



Radiological Protection Institute of Ireland

An Institiúid Éireannach um Chosaint Raideolaíoch

Lessons learned from measuring 4,560 homes in Cork

**Radon Forum
24th November
Cork City**

**Stephanie Long
Senior scientist
Radon advice**

Overview

- Comparison of Cork Co Co data to RPII Cork data
- Brief summary of results
- Comparison of results to map predictions
- Examples of high radon homes in low risk areas
- Remediation effectiveness
- Examples of new homes that can have high radon concentrations



Radon in Cork – private housing

- 4,855 homes measured by RPII
- 12% above 200 Bq/m³
- Highest measurement 4,500 Bq/m³
- Equivalent radiation dose to receiving 15 chest X-rays/day



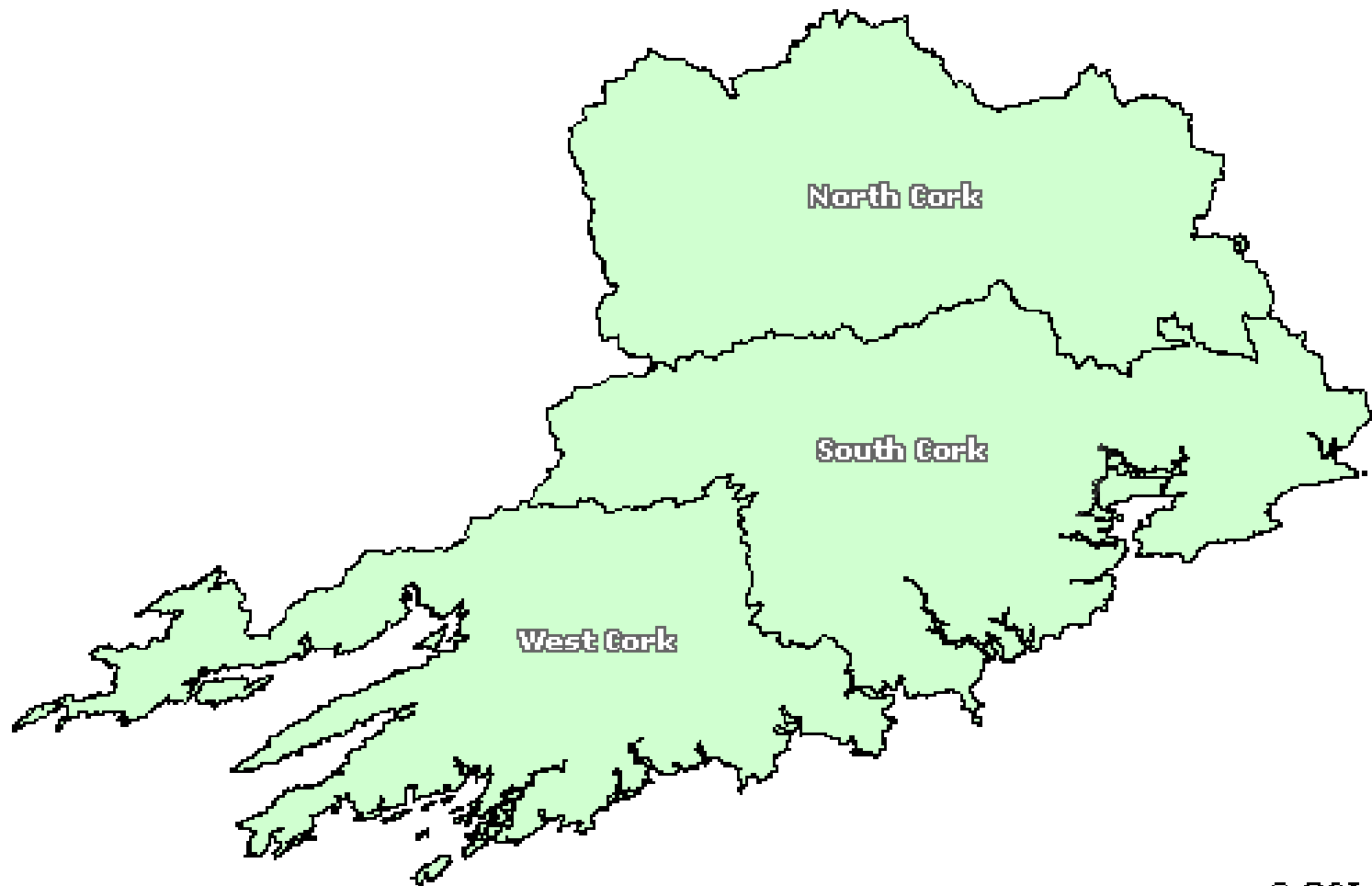
Radon in Cork – social housing

- 4,560 homes measured by Cork Co.Co.
- 6.5% above 200 Bq/m³
- Highest measurement 3,300 Bq/m³
- Equivalent radiation dose to receiving 11 chest X-rays/day



Cork County Council

Click on the different areas for more information



© OSI



Radiological Protection Institute of Ireland

An Institiúid Éireannach um Chosaint Raideolaíoch

Summary of results

- West Cork
 - results for 929 homes
 - 0.5% of homes >200 Bq/m³
- South Cork
 - results for 2668 homes
 - 4% of homes >200 Bq/m³
- North Cork
 - results for 599 homes
 - 21% of homes >200 Bq/m³

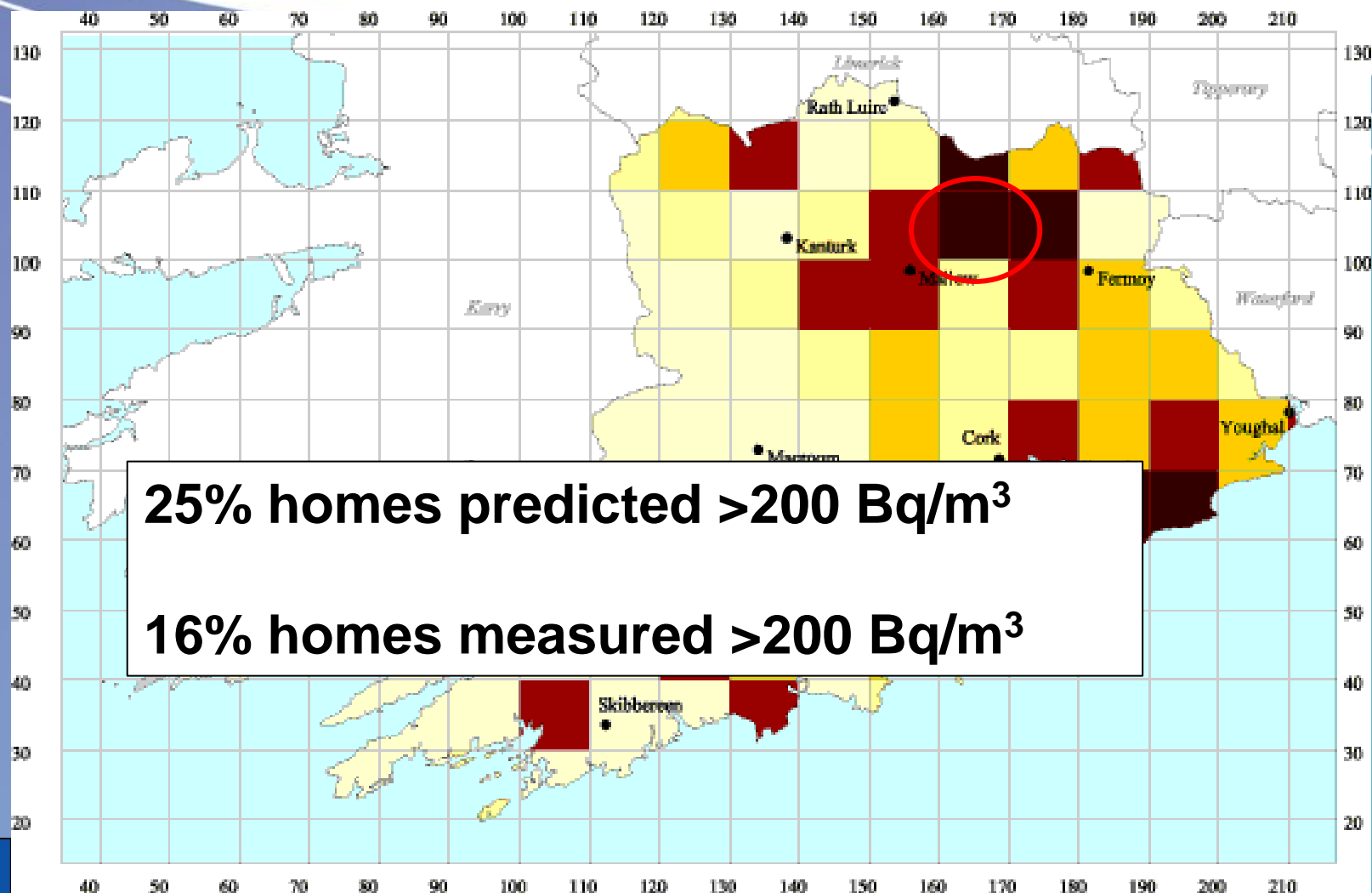


The Radon Map

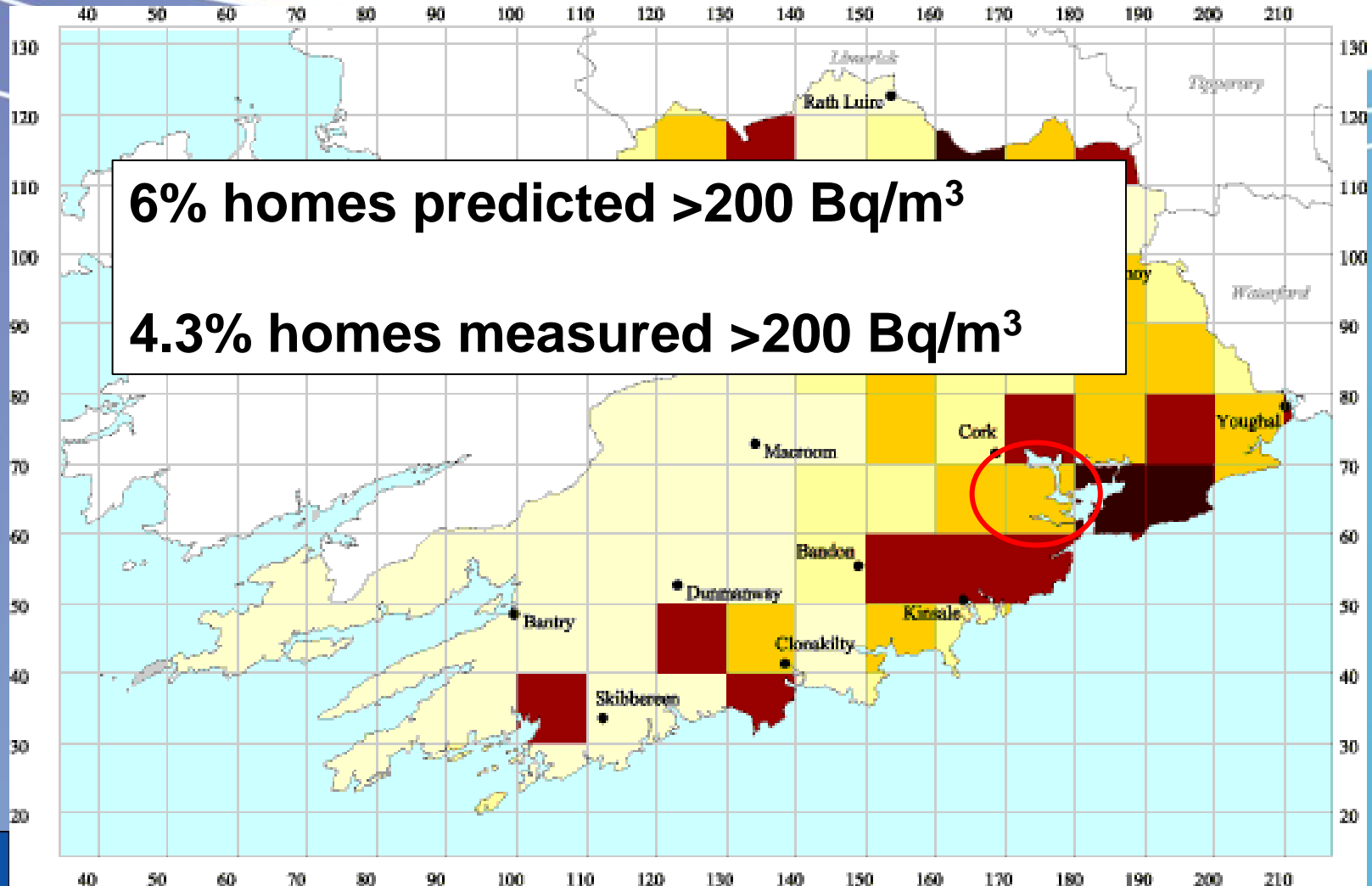
- 11,319 homes measured 1992-1999 (1% of housing stock in 2000)
- 10 km grid squares used as measurement area
- Percentage of homes above 200 Bq/m³ predicted for each 10 km grid square
- 5 categories of 10 km square: <1%, 1-5%, 5-10%, 10-20%, >20%
- Squares predicted to have >10% of homes above 200 Bq/m³ designated High Radon Areas



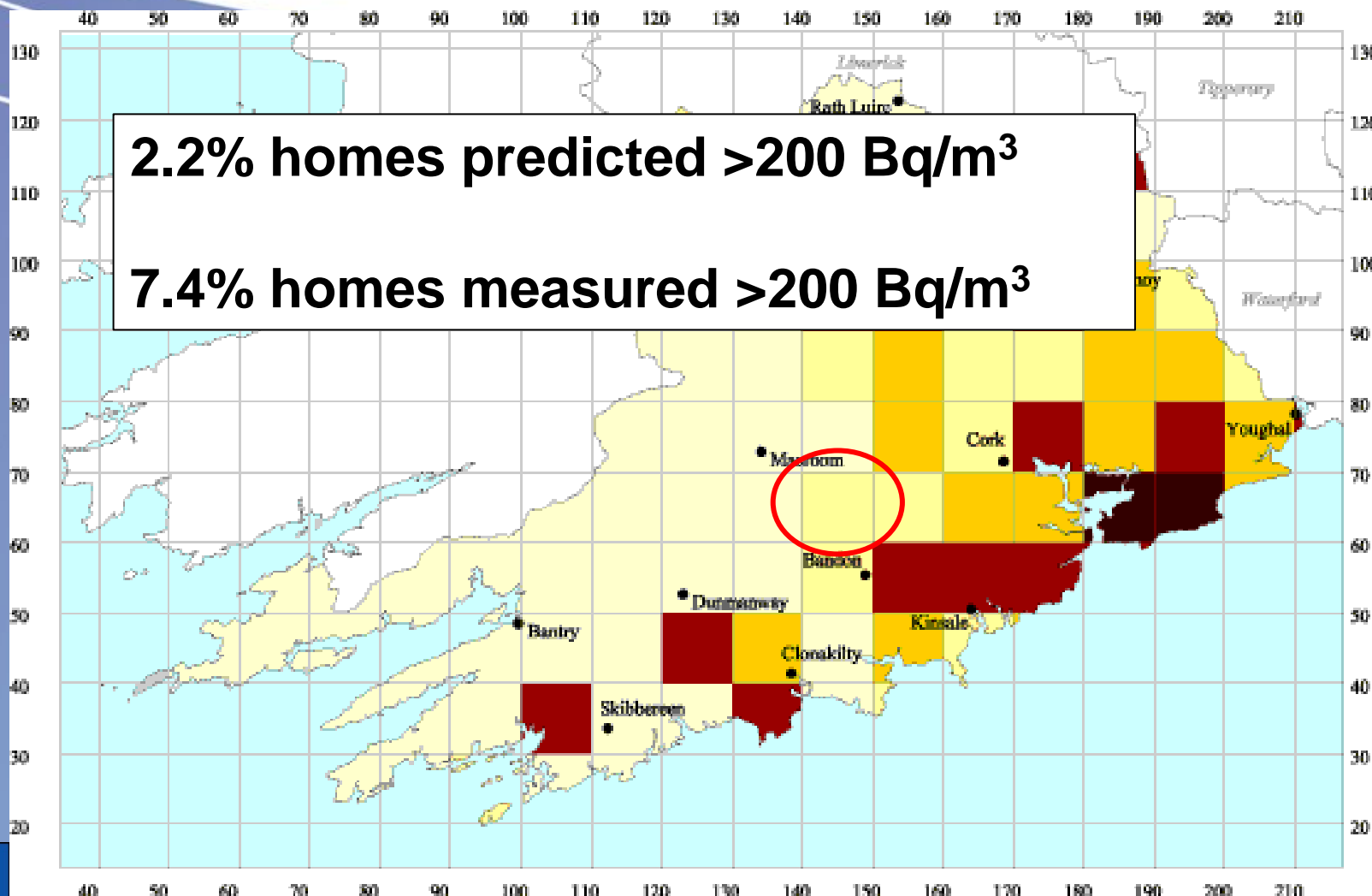
Reliability of radon map



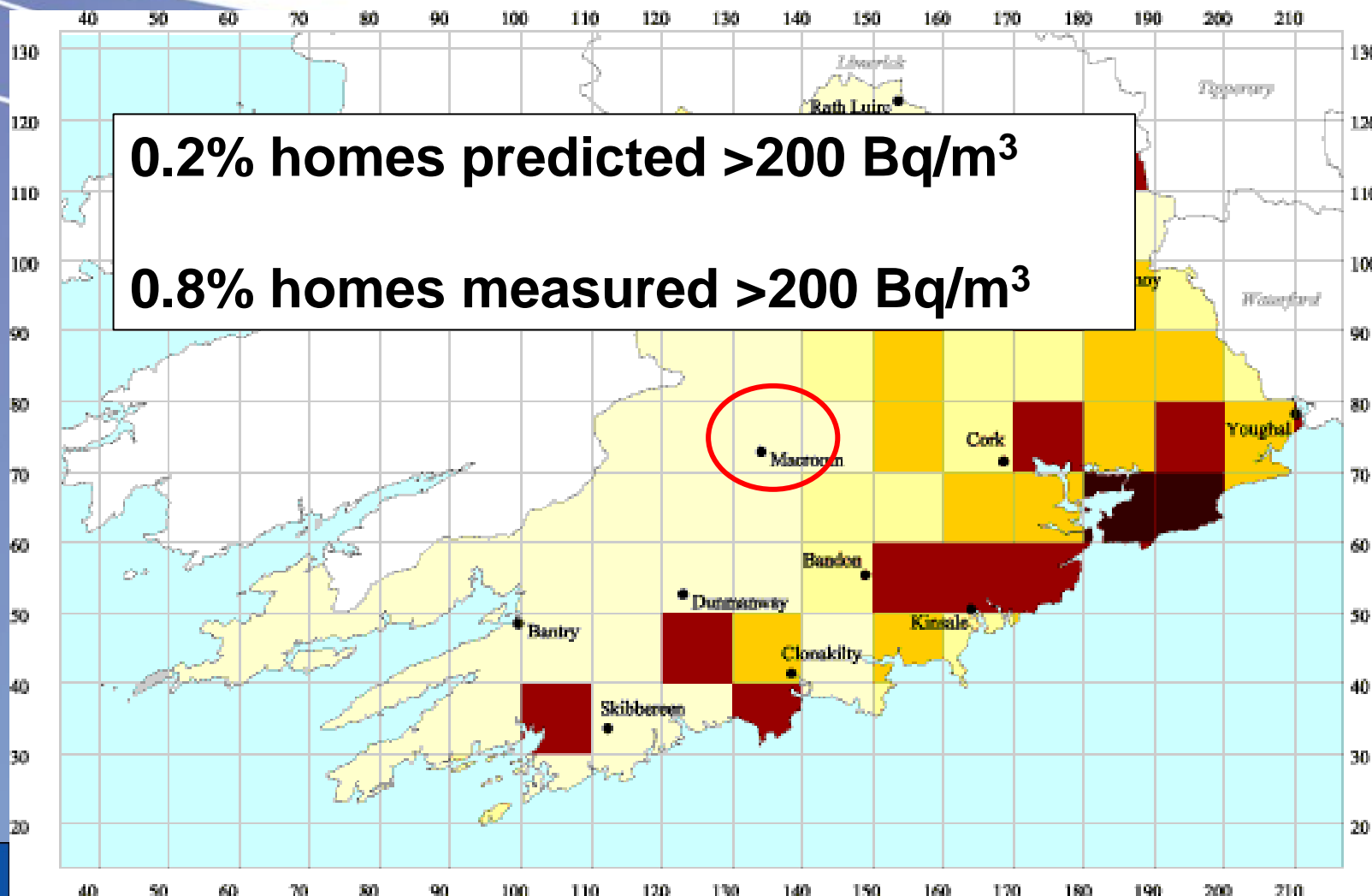
Reliability of radon map



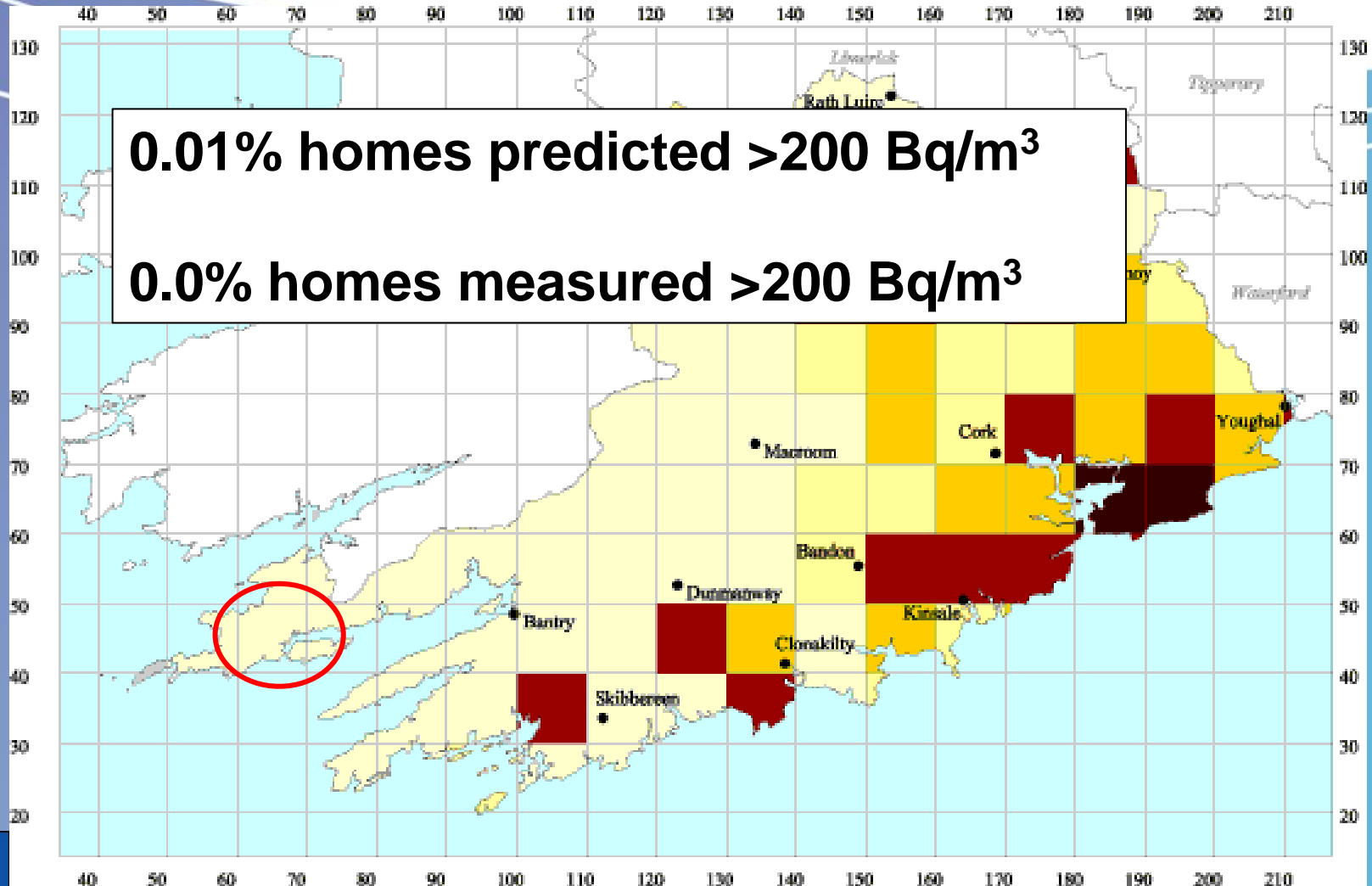
Reliability of radon map



Reliability of radon map



Reliability of radon map

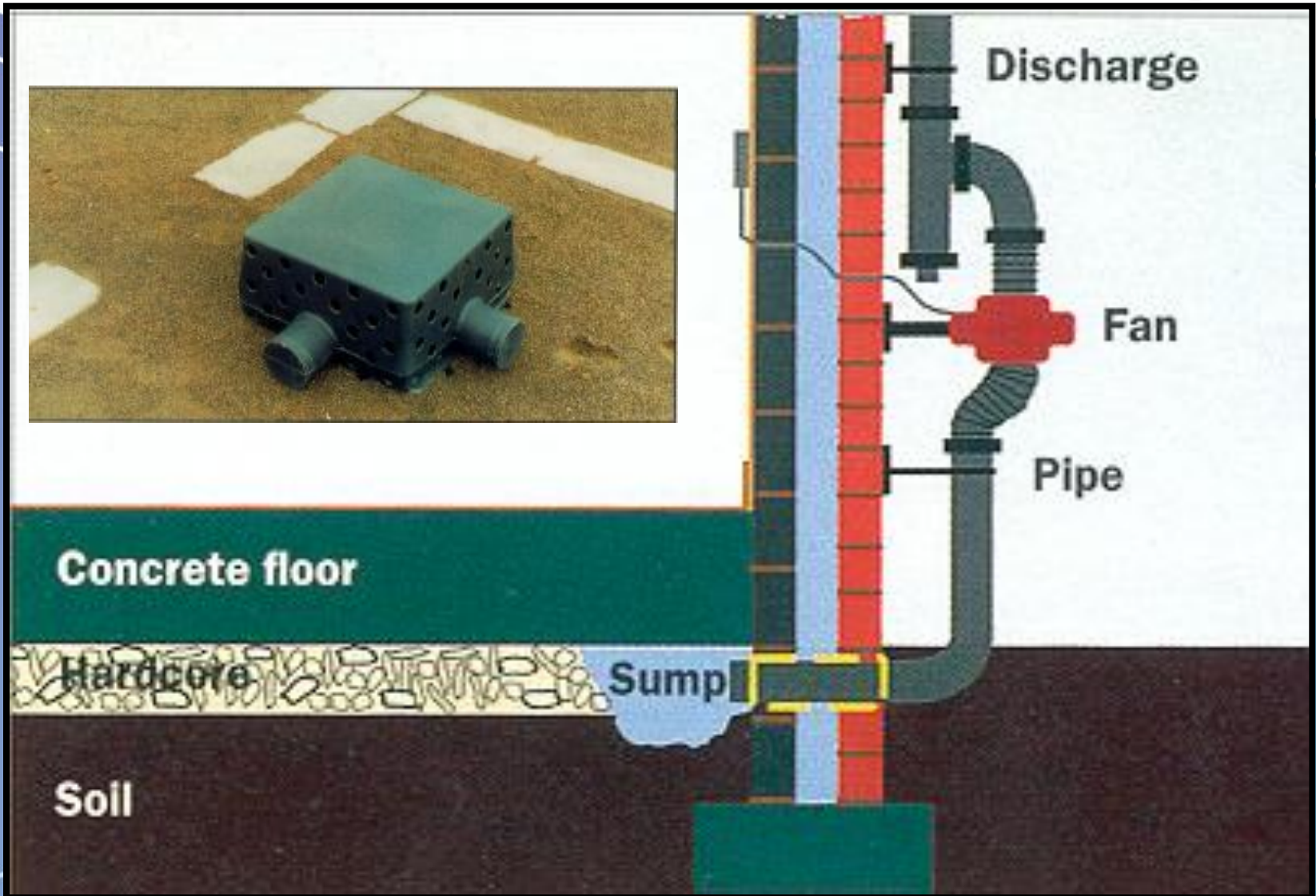
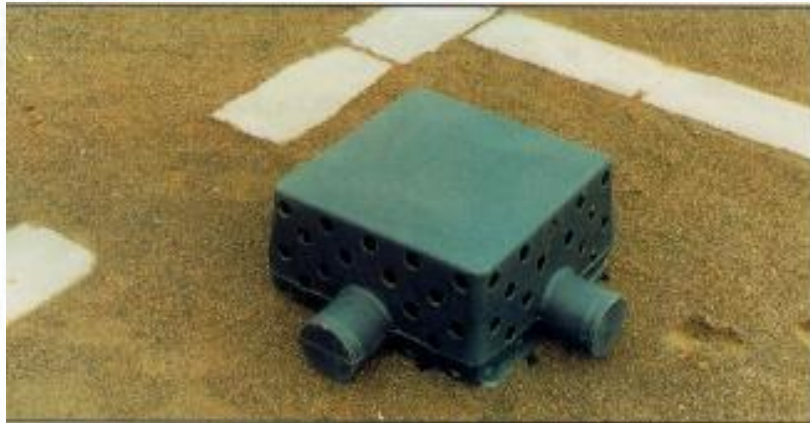


Homes in low radon areas can have high radon concentrations

- West Cork:
 - 3 homes in <1% area (214 - 1063 Bq/m³)
- S. Cork:
 - 1 home <1% area (651 Bq/m³)
 - 11 homes in 1-5% areas (212-478 Bq/m³)
 - 27 homes in 5-10% areas (204-788 Bq/m³)



Remediation with active sump



Effectiveness of remediation

- Homes >800 Bq/m³ remediation efficiency
 - **92-99%** (25 homes in N. Cork)
 - Average reduction **96%**
- 200-800 Bq/m³ remediation efficiency:
 - **61-99%** (95 homes in N. Cork)
 - Average reduction **91%**
- Internationally:
 - Typical active sump reduction efficiency **70-95%**
 - Greater remediation efficiency for higher initial concentrations



Building Regulations

- Since 1998, Building Regulations require that all new homes in high radon areas have a radon barrier installed (and a standby radon sump)
- Low Radon Areas - a standby sump is required



Building regulations – effectiveness?

- 34 homes in High Radon Areas (post-1998) with radon >200 Bq/m³ (N. Cork)
- However the Building Regulations have:
 - reduced mean radon concentration in homes
 - reduced no. of homes >200 Bq/m³



Building regulations – effectiveness?

- Reduction in mean radon concentration:
 - Mean concentration in pre-98 homes **377 Bq/m³**
 - Mean concentration in post-98 homes **194 Bq/m³**
 - **50%** reduction in mean concentration
- Reduction in no. of homes >200 Bq/m³:
 - **45%** of pre-98 homes >200 Bq/m³
 - **22%** of post-98 homes >200 Bq/m³
 - **50%** reduction in no. of homes >200 Bq/m³



Building regulations – effectiveness?

Studies in Tralee, Ennis and Kilkenny have shown:

- Reduction of between 50% and 30% in mean radon concentration
- Reduction of 50% in the % of homes > 200 Bq/m³



Many private homes not yet tested

- Social housing measurements effectively complete
- 175,000 private homes yet to be measured in Cork
- Further public awareness campaign planned to address this



Conclusions

- Predictions of radon map are accurate
- Homes in low risk areas can have high radon concentrations
- Remediation is effective
- New homes can have a radon problem, though building regulations have had some effect
- Further public awareness work required in Cork
- Significant dataset which requires detailed analysis and publication

