

The ethical foundations of environmental radiological protection

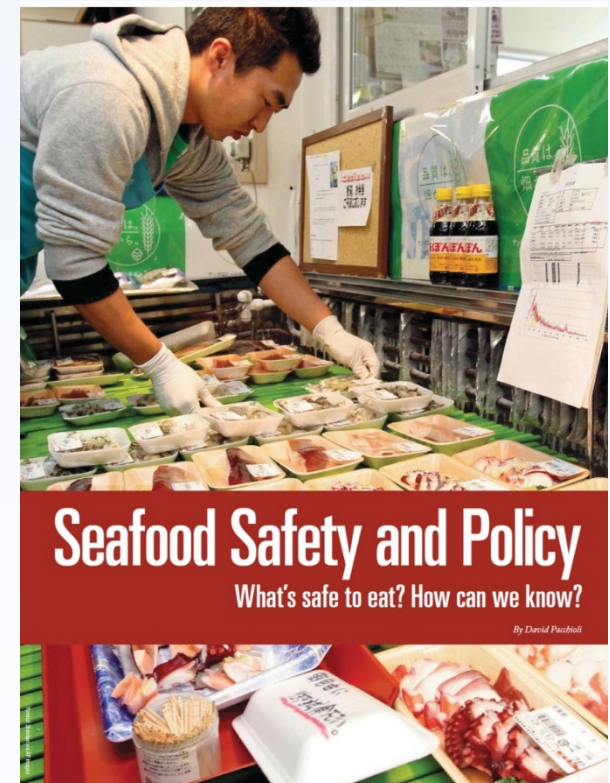
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Sciences

3rd International Symposium on the System of Radiological Protection
22 October 2015

This presentation has neither been approved nor endorsed by the Main Commission of ICRP

What is the Economic Cost of Marine Contamination after Fukushima?

- Direct loss from sales
- Ecological impacts of fishing bans
- Savings from government fishing subsidies



Inspired by Shunsuke Managi, Tokohu University
<http://www.whoi.edu/website/fukushima-symposium/overview>

Oceanus, 2013

What is the Economic Cost of Marine Contamination after Fukushima?

- Direct loss from sales
- Decrease in market value of marine products – even non-contaminated
- Ecological impacts of fishing bans
- Radiation effects in marine organisms
- Savings from government fishing subsidies
- Societal and demographic consequences from loss of livelihood for fishermen
- Loss of access to sites of cultural or community heritage

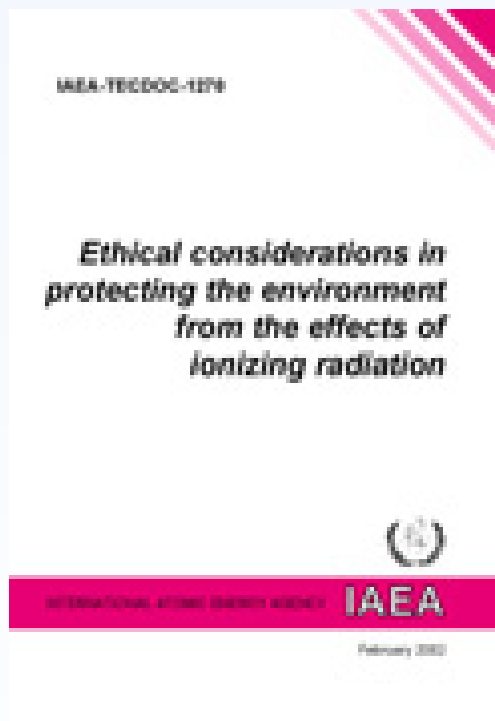


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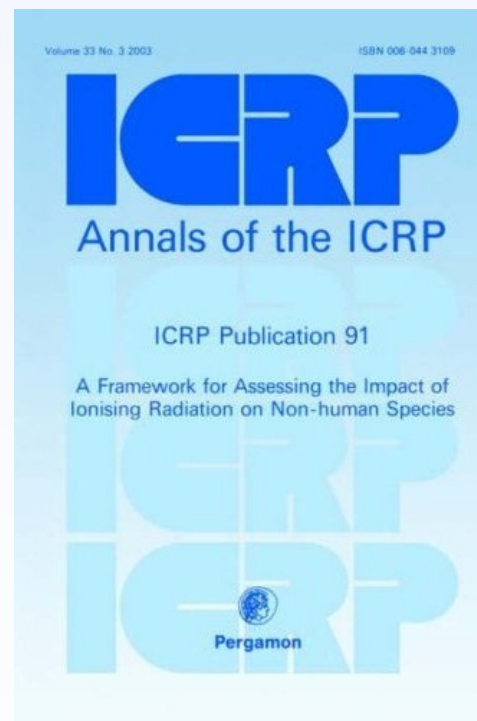
How do we Value the Environment?

- ethically
- in the context of environmental radiation protection

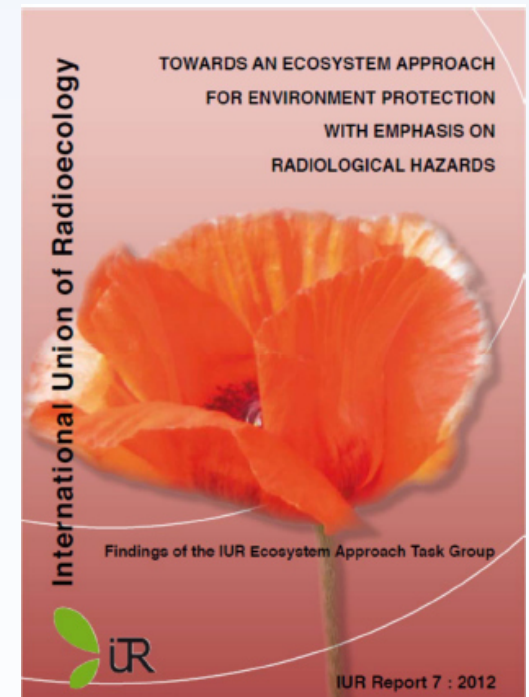
Philosophical and Ethical Aspects addressed during Development of the System



2002



2003



2012

IAEA, ICRP, IUR, NEA/OECD, ...

Stakeholder engagement

Radiation Protection in the 21st Century: Ethical, Philosophical and Environmental Issues

Consensus Conference on
Protection of the Environment

The Norwegian Academy of Science and Letters
Oslo, October 22–25th, 2001



ELSEVIER

Available

Journal of Environmental Radioactivity 74 (2004) 7–17

RADIOACTIVITY

www.elsevier.com/locate/jenvrad

GUIDING PRINCIPLES

“Humans are an integral part of the environment, and whilst it can be argued that it is ethically justified to regard human dignity and needs as privileged, it is also necessary to provide adequate protection to the environment.

In addition to science, policy making for environmental protection must include social, philosophical, ethical (including the fair distribution of harms/benefits), political and economic considerations. The development of such policy should be conducted in an open transparent, and participatory way.

The same general principles for protection of the environment should apply for all contaminants.”

From Conference Consensus Statement, 2001

The Oslo consensus conference on protection
of the environment

D.H. Oughton^{a,*}, P. Strand^b

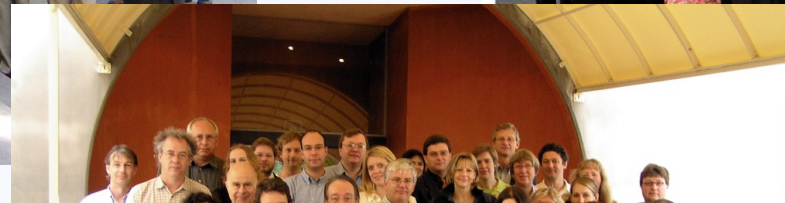
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ERICA – End-Users Group 2004-2006



ERICA – End-Users Group 2004-2006



Available online at www.sciencedirect.com



Journal of Environmental Radioactivity 99 (2008) 1503–1509

JOURNAL OF
ENVIRONMENTAL
RADIOACTIVITY

www.elsevier.com/locate/jenvrad

Stakeholder interaction within the ERICA Integrated Approach

I. Zinger^{a,*}, D.H. Oughton^b, S.R. Jones^c

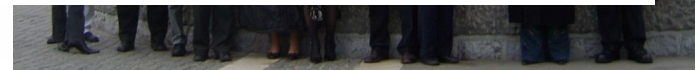
^a Swedish Radiation Protection Authority, 171 16 Stockholm, Sweden

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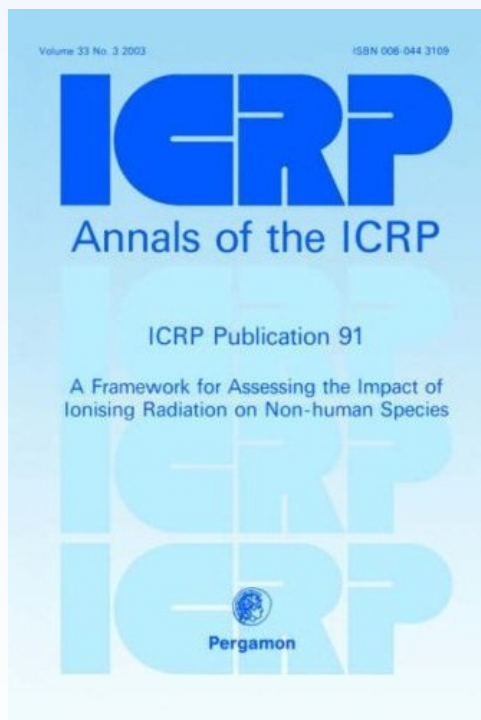
^c Westlakes Scientific Consulting Ltd., Westlakes Research Institute/Westlakes Scientific Consulting, Westlakes Science Park Moor Row, Cumbria CA24 3LN, UK



INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION

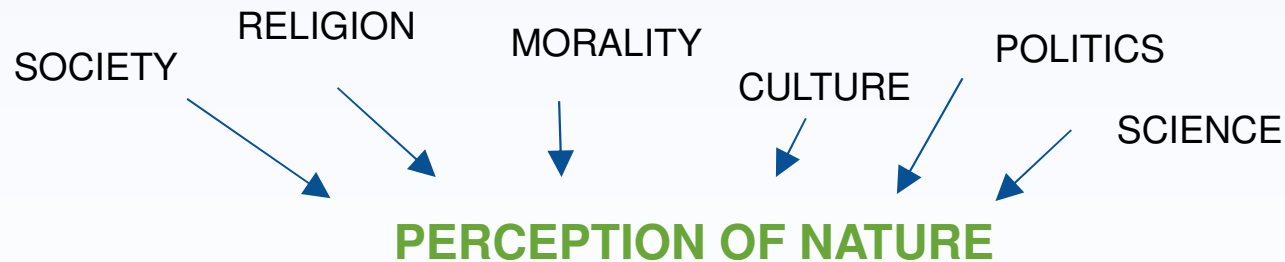


ICRP Publication 91, 2003



A Framework for
Assessing the Impact of
Ionising Radiation on
Non-Human Species

What has Moral Standing in the World and Why?



Value-basis

Conceptualised as:

ANTHROPOCENTRIC

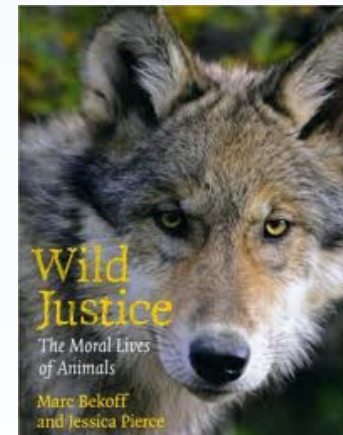
BIOCENTRIC

ECOCENTRIC

Philosophical worldviews

Antropocentric

- Human beings are the entities that have moral standing
- Non-human species and the environment have value only in so much as they satisfy human interests – “extrinsic value” (Frankena, Bookchin)
- Environmental effects matter only to the extent that they affect human interests



Antropocentrism and Valuing the Environment

Tourism?

Mineral Resources?

Food?

Hunting?

Aesthetic beauty?

Ecosystem Services



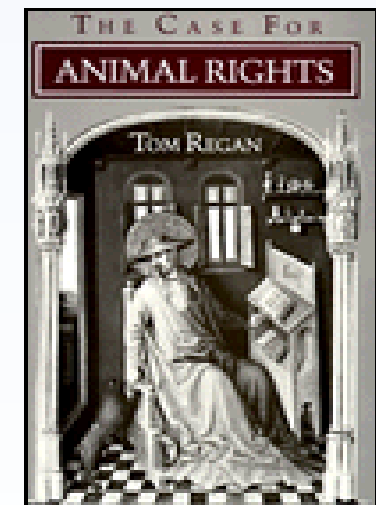
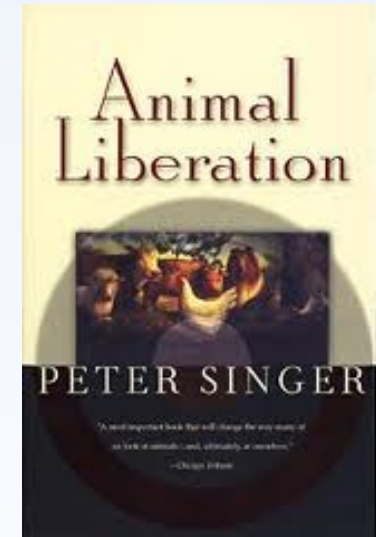
Biocentric

- Moral standing can be extended to individual members of other species, and thus obligations pertaining to such individuals arise as a consequence
- Different views about how we draw a moral distinction between humans and animals?
 - Rationality
 - Sentience
 - Inherent or instrumental worth
- Disagree on which organisms have moral standing



Biocentrism (Animal Ethics)

- **Utilitarian (Peter Singer)**
 - Ethical realm concerns all sentient creatures “can they feel pain, do they suffer”
- **Kantian/deontological (Tom Regan)**
 - animal rights, duty based ethics. Animals are capable of experience, thus have similar claim to rights as humans



Ecocentric

- Moral standing can be extended to virtually everything in the environment, including landscapes—rivers and mountains—but the focus lies more with the entirety and diversity of the ecosystem rather than, say, the



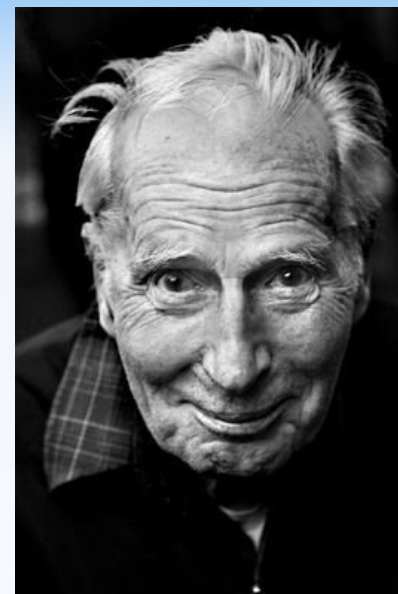
A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise.

(Aldo Leopold)

izquotes.com

Ecocentric

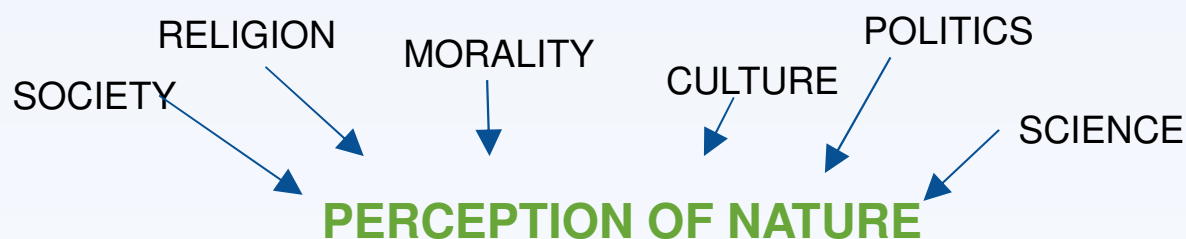
- A variety of views on the reasons for and solutions to environmental problems (human arrogance, male dominance, social and economic hierarchy)
- *“Humans have no right to interfere with the richness and diversity of the ecosystem except to satisfy vital needs (Næss)”*



Arne Næss



Ethical Foundations for Environmental Radiological Protection (ICRP Pub 91)



Value-basis

Conceptualised as:

ANTHROPOCENTRIC

BIOCENTRIC

ECOCENTRIC

*Philosophical
worldviews*

- All three theories can support the need to protect the environment
- Anthropocentrism can give powerful grounds for addressing the environmental impacts of ionising radiation
- Biocentric and ecocentric views reflected in many religions and cultures

Primary Principles of Environmental Radiological Protection (ICRP Pub 91)

ANTHROPOCENTRIC

BIOCENTRIC

ECOCENTRIC

Philosophical worldviews

Broadly compatible with the principles of:

Conservation

Biodiversity

Preservation

Environmental justice

Sustainable development

Human dignity

Primary Principles of Environmental Protection

Precautionary Principle
Substitution Principle

Best Available Technology
Polluter Pays

Informed Consent

2nd Level management principles

- All other things being equal, ionising radiation should not be treated differently to other environmental stressors
- Challenges for implementation and application

Areas of Agreement – ICRP 91

- **Sustainable development.** The UN 'Rio' Declaration of 1992 brought this concept into prominence (UN, 1992). Sustainable development relates to the need to recognise the interdependence of economic development, environmental protection, and social equity, and thus the obligation also to protect and provide for both the human and environmental needs of present and future generations...
- **Environmental justice.** Another feature of the Rio Declaration is the explicit responsibility to ensure that activities within national jurisdiction or control do not cause damage to the environment of other states. This, in turn, reflects the general principle of environmental justice: the need to take account of the fact that inequity can and does arise between the distribution of what might be termed 'environmental benefits and harm'...
- **Human dignity.** This, too, is a concept upon which there is international agreement. It is the cornerstone of the Charter of the UN (UN, 1945). It also has relevance to the concept of environmental protection and how it can be achieved. It recognises the need for the respect of individual human rights, and for the consequent range of human views...

Areas of Agreement – ICRP 91

- **Conservation.** There are many international agreements relating to the conservation of both species and habitats. They essentially relate to the 'importance' or 'vulnerability' attached to individual species, or areas where many species live, particularly with regard to the need for agreement at an international level in order to protect them; ...
- **Preservation.** Preservation recognises the worth of nature as pristine, as independent of human needs. Preservationists also argue for the value of wilderness, land untouched by human degradation or resource use; they recognise that wilderness is an important cultural value, not only in itself but also with respect to promoting character, spirituality, and natural systems (NRC, 1993)...
- **Maintenance of biodiversity.** This obligation also stems from Rio (UN, 1992), and recognises the need to maintain the biological diversity inherent within each species, amongst different species, and amongst different types of habitats and ecosystems.

Some Discussion Points

- **What is Harm?**
- **Impacts of Remediation**
- **Embracing Ecological complexity**

... and some comparisons with other environmental stressors

What is Harm?

SCIENTIFIC
REPORTS

OPEN

Abundance and genetic damage of barn swallows from Fukushima

SUBJECT AREAS:

ECOLOGICAL
EPIDEMIOLOGY
ECOPHYSIOLOGY

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A. P. Möller⁷ & T. A. Mousseau¹

- When does change become damage?
- Impacts on biodiversity, conservation, preservation... ?



Case: GloFish®

Research Ethics Class Discussion:

- GloFish are genetically modified fish that glow under ultraviolet light
- They were originally created for use in ecotoxicological studies, but are now marketed commercially in a number of countries.
- Should they be permitted to be sold in the EU?

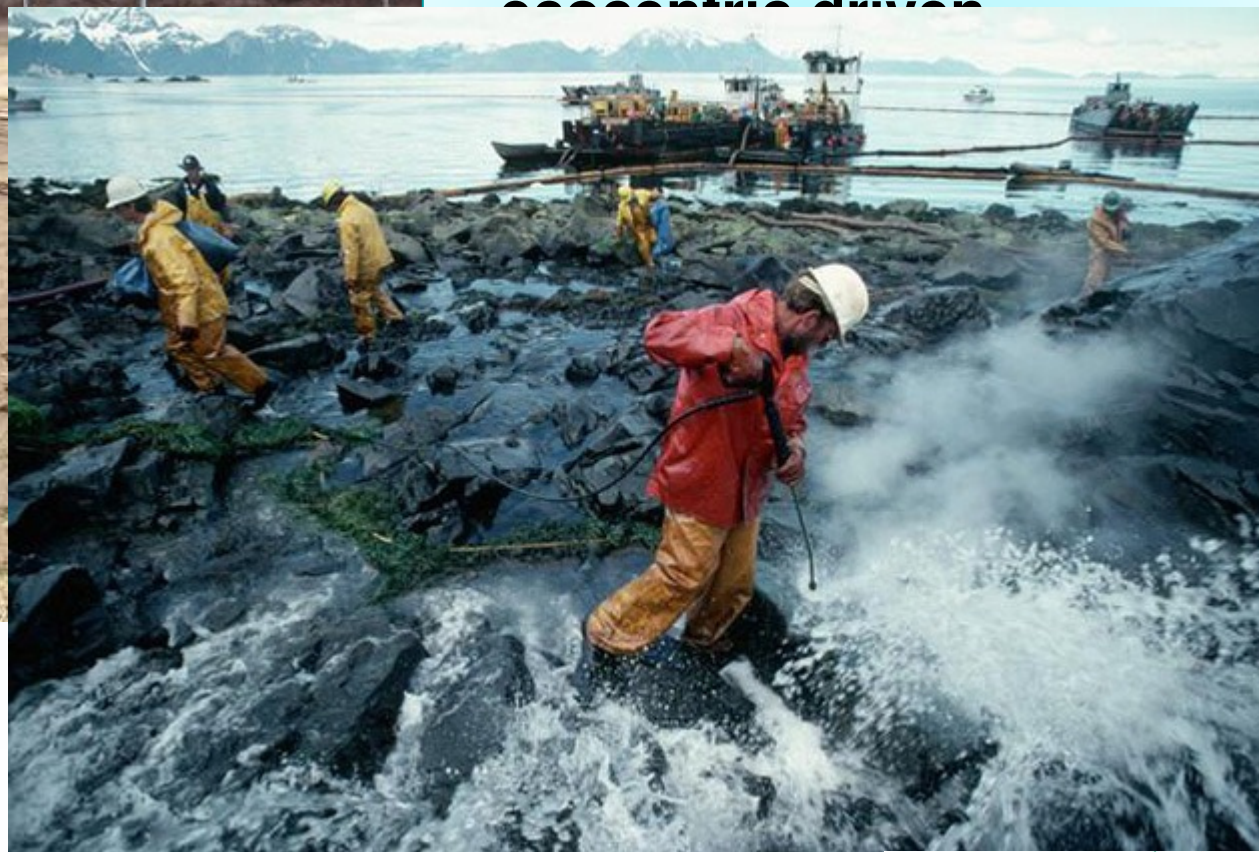


Impacts of Remediation

- Usually carried out on anthropocentric grounds
- Examples of biocentric or ecocentric drivers

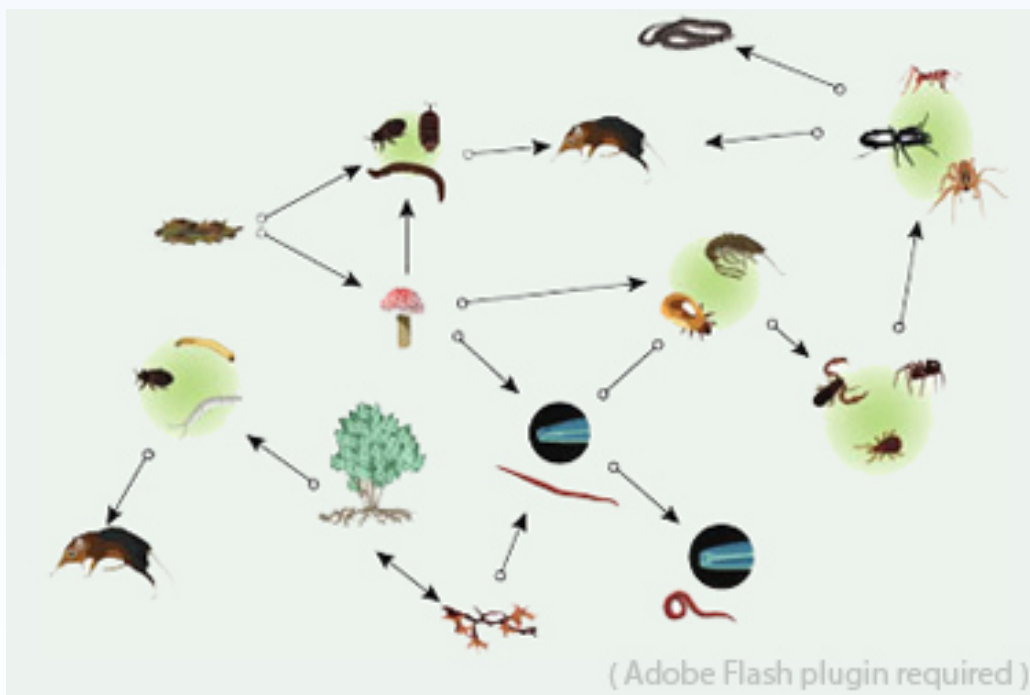


Fukushima Remediation



Embracing Ecological Complexity

- As for other environmental stressors, ionising radiation may cause indirect effects in populations through interactions and competition between species
- Which endpoints to monitor – diversity, functionality,...?



Sustainability and Ecosystem Approach



Worldpress.com

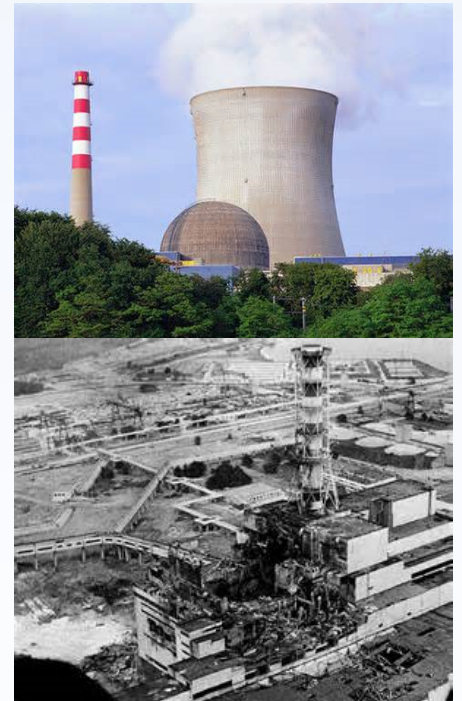
Implementation in Environmental Legislation and Legal Requirements – some final thoughts....

National differences in addressing environmental radiation protection

**Standards, benchmarks, guidance,
...**

Applications in planned and existing situations

Integration of human and environmental protection



Conclusions

- **The ethical foundation of Environmental Radiation Protection has been addressed in ICRP and other publications**
- **A holistic evaluation of the environmental impacts of ionizing radiation should consider not only the direct consequences on the health of humans and non-humans, but also the more complex social, ecological, ethical and economic consequences of environmental exposures.**
- **Environmental radiation protection can improve interaction between chemical and radiological disciplines**
... including improved comparison of radiation and other environmental hazards.
- **Further explorations on implementation and applications of the system would be useful**

Thank you

www.ICRP.org

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