



Transfer - Exposure - Effects:

integrating the science needed to underpin radioactivity assessments for humans and wildlife



REDUCING UNCERTAINTY IN RADIOLOGICAL ASSESSMENT



THE AWARDS
2016

WINNER
RESEARCH PROJECT OF THE YEAR

Radiological impact assessment for humans and wildlife requires quantification of, the behaviour and transfer of radionuclides in the environment, the resultant radiation exposure and associated risk. To ensure stakeholder confidence, it is essential that assessments are based on excellent science and that any elements of uncertainty are understood.

TREE's ground-breaking science is reducing uncertainties in radiological risk assessment. Over the last five years, our research has ranged from improving understanding of radionuclide biogeochemical behaviour in soils through to studying transgenerational effects of ionising radiation exposure on wildlife.

Our research combines laboratory experiments with fieldwork at our natural laboratory, the Chernobyl Exclusion Zone (CEZ). Working at Chernobyl allows us to study a range of radionuclides in the environment, including those of relevance when assessing the potential impacts of deep geological disposal of radioactive wastes. The CEZ also provides a unique opportunity to investigate the effects of radiation on a wide range of wildlife. In the largest co-ordinated research programme ever conducted we have studied the effects of radiation on more than ten species of animals and plants in the CEZ and laboratory.

FINDINGS

TREE has successfully contributed to reducing uncertainties in radiological assessments by delivering:

- ▶ New process-based models of Tc, Se, U and I behaviour in soils
- ▶ Novel approaches for estimating wildlife exposure in the field
- ▶ Radionuclide transfer and effects data for International Commission on Radiological Protection (ICRP) Reference Animals and Plants
- ▶ New models for estimating radionuclide concentrations in crops and wildlife

Some significant findings from our research to date include:

- ▶ Mammal populations in the CEZ appear to be thriving
- ▶ There are some radiation effects observable in Chernobyl wildlife
- ▶ The benchmark dose rate proposed by the ICRP for bees likely needs to be reduced
- ▶ Importantly, from a regulatory perspective, our laboratory and field studies have shown no evidence of radiation effects on wildlife at dose rates typical for UK permitted discharges

FUTURE CHALLENGES

TREE research has revealed significant new scientific challenges and has provided techniques to help address some of these. For example, the effects of radiation on the environment still remain largely unquantified, but novel technologies developed within TREE present new opportunities for undertaking radiation effects studies on wildlife. Also, whilst the potential advantages of TREE's new modelling approaches have been demonstrated, these approaches now require further development and validation for a broader range of organisms, radionuclides and environments. Tackling these new challenges will increase both the robustness and stakeholder acceptance of regulatory radiological risk assessments.

CAPACITY BUILDING

TREE has been committed to capacity building and knowledge exchange. Utilising key learning from TREE we deliver radiological risk assessment training courses to regulators and other stakeholders around the world.

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THE TREE CONSORTIUM

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