

IUR Consensus Symposium 2015
on the ecological effects of radiation on populations and ecosystems

16-19 November 2015

Miami Beach
Florida, USA



Statements

From

the International Consensus Symposium

on the

Ecological effects of radiation on populations and ecosystems

developed to improve

Protection of the Environment against Radiation

Held at Holiday Inn, Miami Beach, USA, 17-19 November 2015

Chaired by François Bréchnignac

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Ecological effects of radiation on populations and ecosystems to improve Protection of the Environment against Radiation

International Consensus Symposium

Situating the need for consensus

Since almost two decades, radiological protection is broadening from a system focused only on impacts of ionizing radiation on humans, to one that encompasses non-human biota and the environment itself. Scientific research in both the laboratory and the field has significantly improved our knowledge, yet there is a feeling of divergence rather than convergence in current opinion. Contrasted results from the laboratory and the field (especially at Chernobyl and Fukushima), and resulting disagreement about their respective implications for risk assessment and management, are currently stimulating a need for refinement of international assumptions and findings relevant to environmental radiological protection systems.

Refinement could be rooted in an ecocentric approach to environmental protection that would reconcile radiation impact understanding developed essentially in the laboratory with observations in the real environment. However, while there is increasing awareness of the need to embrace not only the individual level but also population, community and ecosystem impacts, radiation protection institutions are only starting to engage the range of expertise that can conceptualize and conduct the relevant research.

Building consensus on the ecological effects of radiation on populations and ecosystems could stimulate dialogue, foster a more integrated research program, and facilitate national and international efforts to work toward a more comprehensive system of protection.

In this light, IUR convened an international Consensus Symposium in order to assess the current research status and work on consensus building. A group of 30 scientists, voluntarily assembling researchers with different methods, references and convictions, came together for three days in Miami, 17-19 November 2015. They were invited to present and discuss scientific work from the laboratory and the field, identify areas of agreement and explore reasons for disagreement about conceptual approaches, and review different interpretations of the results as well as their implications for environmental protection. Inspired by a constructive spirit directed at understanding discrepancies rather than arguing disagreements, the group has been successful in formulating consensus statements that have been endorsed by the entire group.

Consensus Statements

- Successful protection of the environment depends on the protection of natural populations, their dynamics, species interactions and contributions to ecosystem functioning. Ecosystem approaches are needed to support these protection goals.
- Improved terminology for referring to environmental protection criteria, operational outcomes and standardized methods is required.
- Field studies and experiments, especially those focusing on populations, make a vital contribution to the scientific background necessary to achieve the environmental protection goals. Field data are essential to account for realistic exposure scenarios, as well as to investigate how exposure to radionuclides interacts with other environmental factors to determine the effects on natural populations.
- Better continuity between laboratory and field studies should be developed to advance protection of the environment. Hypotheses should ideally be tested through an iterative strategy integrating field and laboratory studies, and modeling efforts.
- Strategies need to be developed to disentangle the direct and indirect effects of radiation on (populations of) biota in natural ecosystems, as well as the confounding factors that prevent clear interpretation of the results.
- Reference organism approaches represent an important first step to characterize doses to biota, but they have significant limitations. More effort should be placed on understanding mechanisms and processes of how radiation effects are manifested in natural ecosystems, and on quantifying dose in the field.
- Research programs and studies should encourage a multidisciplinary approach among radioecologists, radiobiologists, ecologists, evolutionary biologists, statisticians, modelers and geneticists. Field study design should encompass methods and approaches established in ecology and address a diverse range of sites and cases with preferably experimental approaches.

Participants giving their consent to the consensus statements*

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*The consensus statements reflect the views of the individual participants themselves and not necessarily those of the organizations employing them.

Concluding remarks from the Miami group

To assess (and manage) ecological risk can be regarded as a duty both to human society and to the ecosystems of which we are a part. Proper risk assessment, and then management, requires both an appropriate understanding and a convincing and appropriate system of environmental protection. In this context, promoting shared understanding within the scientific community regarding the occurrence of ecological impacts of radiation is of high strategic importance. In particular, the still on-going debate on whether or not the Chernobyl and Fukushima accidents are producing ecological consequences needs to be resolved. The Miami Consensus Symposium has constructed a set of collectively agreed statements about means to assess the ecological impact of radiation and their conceptual implications for designing environmental protection.

