

# **System for radiation protection of the environment (i.e. existing, planned and emergency)**

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Panel Discussion

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# Derived Consideration Reference Levels (DCRLs)

- ICRP Publication 108:
- *“A DCRL can therefore be considered as a band of dose rate within which there is likely to be some chance of deleterious effects of ionising radiation occurring to individuals of that type of Reference Animal or Plant, derived from a knowledge of defined expected biological effects for that type of organism that, when considered together with other relevant information, can be used as a point of reference to optimise the level of effort expended on environmental protection, dependent upon the overall management objectives and the exposure situation.”*
- Noting natural background and that very high exposures are unlikely in the environment

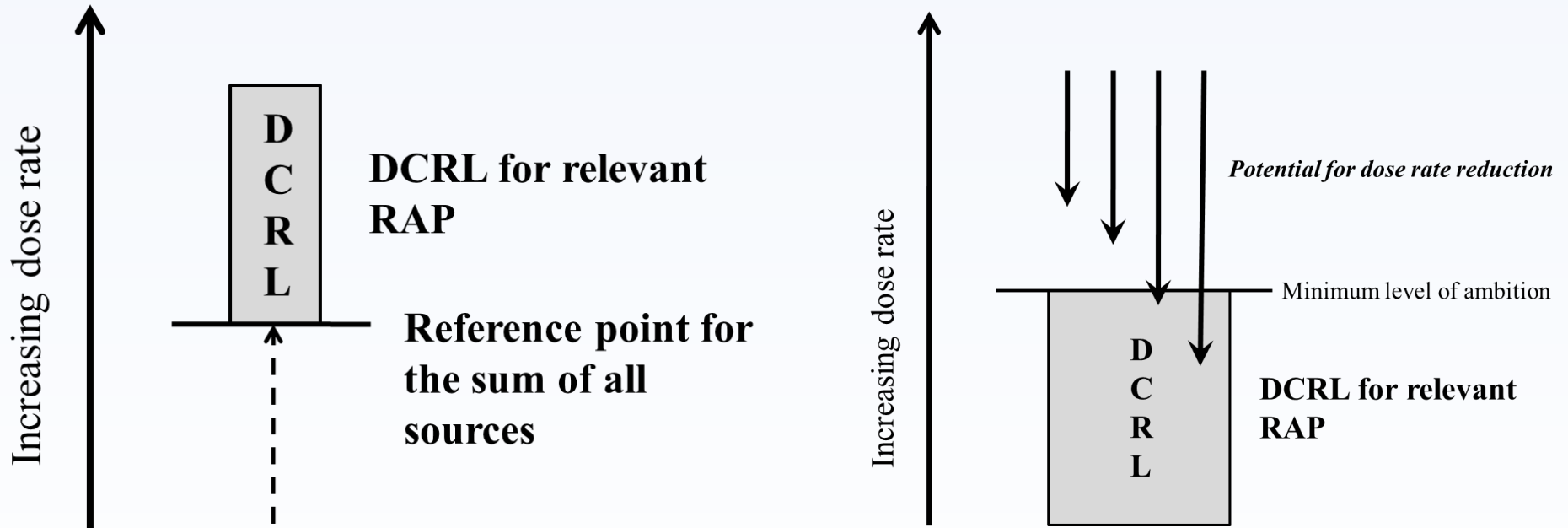
# RAPs and DCRLs

Wildlife group	Ecosystem <sup>1</sup>	RAP	DCRL, mGy d <sup>-1</sup> (shaded)		
			0.1-1	1-10	10-100
Large terrestrial mammals	T	Deer	■	■	■
Small terrestrial mammals	T	Rat			
Aquatic birds	F, M	Duck			
Large terrestrial plants	T	Pine tree			
Amphibians	F, T	Frog	■	■	■
Pelagic fish	F, M	Trout			
Benthic fish	F, M	Flatfish			
Small terrestrial plant	T	Grass	■	■	■
Seaweeds	M	Brown seaweed			
Terrestrial insects	T	Bee	■	■	■
Crustacean	F, M	Crab			
Terrestrial annelids	T	Earthworm			

<sup>1</sup>T, terrestrial; F, freshwater; M, marine

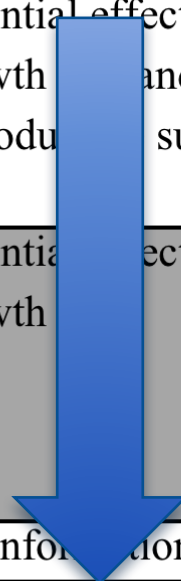
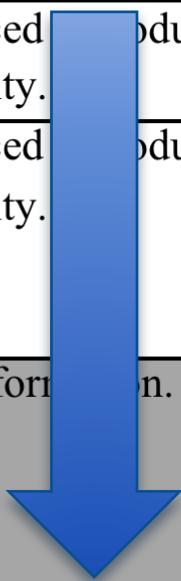
# Application

## Planned and existing exposure situations



[ICRP Publication 124]

Dose rate (mGy d <sup>-1</sup> )	Reference Pine tree	Reference Wild grass	Reference Brown seaweed
>1000	Mortality [5 to 16 Gy LD <sub>50</sub> ].	Mortality [16 to 22 Gy LD <sub>50</sub> ].	Deleterious effects expected at very high dose rates. No LD <sub>50</sub> data.
100 - 1000	Mortality of pine trees after prolonged exposure.	Reduced reproductive capacity.	Effects on growth rate.
10 - 100	Mortality of pine trees after very long exposure. Growth defects. Reduced reproductive success.	Reduced reproductive capacity.	Potential effects on growth and reproductive success.
1 - 10	Morbidity assessed through anatomical and morphological damage. Prolonged exposure leads to reduced reproductive success.	No information.	Potential effects on growth.
0.1 - 1	No information.	No information.	No information.
0.01 - 0.1	No information.	No information.	No information.
< 0.01	Natural background.	Natural background.	Natural background.



# DCRLS in existing exposure situations

- **ICRP Publication 124:**

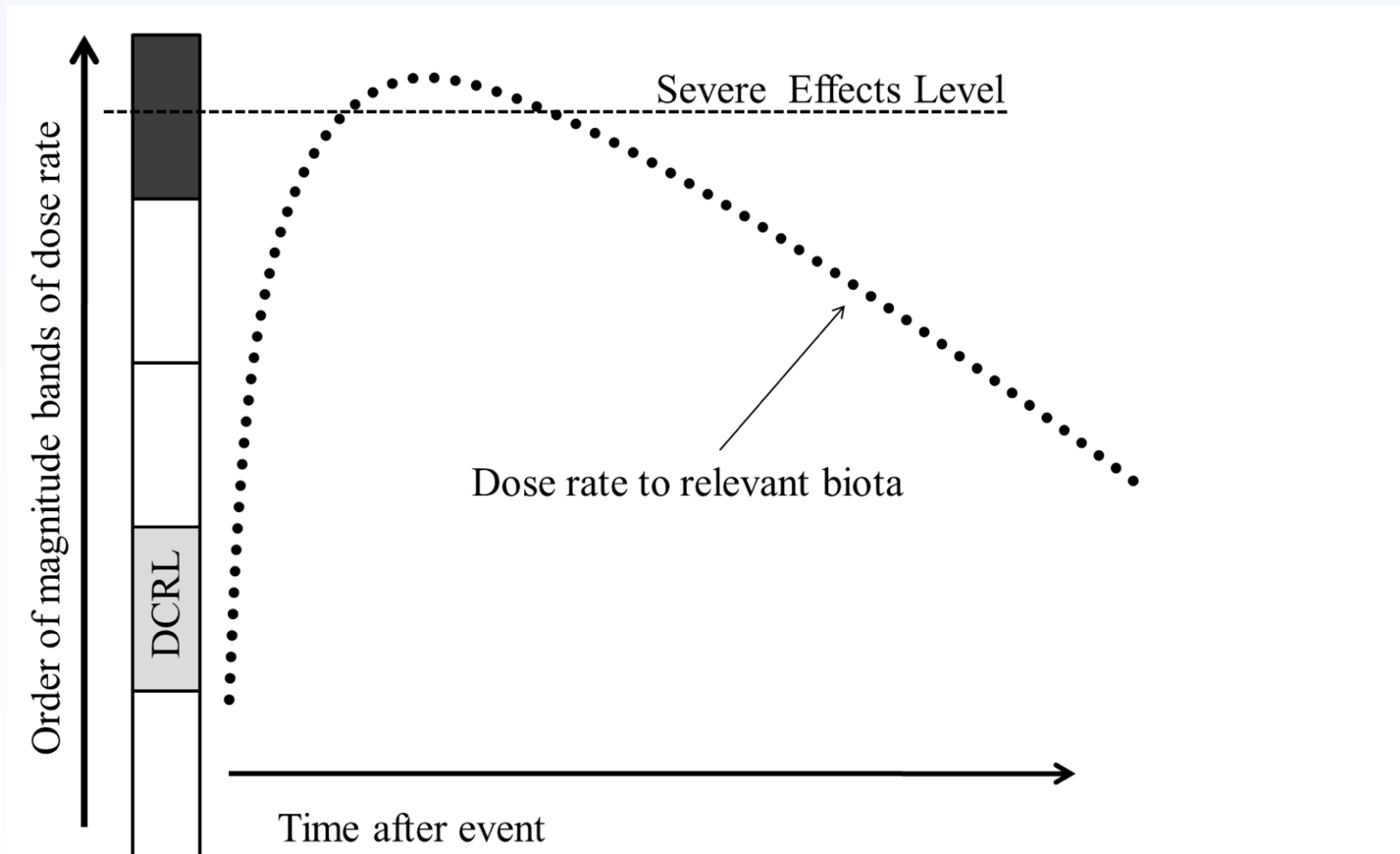
*“...the Commission recommends that the aim should be to reduce exposures to levels that are within the DCRL bands (or even below, depending upon the potential cost/benefits) but with full consideration of the radiological and non-radiological consequences of doing so.”*

# Existing exposure situations

- **General principle**
  - By considering radiological and non-radiological impacts on wildlife aim to do more good than harm in any management approach adopted
- **Justification** of any changes anticipated following management action in terms of both humans and wildlife
- New TG - We may need to produce **additional guidance** and **recommendations** incorporating environmental radiological protection e.g.
  - What to do if the assessment indicates impacts above the DCRL for wildlife but where there is no significant human impact
  - What to do in complex situations with both existing and planned exposure situations

# Application

## Emergency exposure situations



[ICRP Publication 124]



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