



**The ICRP approach to radiation protection of the environment**

**Regulatory Information Conference (RIC)**  
March 10-12  
27<sup>th</sup> Annual Regulatory Conference

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Professor & Head,  
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**C5 Mission**

“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”



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**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*



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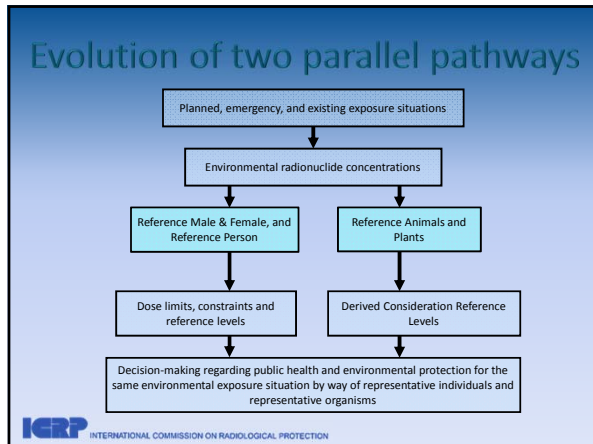
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### ICRP103

(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.....

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### ICRP 108: RAPS



WILDLIFE GROUP	Reference Animals and Plants
Large terrestrial mammals	Deer
Small terrestrial mammals	Rat
Aquatic birds	Duck
Amphibians	Frog
Freshwater pelagic fish	Trout
Marine fish	Flatfish
Terrestrial insects	Bee
Marine crustaceans	Crab
Terrestrial annelids	Earthworm
Large terrestrial plants	Pine tree
Small terrestrial plants	Wild grass
Seaweeds	Brown seaweed

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## ICRP 108

ICRP 108 reviews biological characteristics

- Occurrence
- Taxonomy
- Life cycle and life span
- Reproductive strategy
- Physiology
- Ecology
- .....other factors.....



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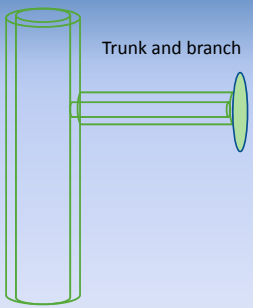
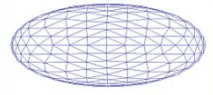
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## ICRP 108

DCCs for simple geometries



Trunk and branch



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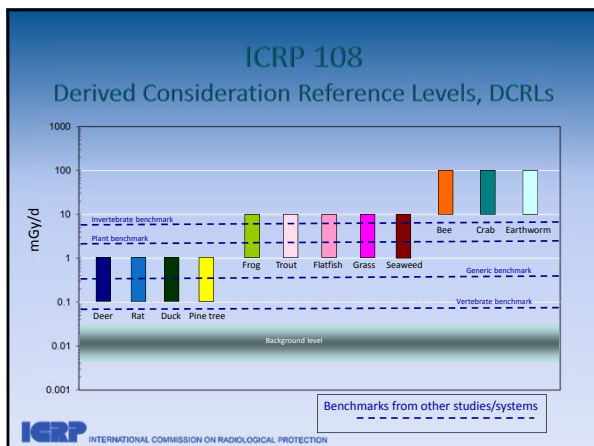
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## ICRP 114

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 in to account life cycle stages and habitats, when possible; and
- Discussing the robustness of the data



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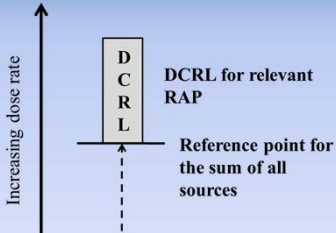
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## ICRP 124


Application in planned exposure situations



Increasing dose rate

DCRL for relevant RAP

Reference point for the sum of all sources



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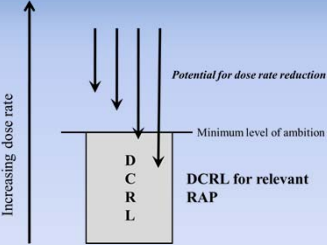
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## ICRP 124

Application in existing exposure situations




Increasing dose rate

Potential for dose rate reduction

Minimum level of ambition

DCRL for relevant RAP



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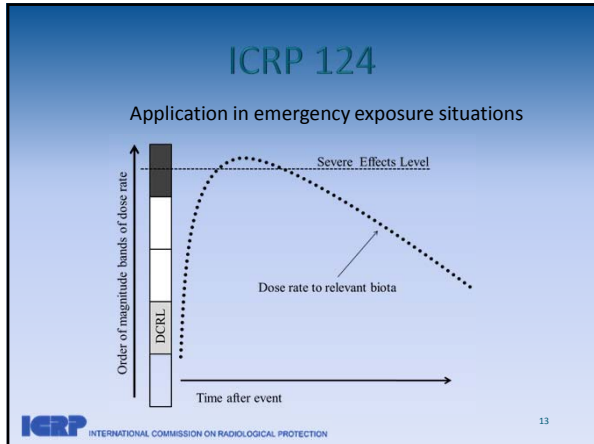
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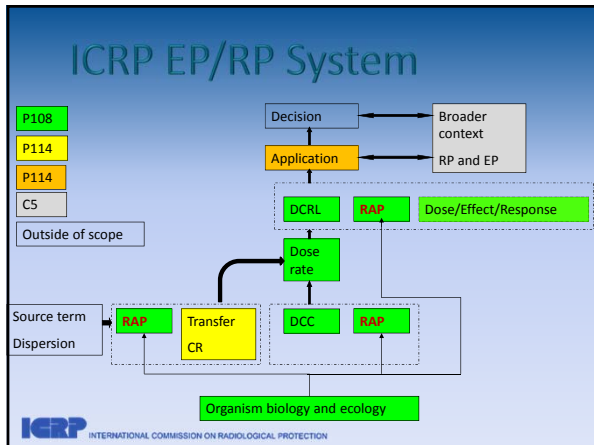
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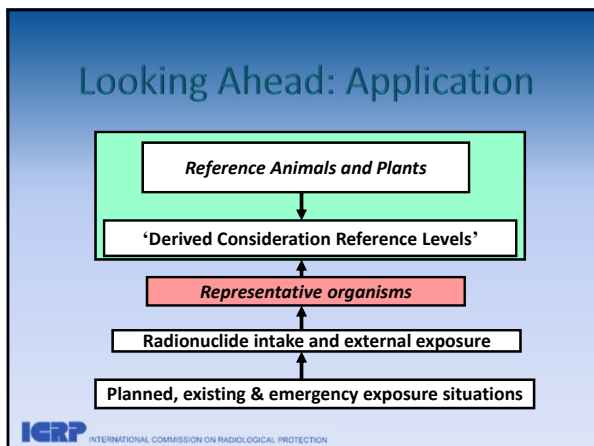
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## Looking Ahead: RAPS Monographs

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## Looking Ahead: Applications

**Environmental compliance index.**  
 If :  
 $\Sigma$  radionuclides not greater than x  
 & no individual radionuclide greater than y  
 then  
 OK for man and the environment

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Max. concentrations of radionuclides in air, water and 'soil'

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Authorized Release Rates

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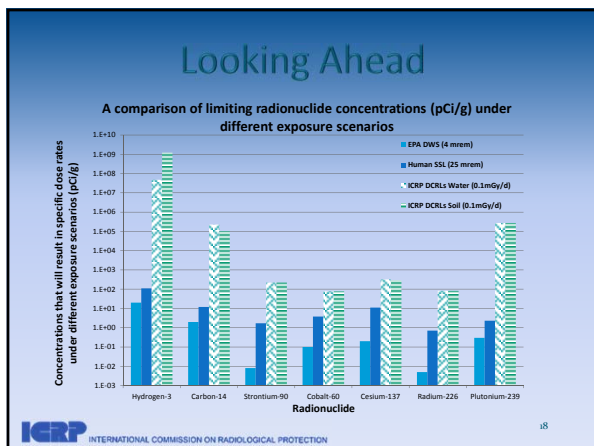
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## Conclusions

- 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
- ICRP priority during this term to
  - Consolidation
  - Broadening the scientific basis
  - Improving applicability

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# ICRP

[www.icrp.org](http://www.icrp.org)

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## Other Activities

### Finalisation of TGs 72 and 74

- TG 72 on RBE for RAPs. Useful survey of general interest – data for many RAPs scarce or inexistent. Sign-off for discussion with C1 and then to MC
- TG 74 on more realistic dosimetry. Finalisation of the work of the TG. Potential development of a stand-alone software tool (or a web-based application) capable of deriving DCC for arbitrary organisms based on the new ICRP radionuclide database (P107).

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## Other Activities

### Consolidation of system and data bases

- Generic methodology for establishing relevant data bases for assessments of effects in organisms and ecosystems. Outline of report structure developed.
- RAP monographs. Compilation of data on biology, life cycle, stable element ratios, exposure scenarios (incl background), transfer factors, effects, models, conclusions.

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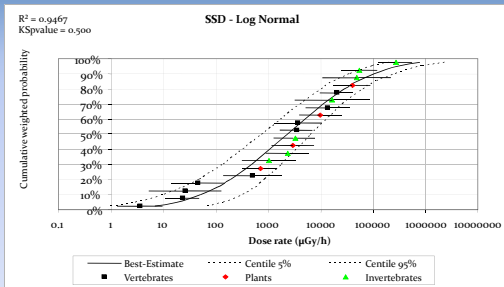
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## Other Activities: Species Sensitivity



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## Other Activities

### Situation-specific applications

- Definition of the representative organism, building on existing data bases
- Application in different situations, e.g. for nuclear fuel cycle facilities, mining and milling of radioactive ores.....

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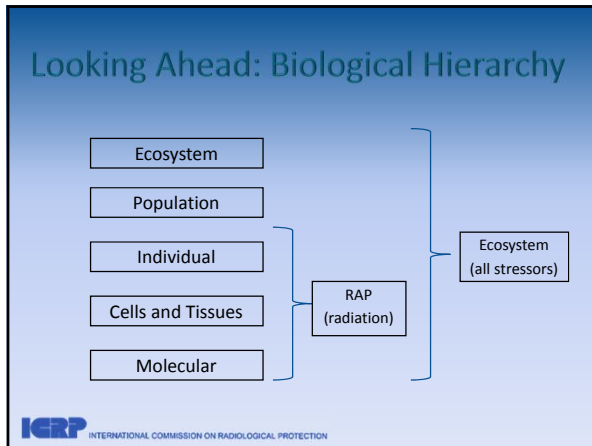
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