

Garnier-Laplace et al. Predicted-no-effect values for freshwater and terrestrial ecosystems EST 40

Garnier-Laplace, J., Della-Vedova, C., Gilbin, R., Copplestone, D., Hingston, J., Ciffroy, P., 2006.

First derivation of predicted-no-effect values for freshwater and terrestrial ecosystems exposed to radioactive substances.
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The FASSET Radiation Effects Database (FRED) constitutes a unique structured resource of the biological effects of ionizing radiation on non-human species mainly from temperate ecosystems, encompassing 26,000 primary data entries. Quality-assessed data were extracted from FRED and dose-effect relationships were constructed to provide estimates of ED_{50} and EDR_{10} . These estimates are Doses (or Dose Rates) related to the percent change in the average level of the endpoint for a particular effect (50% or 10% for acute or chronic exposure regimes, respectively). Acute and chronic Species Sensitivity Distributions (SSDs) were built on the basis of these data sets, and the Assessment Factor Method (AFM) was applied when data were too scarce. The Hazardous Dose corresponding to 5% of species acutely affected at the 50% effect level varied from 1 to 5.5 Gy according to the ecosystem. For chronic external irradiation exposure, no-effect values varied from 10 Gy/h for freshwaters through application of the AFM to 67 Gy/h for terrestrial ecosystems, corresponding to the 5th percentile of the non-weighted SSD (vs 229 Gy/h when trophic weights are applied). These values are higher by ca. $\times 50$ to $\times 100$ than the upper bound of natural background, and lower than dose rates triggering effects at individual levels on contaminated sites.

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