WG-8 Biota modelling: Further development of transfer and exposure models and application to scenarios
Address the uncertainty in biota modelling results (as indicated in EMRAS), and build more confidence in simple modelling approaches as used for regulatory purposes.
Activities agreed Nov. 2012

• Modelling exposure in spatially heterogeneous environments
• Simple whole-organism ellipsoid geometries v’s Voxel phantoms
• Develop scenario for Fukushima marine environment
• Collate biological half-life data for wildlife
• ‘Lessons learnt’ documentation
Modelling spatially heterogeneous environments

- Typically simplistic
  - Point of capture media concentrations
  - Average over likely home-range

- Is that good enough?
• Review of approaches used in other fields
• Various data sets proposed – most not suitable
• Swedish moose data presented June 2014
• Norwegian reindeer scenario Nov 2014
• Modelling results now available
  – evaluated Swedish moose data this week
‘Rules’ from moose experts

• Migration is very quick
• Grazing area 30 km² in summer, 15 km² in winter
• Timing of summer and winter grazing
• End of summer – migrate 30 km SE
• Preferred & avoided habitats
• Slope >10º avoided
Modelling

- Simple (‘traditional’) grazing areas - total area & then remove some habitats/slope
- ECOSPACE – spatial/temporal (biomass)
- GoldSim – individual movement model

- ‘Data’ = dose estimated from moose position
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<th>‘Simple’ preferred habitat</th>
<th>GoldSim</th>
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Reindeer
‘Lessons learnt’ document

- Capabilities of openly available models
- How you ‘make’ model do what you need
- Parameter values
- Dosimetry/voxels/geometries - organisms
- Coping with heterogeneous media distributions
- Radionuclide specific issues (decay series, H-3, C-14)
Thanks to group members
The assumption of heterogeneous or homogeneous radioactive contamination in soil/sediment: does it matter in terms of the external exposure of fauna?

K. Beaugelin-Seiller

Effects of soil water content on the external exposure of fauna to radioactive isotopes

K. Beaugelin-Seiller

A comparison of the ellipsoidal and voxelized dosimetric methodologies for internal, heterogeneous radionuclide sources

Elizabeth Ruedig, Nicholas A. Beresford, Mario Enrique Gomez Fernandez, Kathryn Higley

Should we ignore U-235 series contribution to dose?

Karine Beaugelin-Seiller, Richard Goulet, Steve Mihok, Nicholas A. Beresford

Radiological Dose Rates to Marine Fish from the Fukushima Daiichi Accident: The First Three Years Across the North Pacific

Mathew P. Johansen, Elizabeth Ruedig, Keiko Tagami, Shigeo Uchida, Kathryn Higley, and Nicholas A. Beresford

Making the most of what we have: application of extrapolation approaches in radioecological wildlife transfer models

Nicholas A. Beresford, Michael D. Wood, Jordi Vives i Batlle, Tamara L. Yankovich, Clare Bradshaw, Neil Willey