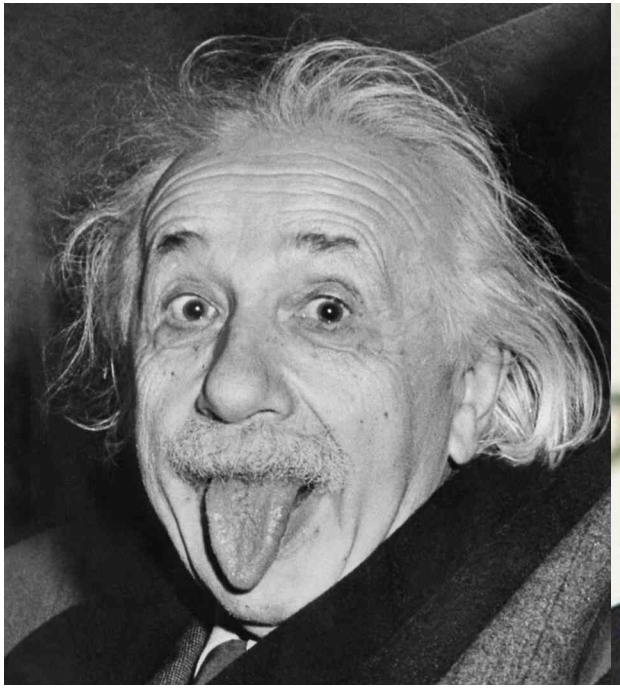
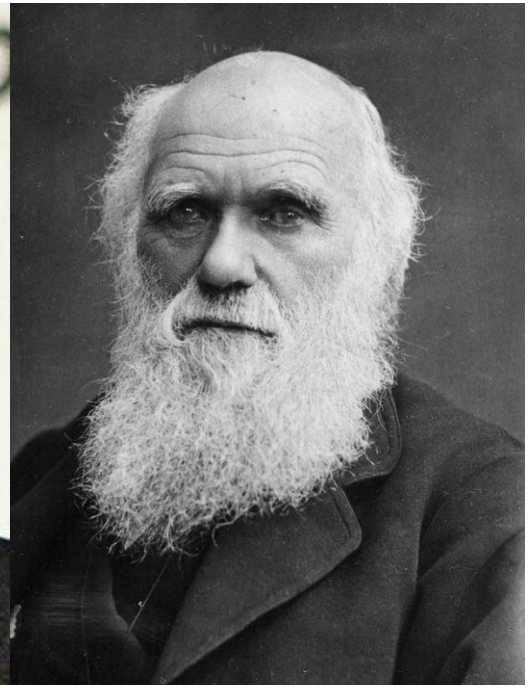
Multidisciplinary advances in field dosimetry





Dr Mike Wood
University of Salford, UK

Outline

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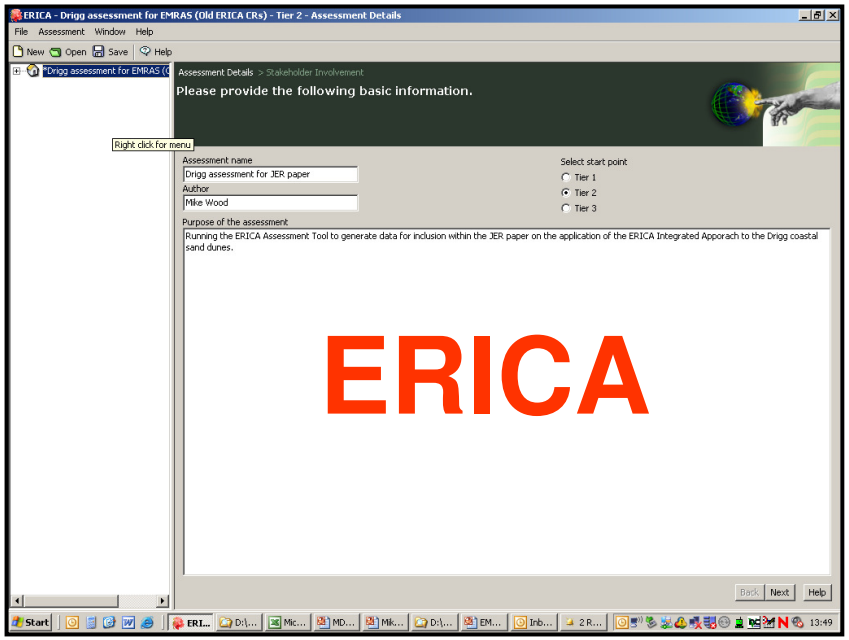
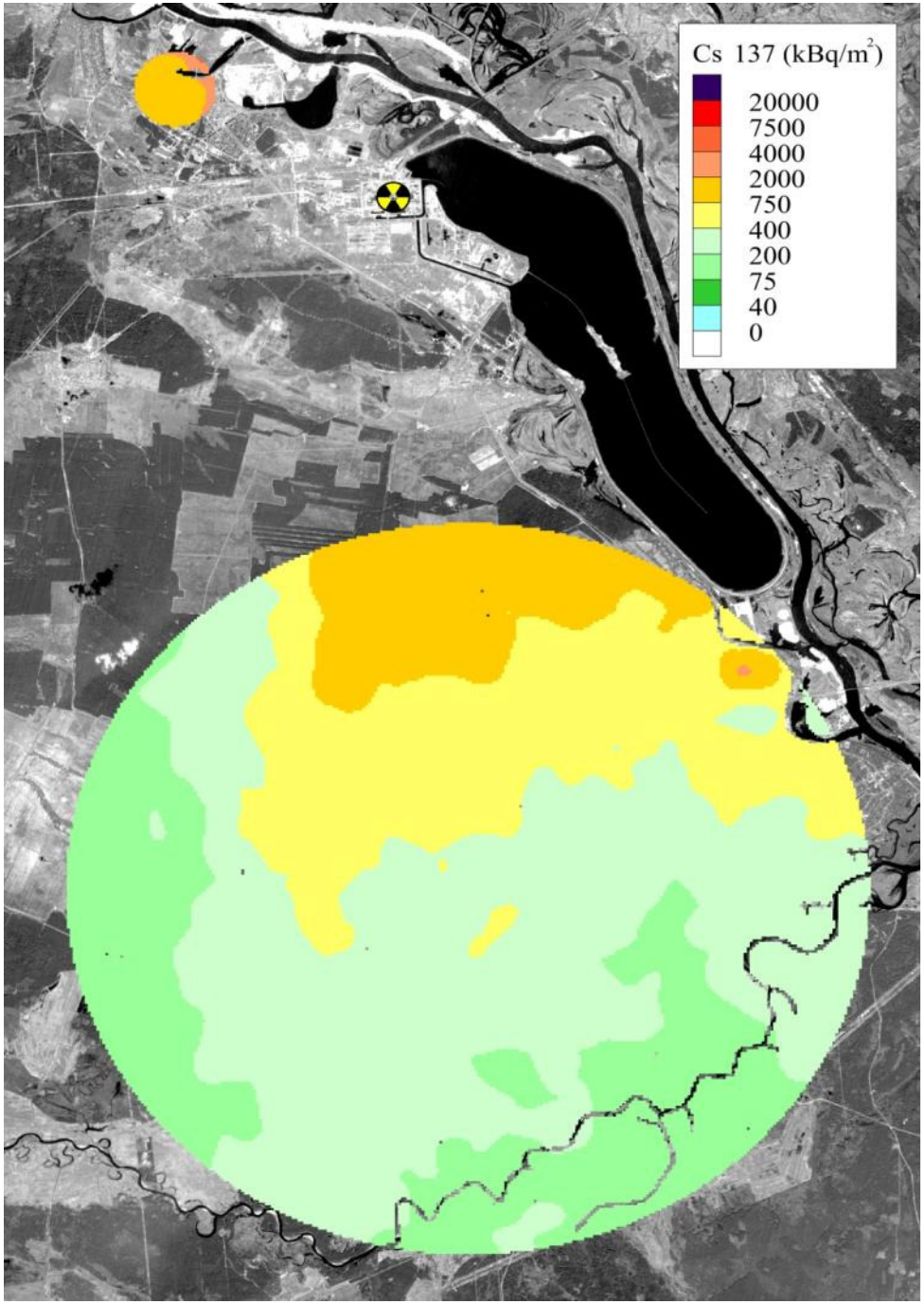
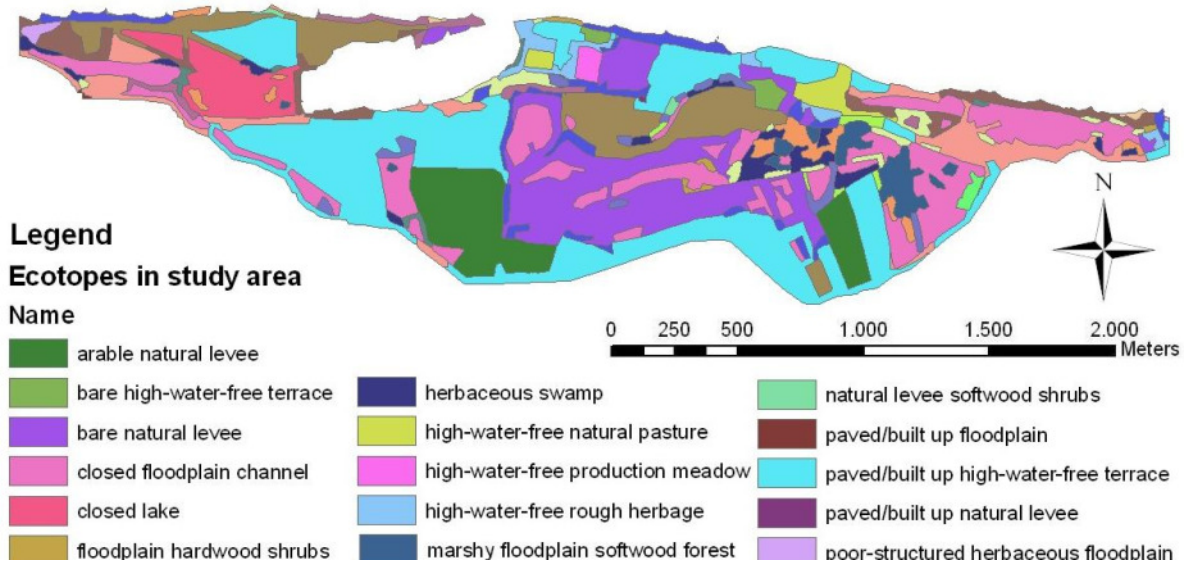
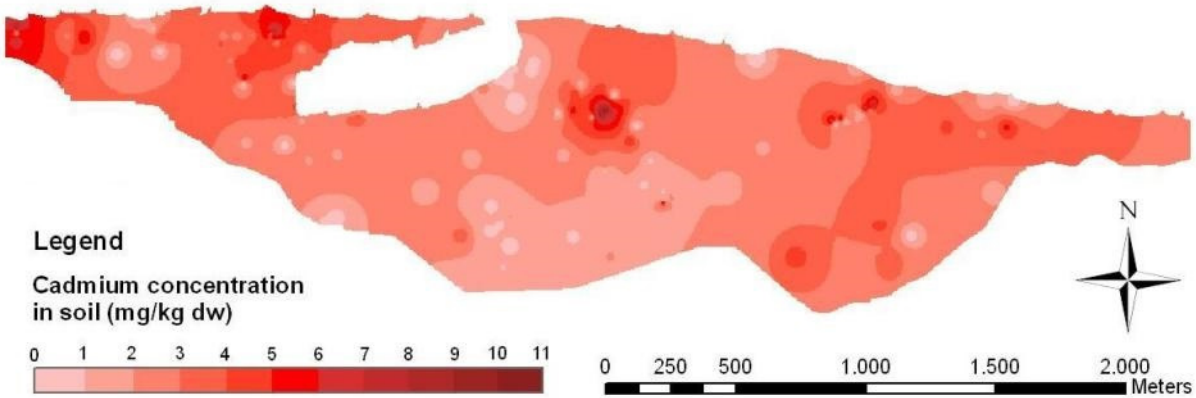
- Build on previous presentations
  - Jordi, Tom & Larry
- International programmes addressing issues being raised
- IAEA MODARIA WG8 Sub-group
- TREE
  - Field dosimetry technology
  - Habitat utilisation and population studies
- Opportunities....

Modelling exposure

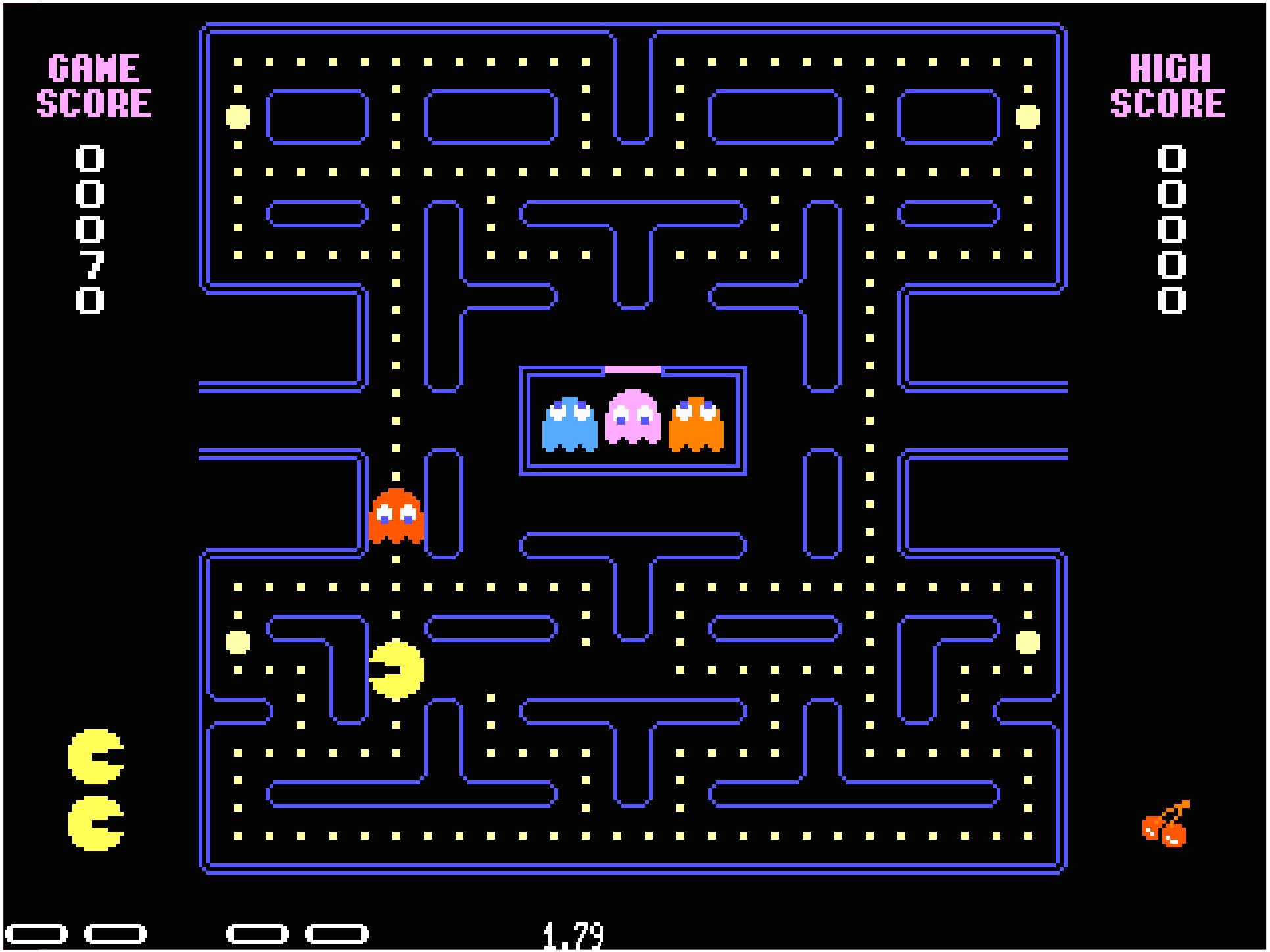








NoMiracle D4.2.1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HIGH SCORE
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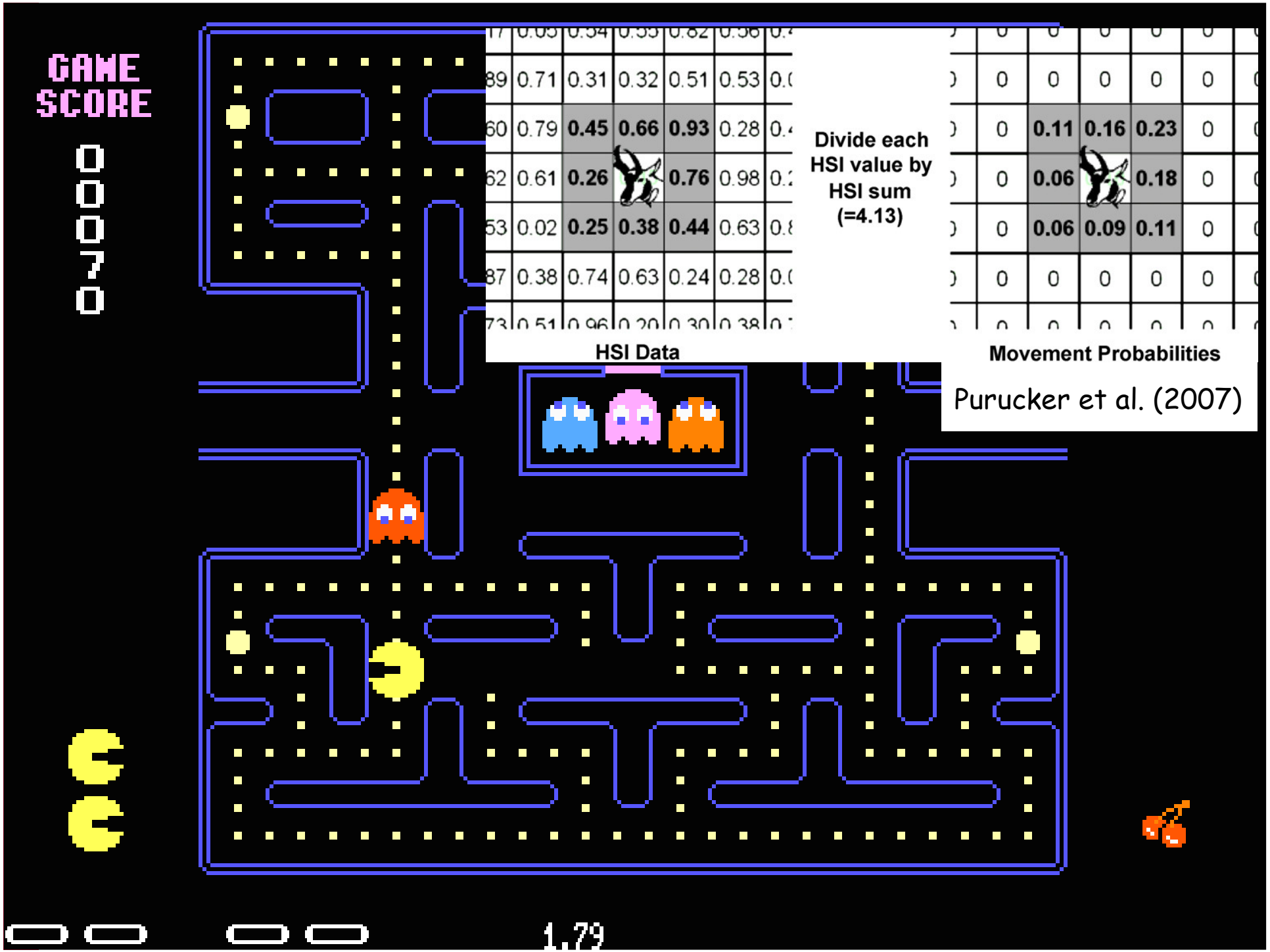
1.79



17	0.05	0.54	0.55	0.82	0.56	0.4
89	0.71	0.31	0.32	0.51	0.53	0.0
60	0.79	**0.45**	**0.66**	**0.93**	0.28	0.4
62	0.61	**0.26**		**0.76**	0.98	0.2
53	0.02	**0.25**	**0.38**	**0.44**	0.63	0.8
87	0.38	0.74	0.63	0.24	0.28	0.0
73	0.51	0.96	0.20	0.30	0.38	0.7

HSI Data

Divide each HSI value by HSI sum (=4.13)

0	0	0	0	0	0	0
0	0	**0.11**	**0.16**	**0.23**	0	0
0	0	**0.06**		**0.18**	0	0
0	0	**0.06**	**0.09**	**0.11**	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Movement Probabilities

Purucker et al. (2007)

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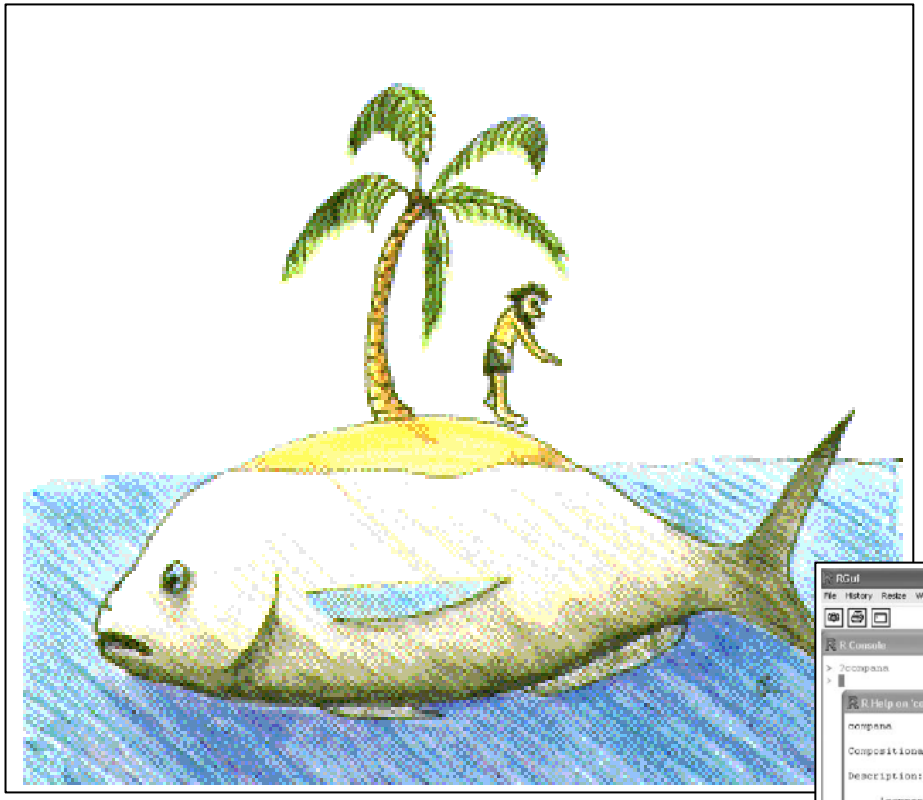

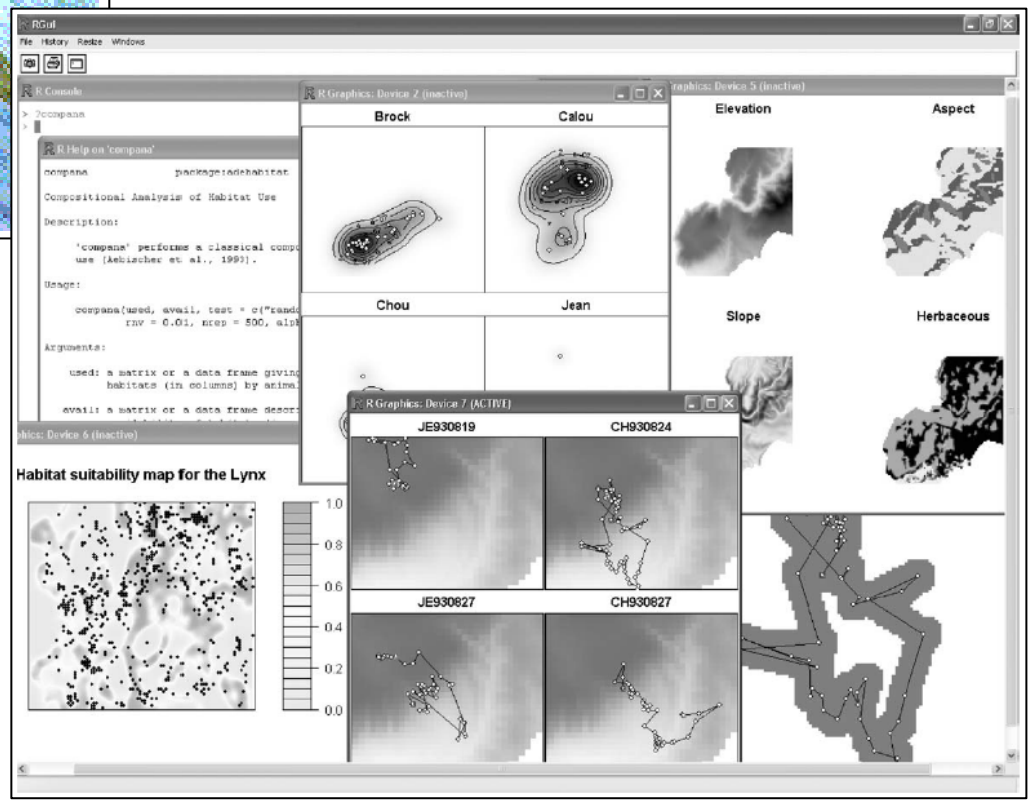

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Should we consider other approaches?

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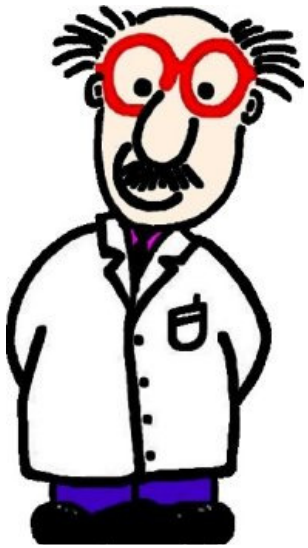
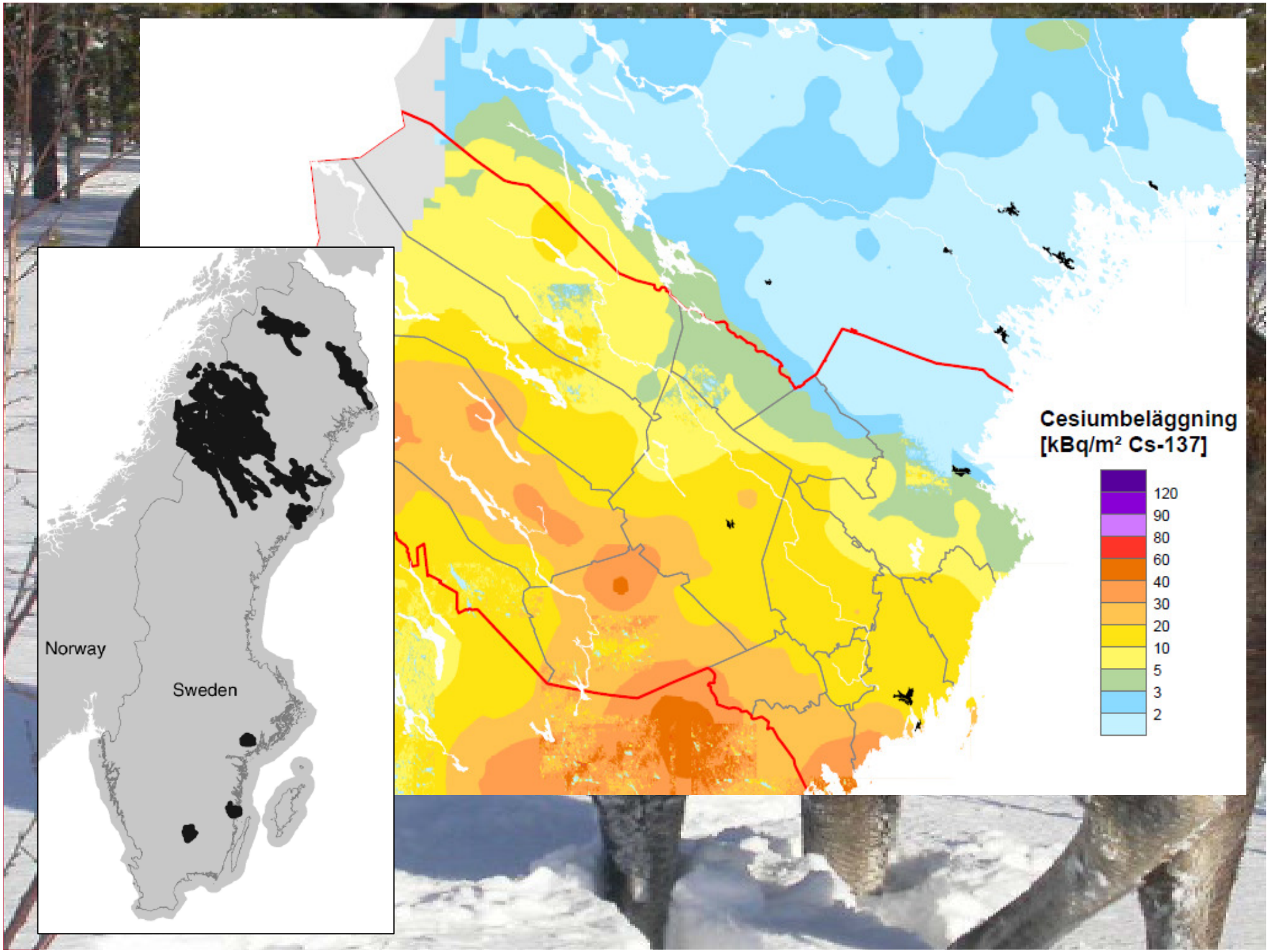
Current simplistic assumptions which ignore how animals utilise their environment ensure wildlife is protected by generating a conservative estimate of exposure (for regulatory purposes)




Norway
Sweden
Cesiumbeläggning
[kBq/m² Cs-137]
120
90
80
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30
20
10
5
3
2


ГОТЕЛЬ ПОЛІССЯ

TREE

Transfer - Exposure - Effects: integrating the science needed to underpin radioactivity assessments for humans and wildlife

Habitat utilisation & external dose

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7

Habitat utilisation

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- 40 new cameras
  - 9 MMS
- £2k of batteries!
- 45 cameras in total
- Population study opportunities
- Calibration tests before deploy in CEZ


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Habitat utilisation & external dose

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- 15 – 20 GPS collars
  - Data log
  - Radio tag
  - Drop off
- Deploy for 1 year
- Public Health England collaborating on dosimetry (TLD)
  - Calibration
  - Measurement
  - Interpretation

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MIRION TECHNOLOGIES

Instadose 2

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Instadose 2 concept

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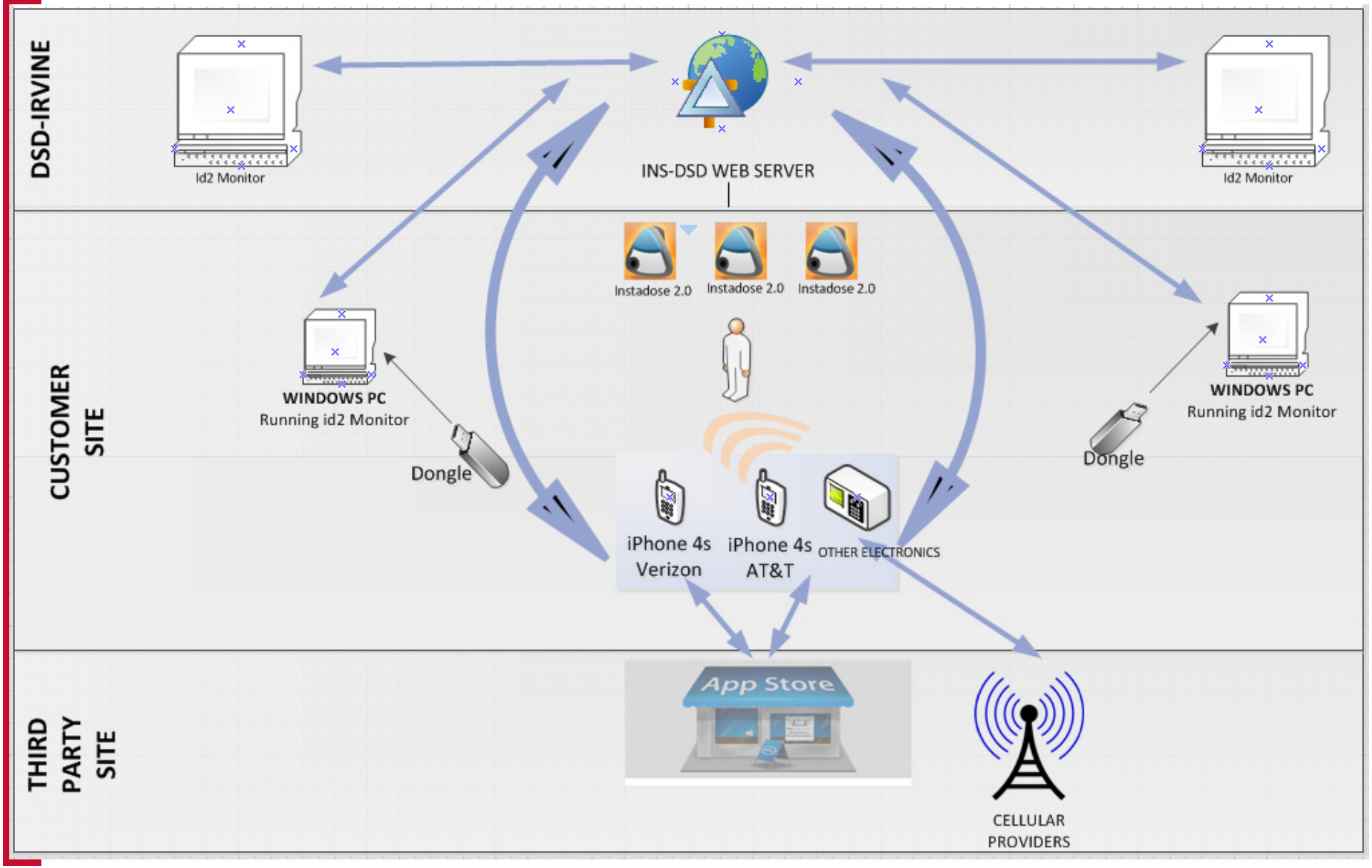

Direct Ion Storage (DIS)

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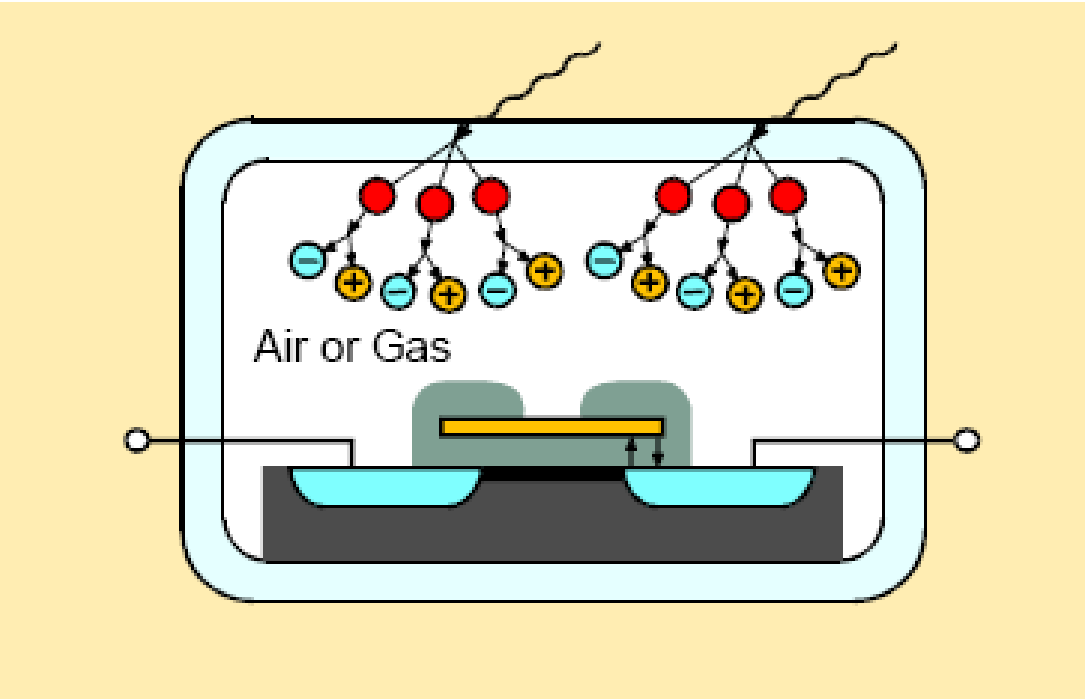

- Non Volatile Analog Memory Cell surrounded by a Gas Filled Ion Chamber
- For photon radiation, initial interactions take place in the wall material and secondary electrons ionize the gas of the chamber

Instadose 2

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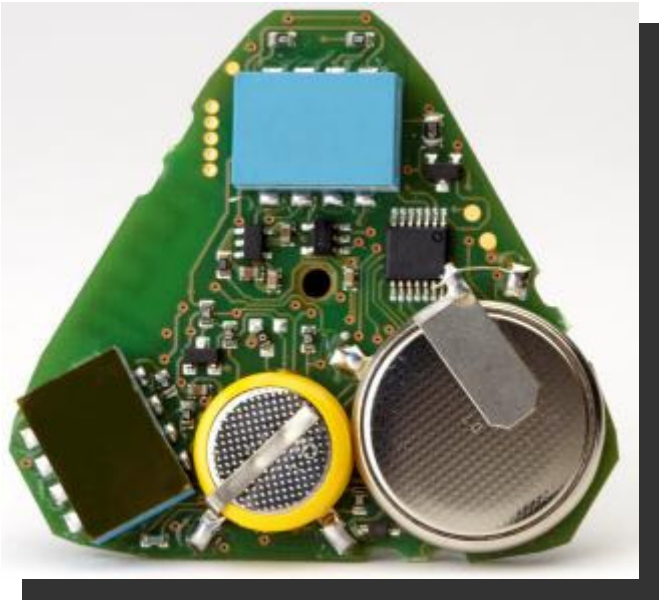

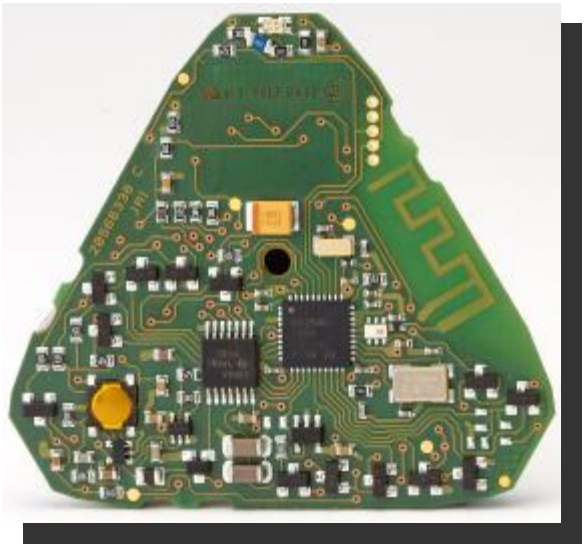

Diet composition & internal dose

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Linked PhD projects

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Radioactivity And The Environment

OFFICE OF ATOMS FOR PEACE

Conclusions

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- General consensus that we should evaluate the influence of animal-environment interaction in heterogeneously contaminated environments
- Starting point is that simplistic approach is fit for regulatory purposes
- Extensive programme to develop and implement new collar and detector technology to improve field dosimetry
- Opportunities
  - Link real-world exposure and effects
  - Further collaboration with Tom and his colleagues

Advances in environmental radiation protection: re-thinking animal-environment interaction modelling for wildlife dose assessment

Wood MD[1], Beresford NA[2] Bradshaw C[3], Gashchak S[4], Hinton T[5]

[1] School of Environment & Life Sciences, University of Salford, Manchester, M4 4WT, UK
[2] Centre for Ecology & Hydrology, Bailrigg, Lancaster, LA1 4AP, UK

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- Funders
  - Natural Environment Research Council (NERC)
  - Nuclear Decommissioning Authority (NDA)
  - Environment Agency (EA)
  - Science and Technology Facilities Council (STFC)


Any questions?
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