Overview of ICRP C5
Protection of the Environment

IUR International Workshop

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Kathryn Higley
Vice-Chair, ICRP Committee 5
OVERVIEW of ICRP

• ICRP is an independent, international organization that advances for the public benefit the science of radiological protection, in particular by providing recommendations and guidance on all aspects of protection against ionizing radiation.

• ICRP is a Registered Charity (a not-for-profit organisation) in the United Kingdom, and has a Scientific Secretariat in Ottawa, Canada.

• ICRP is comprised of a Main Commission, a Scientific Secretariat, five standing Committees (on Effects, Doses, Medicine, Application, and the Environment), and a series of Task Groups and Working Parties.
ICRP Management

- Main Commission (MC) and Scientific Secretariat direct, organize, and oversee ICRP.
- Main Commission approves all reports for publication.
- Committees advise MC and direct Task Groups.

**Task Groups**
- Established to undertake a specific task, such as production of a single ICRP report.
- Generally comprised of a mixture of Committee members and other experts in the field.

**Working Parties**
- Normally formed of Committee members to explore particular issues,
- May become Task Groups if work is to result in an ICRP publication.
Committee 5 Membership

Carl-Magnus Larsson, Australia, Chair
Kathryn A. Higley, USA, Vice-Chair
Almudena Real, Spain, Secretary
David Copplestone, UK
Jacqueline Garnier-Laplace, France
Jianguo Li, China
Kazuo Sakai, Japan
Per Strand, Norway
Alexander Ulanovsky, Germany
Jordi Vives I Batlle, Belgium
C5 is concerned with radiological protection of the environment. It will aim to ensure that the development and application of approaches to environmental protection are compatible with those for radiological protection of man, and with those for protection of the environment from other hazards
Evolution of two parallel pathways

Planned, emergency, and existing exposure situations

Environmental radionuclide concentrations

Reference Male & Female, and Reference Person

Reference Animals and Plants

Dose limits, constraints and reference levels

Derived Consideration Reference Levels

Decision-making regarding public health and environmental protection for the same environmental exposure situation by way of representative individuals and representative organisms

INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION
ICRP 91 (2003)

Review of ethics and principles, recommending that the System for Environmental Protection should

- focus on biota;
- consider *adequate protection* on the basis of understanding of effects;
- identify reference animals and plants (RAPs); and
- let the RAPs guide the derivation of
  - exposure scenarios (CFs and DCFs)
  - effects data
  - dose rates benchmarks
(30) ....aim is...preventing and reducing the frequency of deleterious radiation effects to a level where they would have negligible impact on the maintenance of biological diversity, the conservation of species, or the health and status of natural habitats, communities and ecosystems.

(366) .....Reference Animals and Plants.......
<table>
<thead>
<tr>
<th>WILDLIFE GROUP</th>
<th>RAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large terrestrial mammals</td>
<td>Deer</td>
</tr>
<tr>
<td>Small terrestrial mammals</td>
<td>Rat</td>
</tr>
<tr>
<td>Aquatic birds</td>
<td>Duck</td>
</tr>
<tr>
<td>Amphibians</td>
<td>Frog</td>
</tr>
<tr>
<td>Freshwater pelagic fish</td>
<td>Trout</td>
</tr>
<tr>
<td>Marine fish</td>
<td>Flatfish</td>
</tr>
<tr>
<td>Terrestrial insects</td>
<td>Bee</td>
</tr>
<tr>
<td>Marine crustaceans</td>
<td>Crab</td>
</tr>
<tr>
<td>Terrestrial annelids</td>
<td>Earthworm</td>
</tr>
<tr>
<td>Large terrestrial plants</td>
<td>Pine tree</td>
</tr>
<tr>
<td>Small terrestrial plants</td>
<td>Wild grass</td>
</tr>
<tr>
<td>Seaweeds</td>
<td>Brown seaweed</td>
</tr>
</tbody>
</table>
ICRP 108 reviews biological characteristics

- Occurrence
- Taxonomy
- Life cycle and life span
- Reproductive strategy
- Physiology
- Ecology
- Other factors
ICRP 108

DCCs for simple geometries

Trunk and branch
ICRP 108
Derived Consideration Reference Levels, DCRLs

- Deer
- Rat
- Duck
- Pine tree
- Frog
- Trout
- Flatfish
- Grass
- Seaweed
- Bee
- Crab
- Earthworm

- Invertebrate benchmark
- Plant benchmark
- Vertebrate benchmark
- Generic benchmark
- Background level

Benchmarks from other studies/systems
Concentration Ratios for 39 elements and 12 RAPs

- with associated statistics;
- based on existing field and laboratory data;
- using new methodology to derive data (‘surrogate data’) where such are missing;
- taking into account life cycle stages and habitats, when possible; and
- discussing the robustness of the data
ICRP 124

Application in planned exposure situations

DCRL for relevant RAP

Reference point for the sum of all sources
ICRP 124

Application in existing exposure situations

Potential for dose rate reduction

Increasing dose rate

Minimum level of ambition

DCRL for relevant RAP
ICRP 124

Application in emergency exposure situations

Order of magnitude bands of dose rate

Severe Effects Level

Dose rate to relevant biota

Time after event
Conclusions

- A robust system has evolved that is compatible with the RP system for man and the EP system developed for other hazards
- Considering the environment in its own right is appropriate and facilitates communication
- Simple to apply using default RAPs databases – but can also cope with complex exposure situations
- Priority during this term to
  - Consolidation
  - Broadening the scientific basis
  - Improving applicability