

# Systems ecology of radiocesium dispersal in forest landscapes and food

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*Abstract:* Persisting radiocesium in food of humans, reindeer, or other wildlife calls for research and assessments of the future. What trends in Cs are likely in forest and shrubland, as well as crops and pasture? Soon after Chernobyl fallout in 1986, Swedish berry plants, tree parts, organic and sandy soil were analysed. Now we can infer rates of transfer among a typical ecosystem's parts. Cs in food chains in Nordic woodlands seems likely to remain high for many years. I predicted such Cs would be removed to less available forms in soil minerals more slowly than Cs in Nordic crop systems, or in deciduous forest tagged with Cs-137 at Oak Ridge National Laboratory, Tennessee.\* Cooler climate, partly evergreen plant habit, and many peat and sandy soils are among factors shared by Nordic countries that keep their Cs actively circulating in the ecosystem. Reindeer food chains in lichen woodlands (pine or birch) and seasonal pastures\*\* seem important for testing improved modeling of natural processes of the system and predicting alternative scenarios, without waiting to see the real future. For this purpose, we need help in estimating lower and upper bounds for RATES: e.g. fractions per week of Cs in important parts (vegetation, consumers, residues, soils) moving to the other parts. Calculations using the resulting table (matrix) of sources and destinations would show net change (turnover) per week. Models combining many steps should imitate nature's redistribution of Cs. Displaying a range of possible future conditions and problems, and filling gaps in field or lab research, could clarify policy issues for reindeer and other ecological management.

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\* J.S. Olson, Radiocesium in Swedish Forests, *Meddeland. fr. Växtbiol. inst.* 1987:1

\*\* O. Eriksson *et al.*, Radioaktivt Cs i Renbetet, *Medd. från Växtbiol. inst.* 1987:2