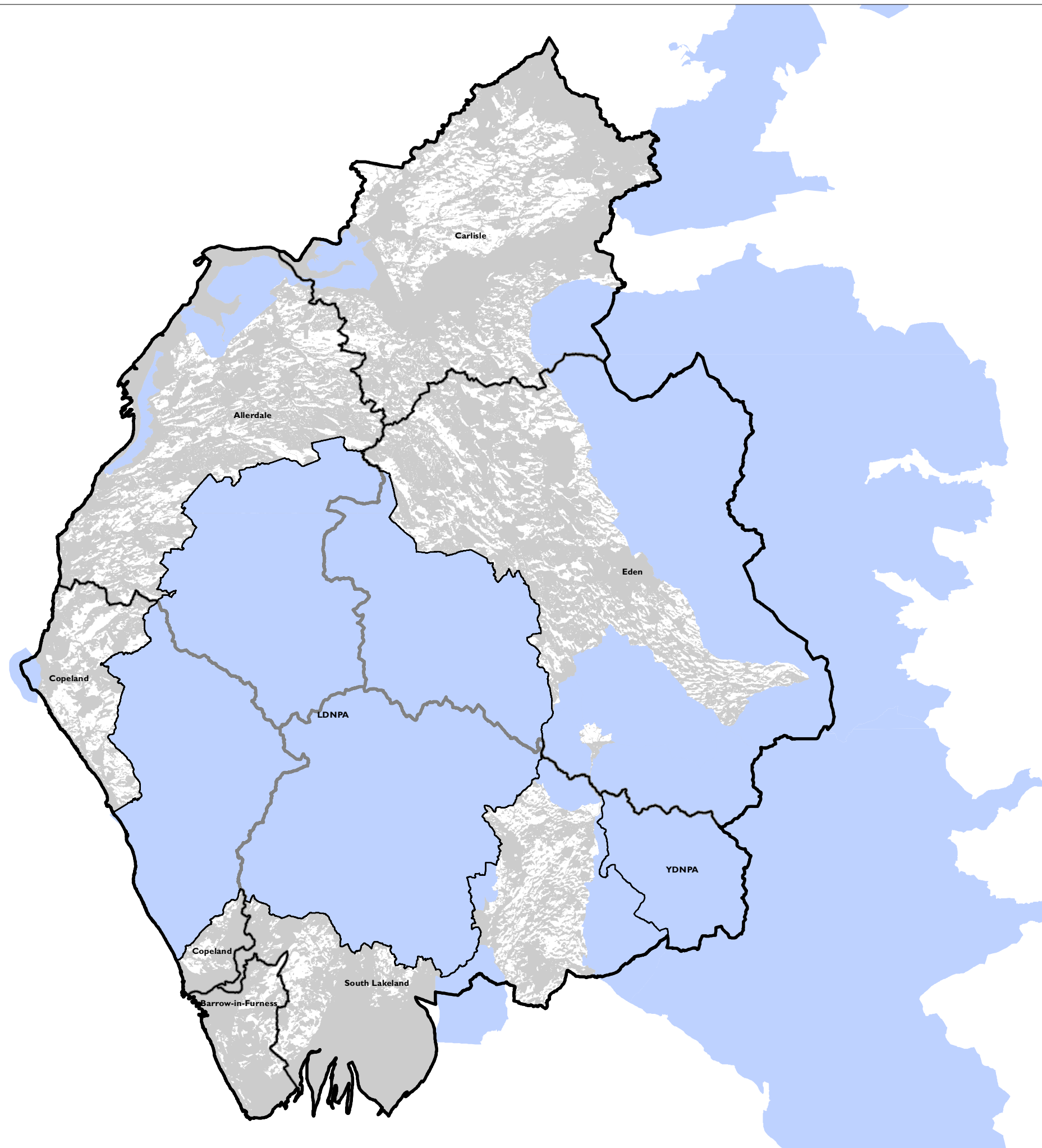


Cumbria Renewable Energy Capacity and Deployment Study

Map 15: Mapped constraints for solar farms

Key

-  Cumbria County Council
-  Local Planning Authorities
-  Local Authority boundaries
-  Protected landscapes and extensions
-  Mapped constraints for solar farms



Source: Various - to be completed

Date: 26/07/2011
Revision: A



Cumbria Renewable and Low Carbon Energy Capacity and Deployment Study

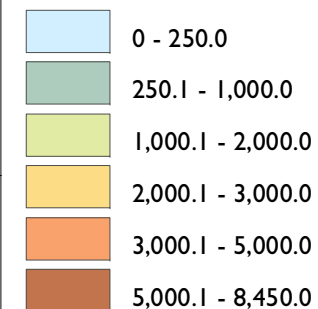
Map 16: Total domestic and non-domestic heat density

Key

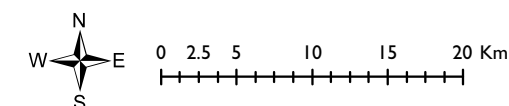
-  Cumbria County Council
-  Cumbria Local Authority boundaries
-  National Parks
-  Areas of Outstanding Natural Beauty
-  Potential extensions to protected landscapes (Consultation boundary 2009)
-  Heritage Coast

Total heat density (by MLSOA)

Heat demand (kW)/square km



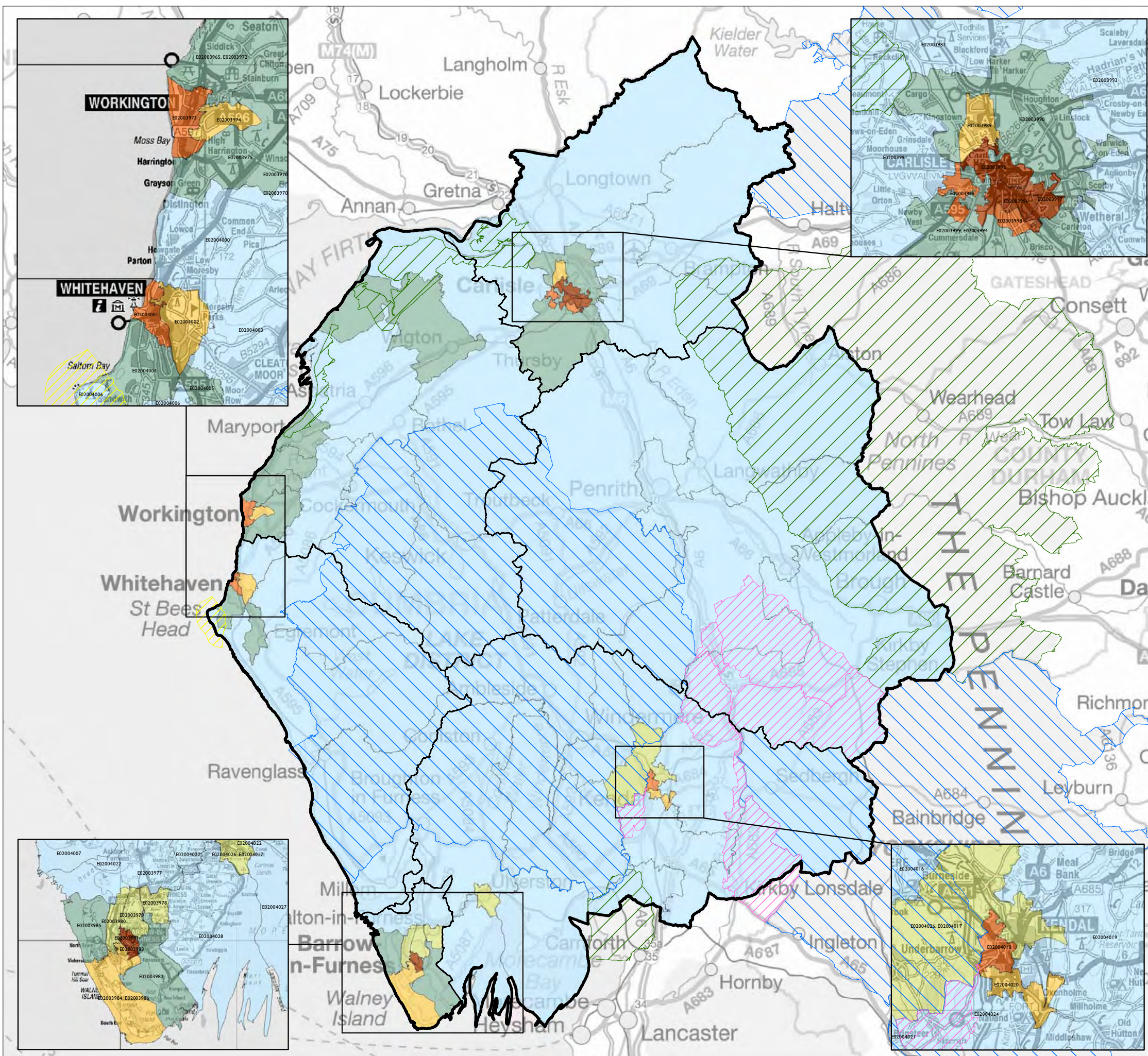
Please note that some MLSOA have had to be aggregated to reflect the DECC consumption statistics



Source: DECC Middle Layer Super Output Area (MSOA) domestic and non-domestic gas estimates 2008, Natural England

Date: 26/07/2011

Revision:



Cumbria Renewable and Low Carbon Energy Capacity and Deployment Study

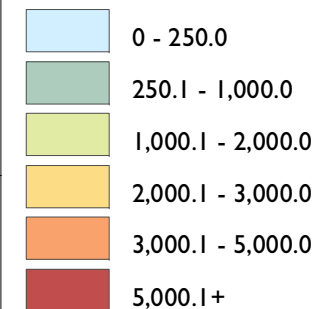
Map 17: Domestic heat density

Key

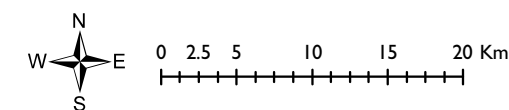
- Cumbria County Council
- Cumbria Local Authority boundaries
- National Parks
- Areas of Outstanding Natural Beauty
- Potential extensions to protected landscapes (Consultation boundary 2009)
- Heritage Coast

Domestic heat density (by MLSOA)

Heat demand (kW)/square km

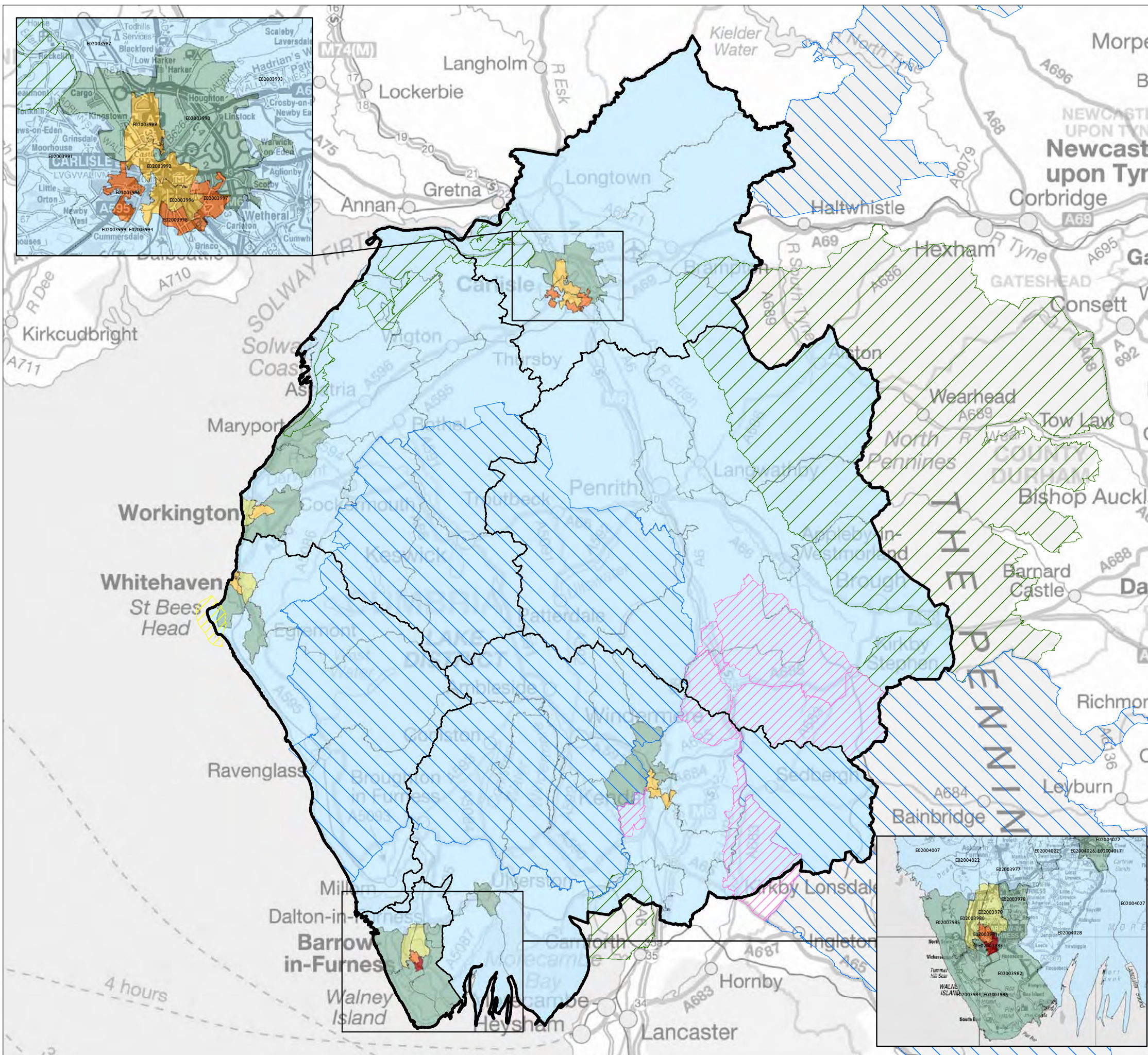


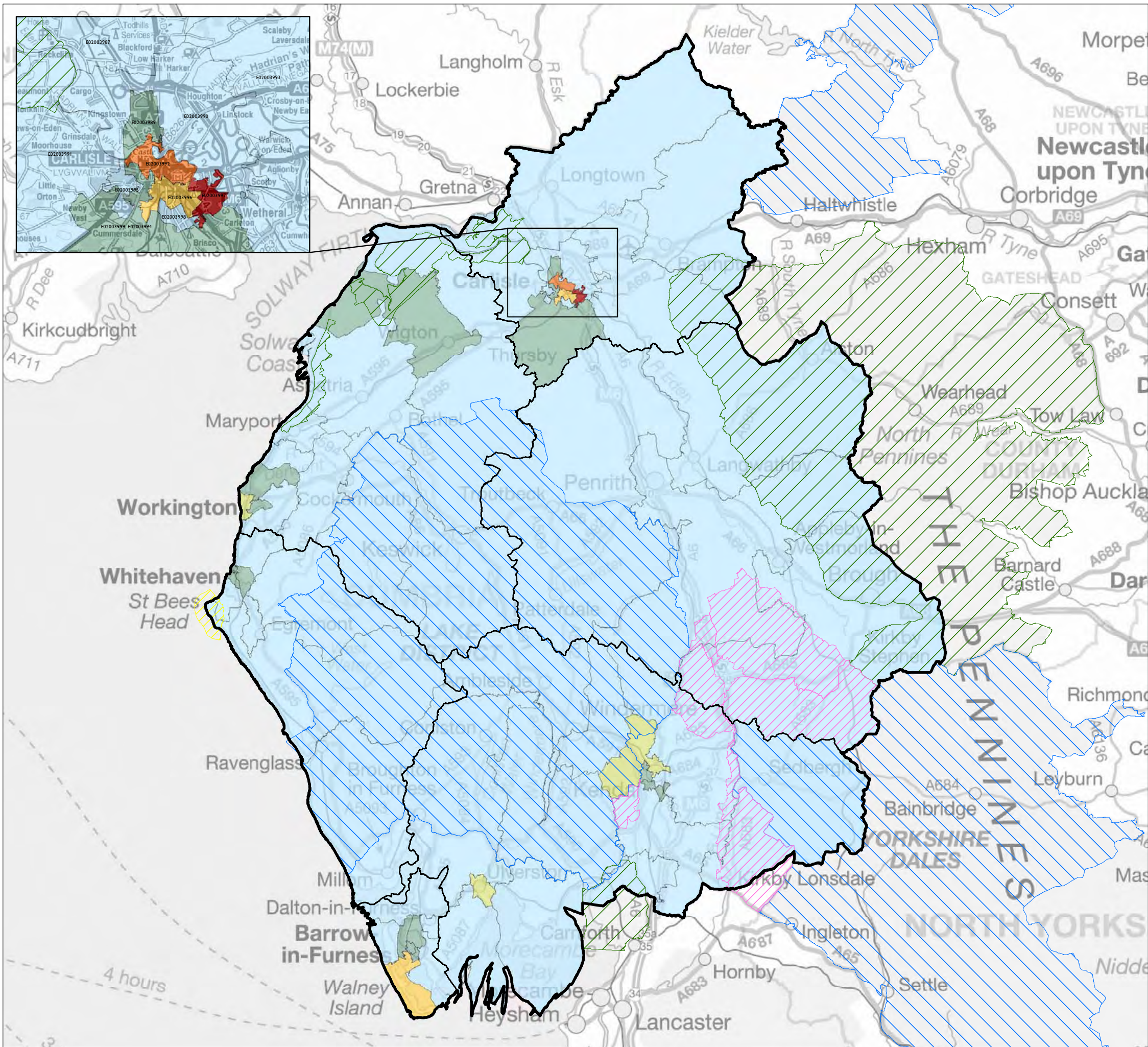
Please note that some MLSOA have had to be aggregated to reflect the DECC consumption statistics



Source: DECC Middle Layer Super Output Area (MLSOA) domestic gas estimates 2008, Natural England

Date: 26/07/2011
Revision:





Cumbria Renewable and Low Carbon Energy Capacity and Deployment Study

Map 18: Non-domestic heat density

Key

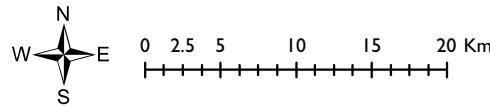
- Cumbria County Council
- Cumbria Local Authority boundaries
- National Parks
- Areas of Outstanding Natural Beauty
- Potential extensions to protected landscapes (Consultation boundary 2009)
- Heritage Coast

Domestic heat density (by MLSOA)

Heat demand (kW)/square km

- 0.0 - 250.0
- 250.1 - 1,000.0
- 1,000.1 - 2,000.0
- 2,000.1 - 3,000.0
- 3,000.1 - 5,000.0
- 5,000.1+

Please note that some MLSOA have had to be aggregated to reflect the DECC consumption statistics



Source: DECC Middle Layer Super Output Area (MLSOA) non-domestic gas estimates 2008, Natural England

Date: 26/07/2011
Revision:

