

Radon in Dwellings in Northern Ireland: 2009 Review and Atlas



The Fourth Radon in Dwellings Report

Martyn Green

HPA

Radiation Protection Division

25th November 2009



Radon in Dwellings in Northern Ireland

A report for the Northern Ireland Environment Agency



HPA-RPA-061

Radon in dwellings in Northern
Ireland: 2009 review and Atlas

B M R Green, R Larmour,
JCH Miles, D M Rees and
F K Ledgerwood

Radon detectors



Original yellow detector

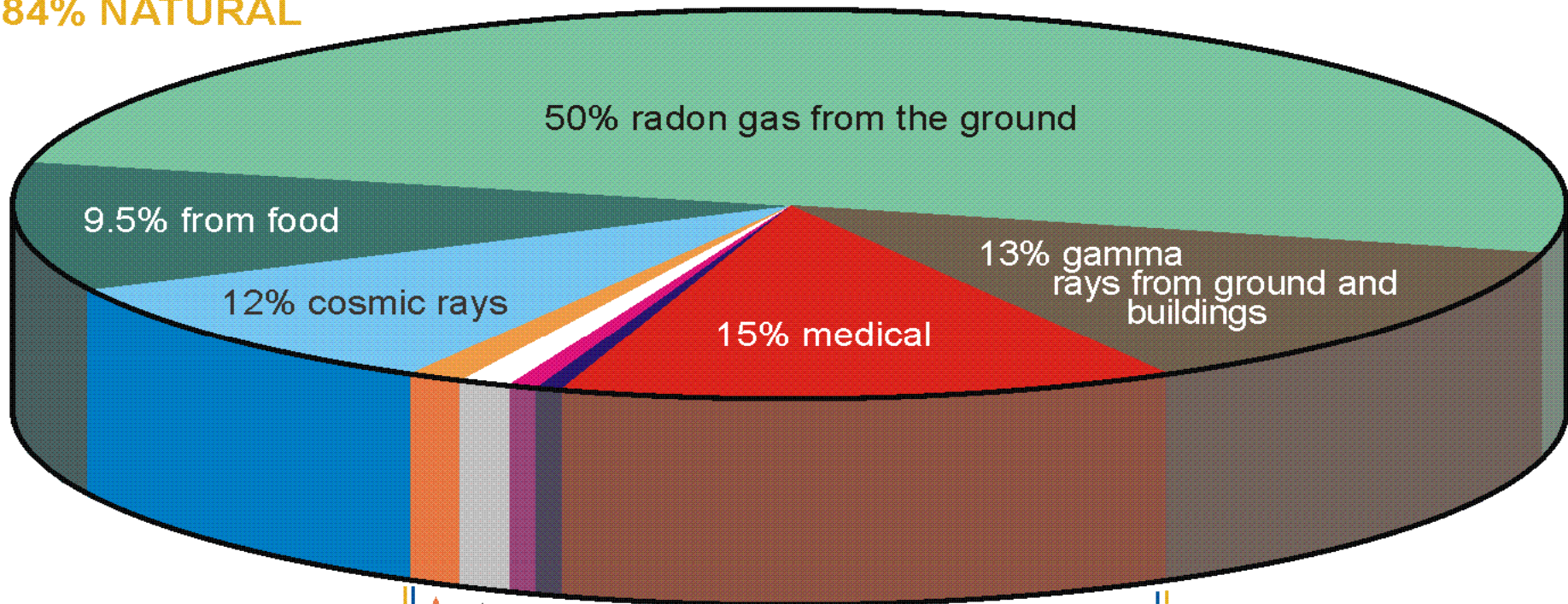


New black detector

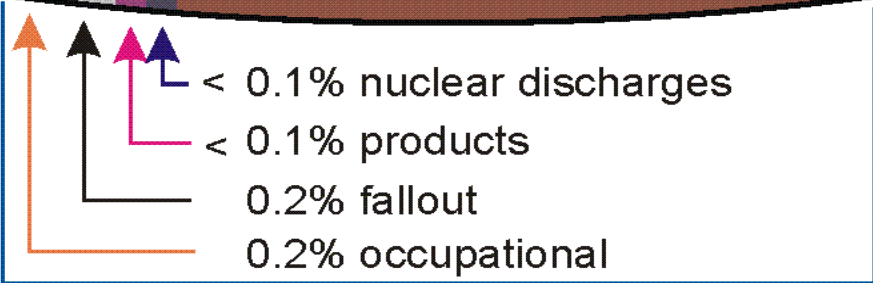
Average dose for all sources



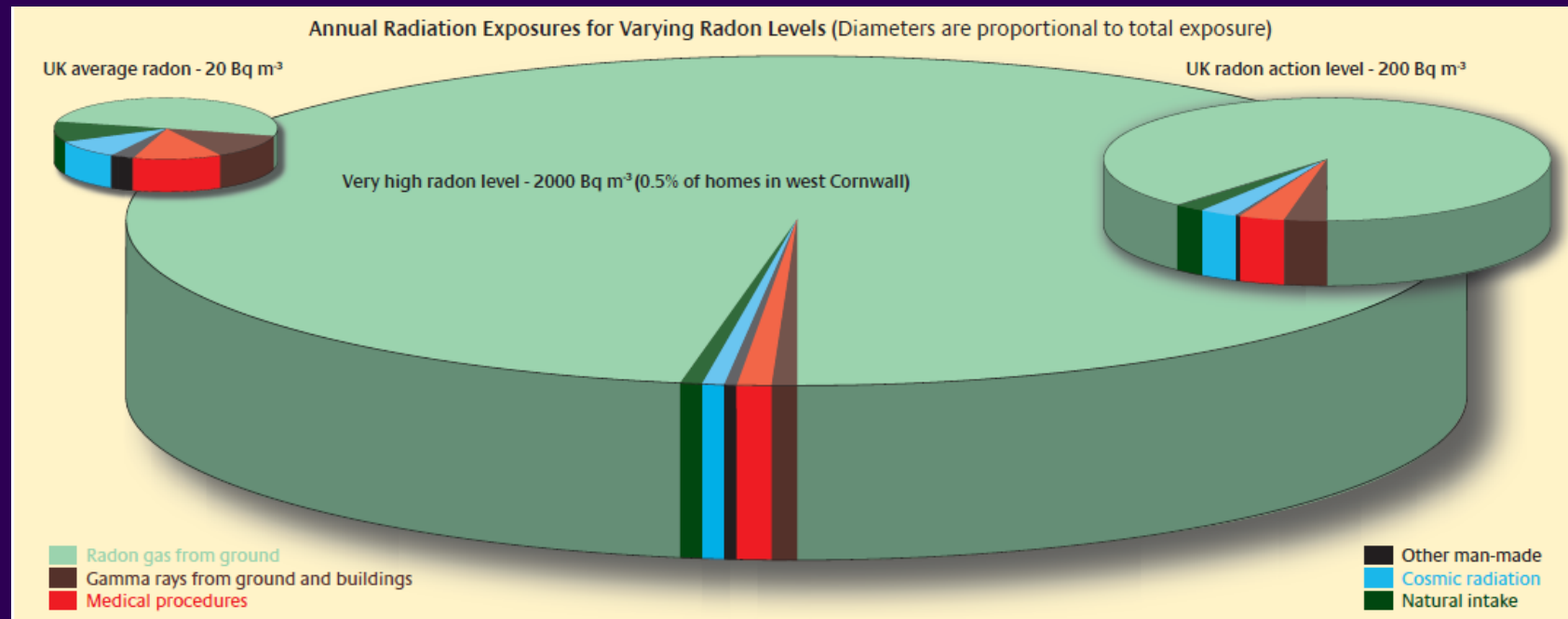
84% NATURAL



16% ARTIFICIAL



Variation in radon exposures



- Radon levels cover a very wide range
- This presents a significant problem for some householders and employers in Northern Ireland

Overall results summary



Dwellings

Results Bq m⁻³

Total

Measured

Arithmetic
average

Geometric
average

751,000

24,000

70

46

Population weighted average

19 Bq m⁻³

Highest level found

4,900 Bq m⁻³

Number found at or above the Action Level

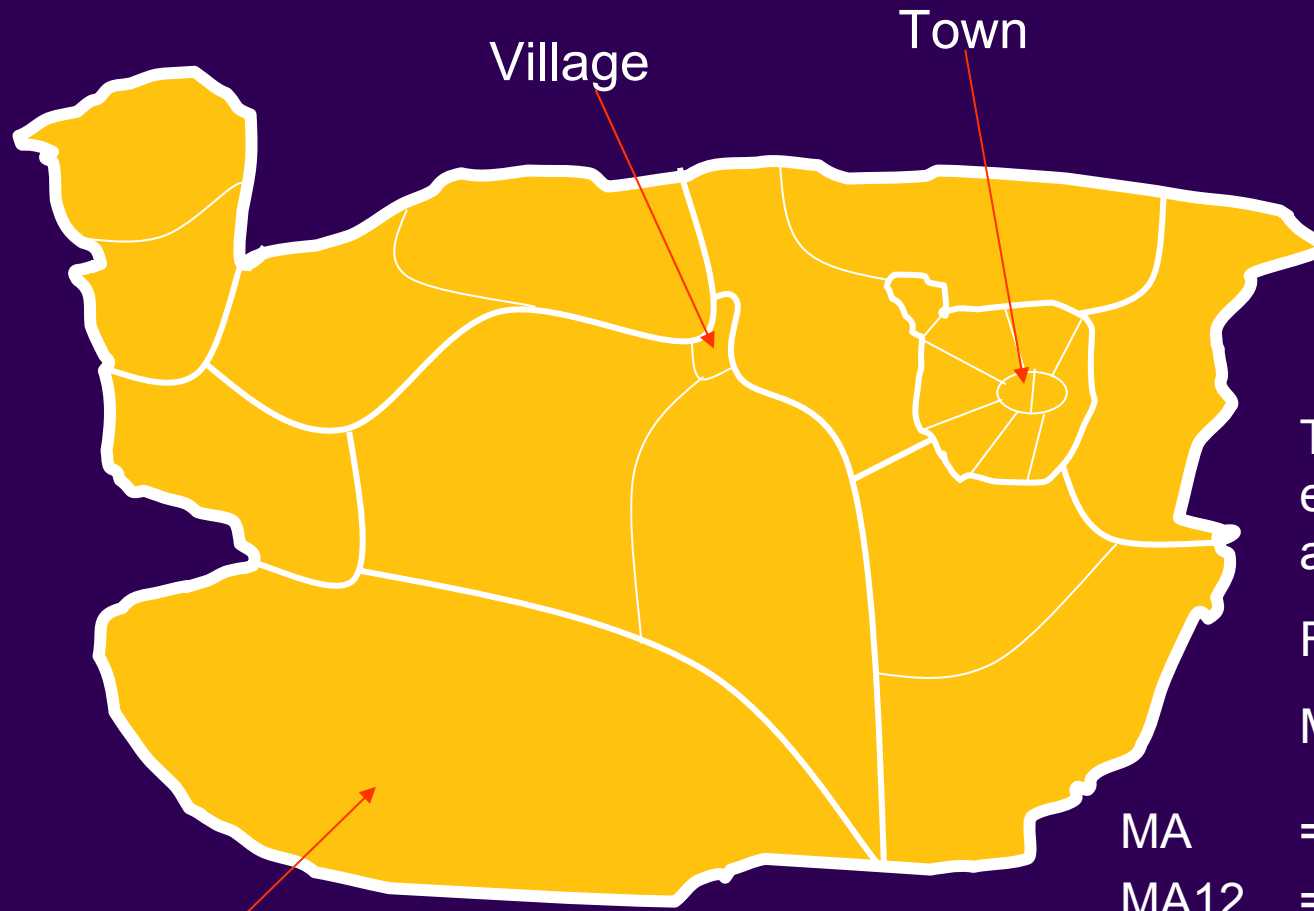
1,200

Data for selected Local Authorities (table C2)



	Belfast	Derry	Fermanagh	Newry & Mourne
Total dwellings	129,000	40,700	20,600	36,400
Measured dwellings	36	2,000	1,200	7,300
Arithmetic average (Bq m ⁻³)	24	73	56	90
Geometric average (Bq m ⁻³)	19	48	33	63
Highest (Bq m ⁻³)	73	4,900	3,900	2,500
At or above Action Level	0	100	48	4590

Postcode hierarchy



The postcode is an eight character code and has three divisions.

For postcode (or walk)
MA12 4XZ

- MA = postcode Area
- MA12 = postcode District
- MA12 4 = postcode Sector

Sparsely populated region

Postcode hierarchy



	Name	No. of dwellings	No. of non-dwellings	No. of large users
BT	Postcode Area	750,771	35,884	2,489
BT1	Postcode District	1,195	1,384	322
BT74		7,257	599	52
BT1 1	Postcode Sector	107	355	59
BT74 4		2,671	212	8
BT1 1AA	Full postcode or postcode walk	0	0	1
BT74 4RD		20	0	0

BT1 1AA is Royal Mail, Donegall Quay, Belfast

BT74 4RD is a residential road, Underwood Park, in Enniskillen

Data by postcode district and sector



- Tables C3 and C4 show the data by divisions of the postcode.
- Postcode District (e.g. BT74) in table C3.
- Postcode Sector (e.g. BT74 4) in table C4.
- To preserve confidentiality and to avoid misleading averages, data are only given if more than 5 results.
- Data given are:-
 1. Total stock of dwellings and number measured
 2. Arithmetic and geometric mean (Bq m^{-3})
 3. Highest level found and number at or above the Action Level

Data by Health Board Area

(table C5)



Health Board area	Dwellings		Results (Bq m ⁻³)			Number at or above AL
	Total	Measured	Arithmetic average	Geometric average	Highest	
Eastern	300,000	6,000	55	39	1,600	160
Northern	191,000	1,600	39	26	2,000	22
Southern	137,000	8,900	82	56	2,500	620
Western	111,000	7,400	73	46	4,900	440

Predictive data (table C6)



- Estimated not measured
- Provided as an aid to planning for relevant authorities
- Shows number of homes in each band
- A total of 81,000 homes in Affected Areas
- Gives an estimated range of the homes at or above AL
- Lower value based on lower threshold of each band
- Higher value based on calculated percentage
- Between 2,400 and 4,400 homes above the AL

Extract from table C6



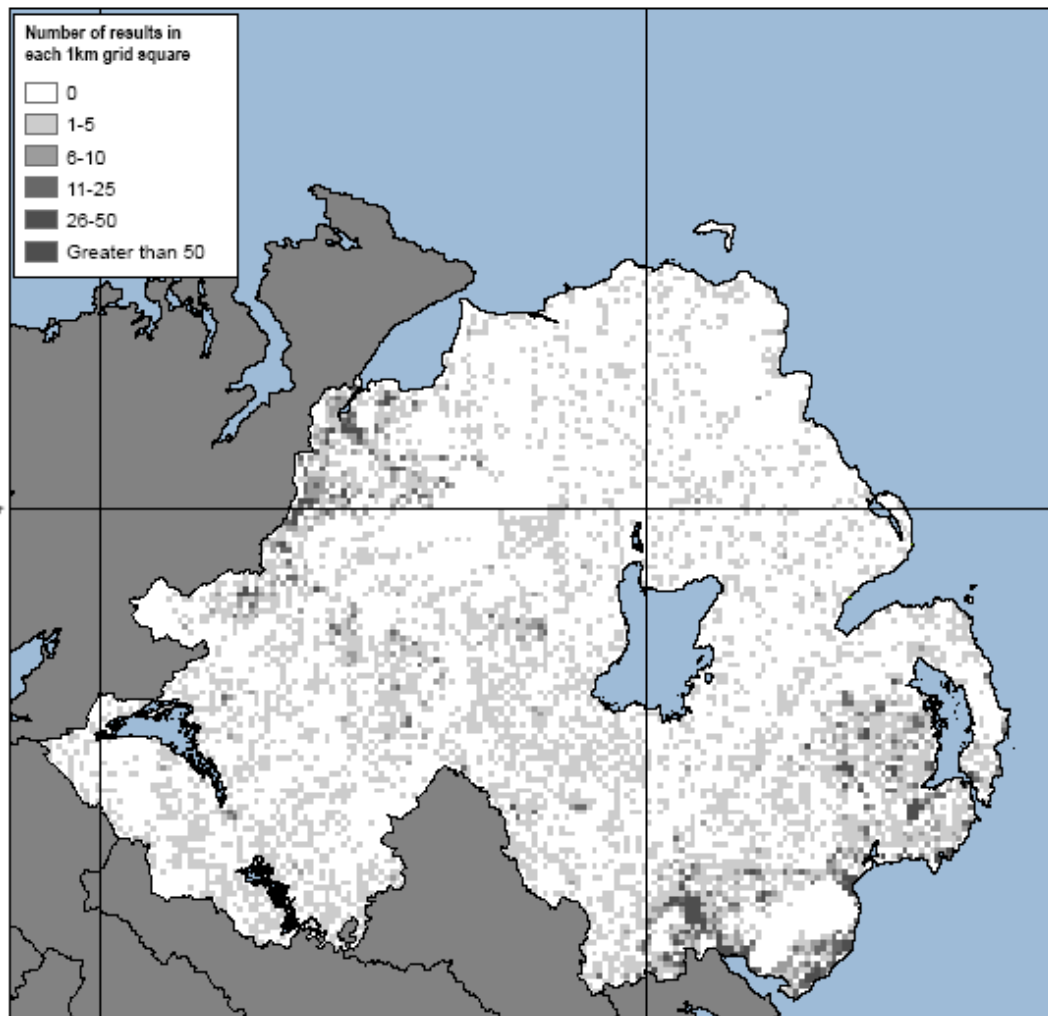
Area	Number of dwellings in each probability band							All AAs	Expected Number =/>>AL
	Total	Less than 1%	1% - 2.9%	3% - 4.9%	5% - 9.9%	10% - 29.9%	More than 30%		
Belfast	129,000	129,000	0	0	0	0	0	0	0 - 50
Derry	40,700	29,300	7,700	1,200	2400	150	0	11,400	250 - 460
Fermanagh	20,600	15,500	2,500	1,500	860	220	0	5100	140 - 230
Newry & Mourne	36,400	14,800	6,200	6,200	6,700	2,100	300	21,600	890 - 1,300
Total for all N. I.	732,000	651,000	43,600	6,500	4,300	6,300	370	81,000	2,400 - 4400

Overall radon map



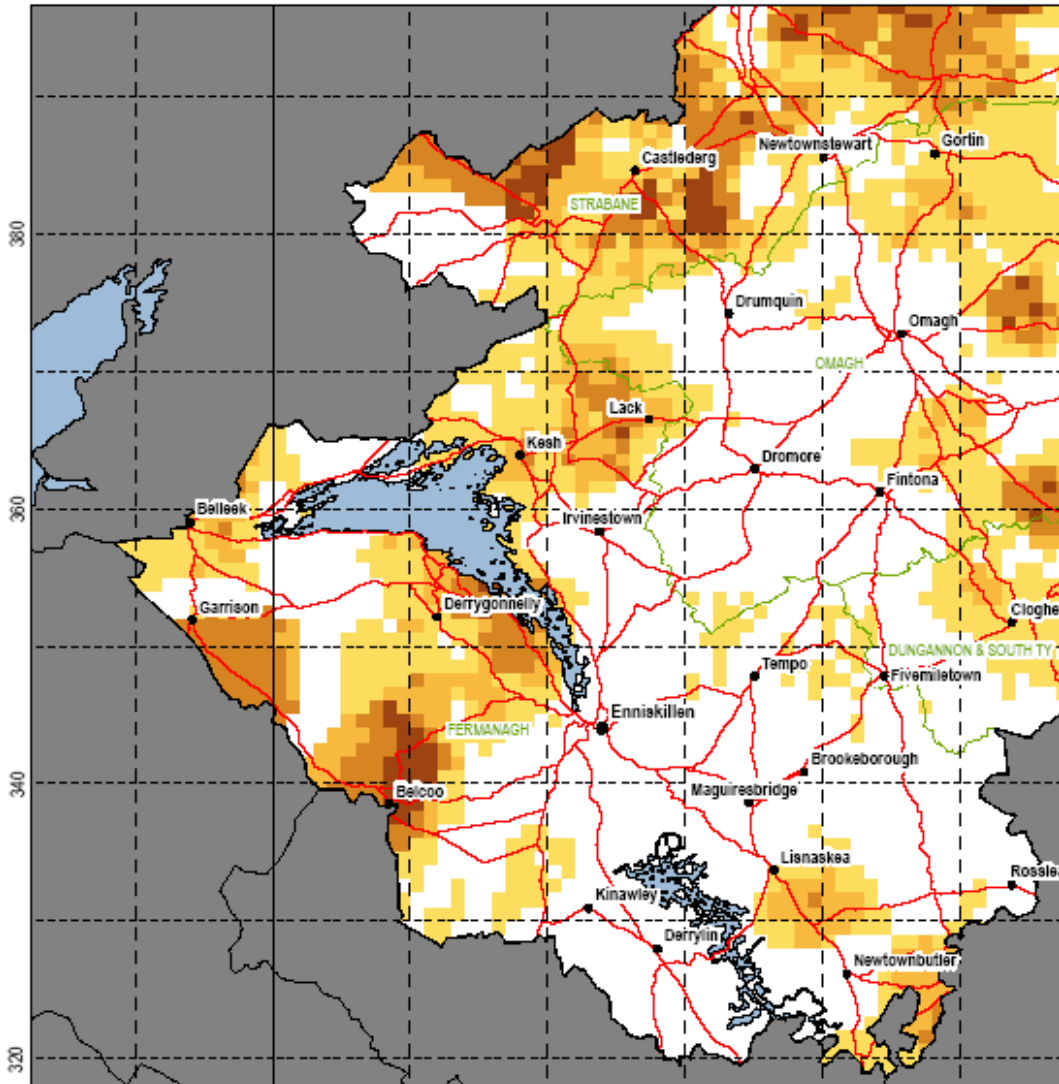
Overall radon
map of radon
Affected Areas in
Northern Ireland

Number of measurements



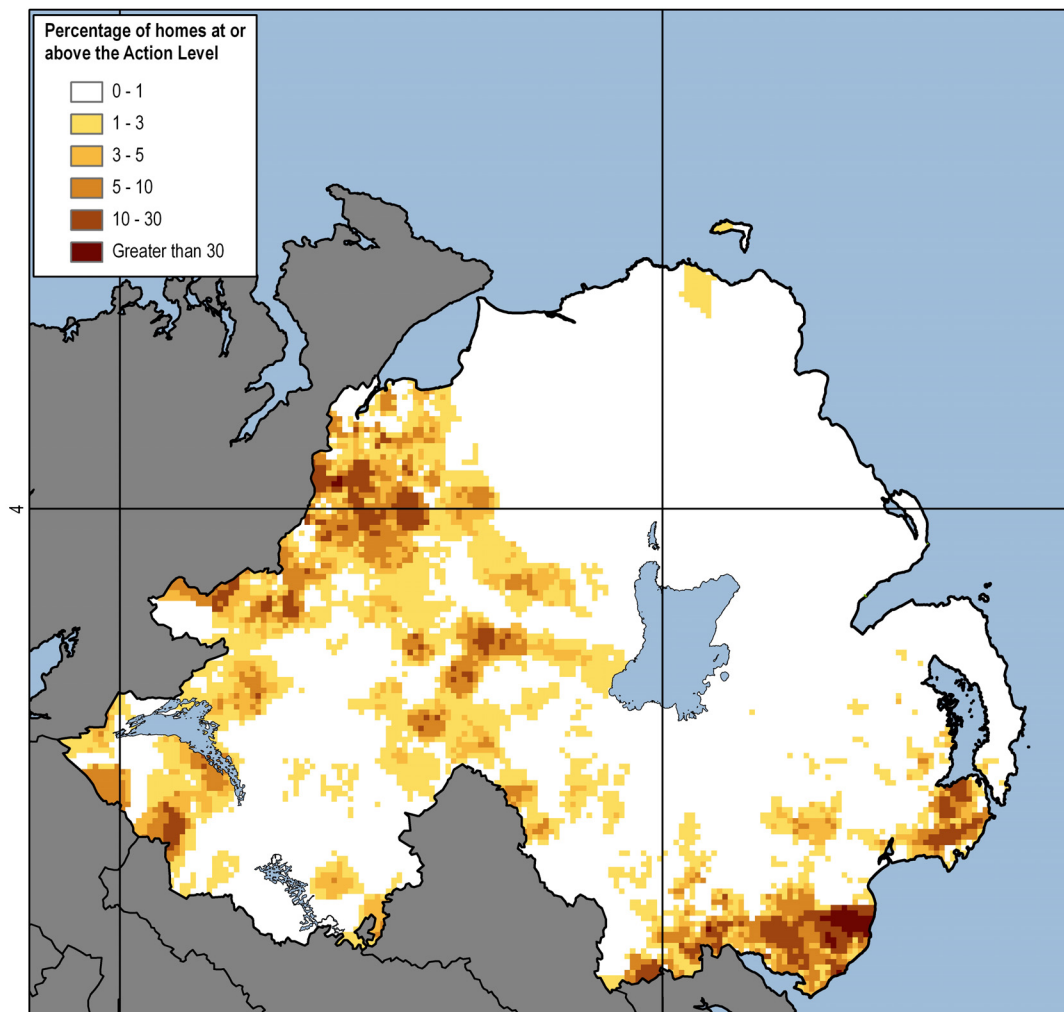
Number of results within each 1-km grid square in Northern Ireland

Example map (1 of 5)



Map of Southwest Northern Ireland, showing council boundaries, settlements and major roads

Overall radon map



Overall radon
map of radon
Affected Areas in
Northern Ireland



Radon in Dwellings in Northern Ireland

A report for the Northern Ireland Environment Agency



HPA-RPA-061

Radon in dwellings in Northern
Ireland: 2009 review and Atlas

B M R Green, R Larmour,
JCH Miles, D M Rees and
F K Ledgerwood