EMRAS WORKING GROUP 8:
– ENVIRONMENTAL SENSITIVITIES
– FOREST AND ARCTIC SCENARIOS

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General requirements:

Source term: ^{137}Cs, ^{90}Sr, and ^{131}I; A single deposition of 1000 Bq/m^2 each under both dry conditions and heavy rainfall.

Seasons: Winter, spring, summer, fall.

Radionuclide concentrations: In soil, water, and plants or animals either consumed directly by humans, or as members of food chains leading to humans.

Radiation doses: To adult, 10-year old, and one-year old – during the 1st year, 2nd year and 10th year after the accident.

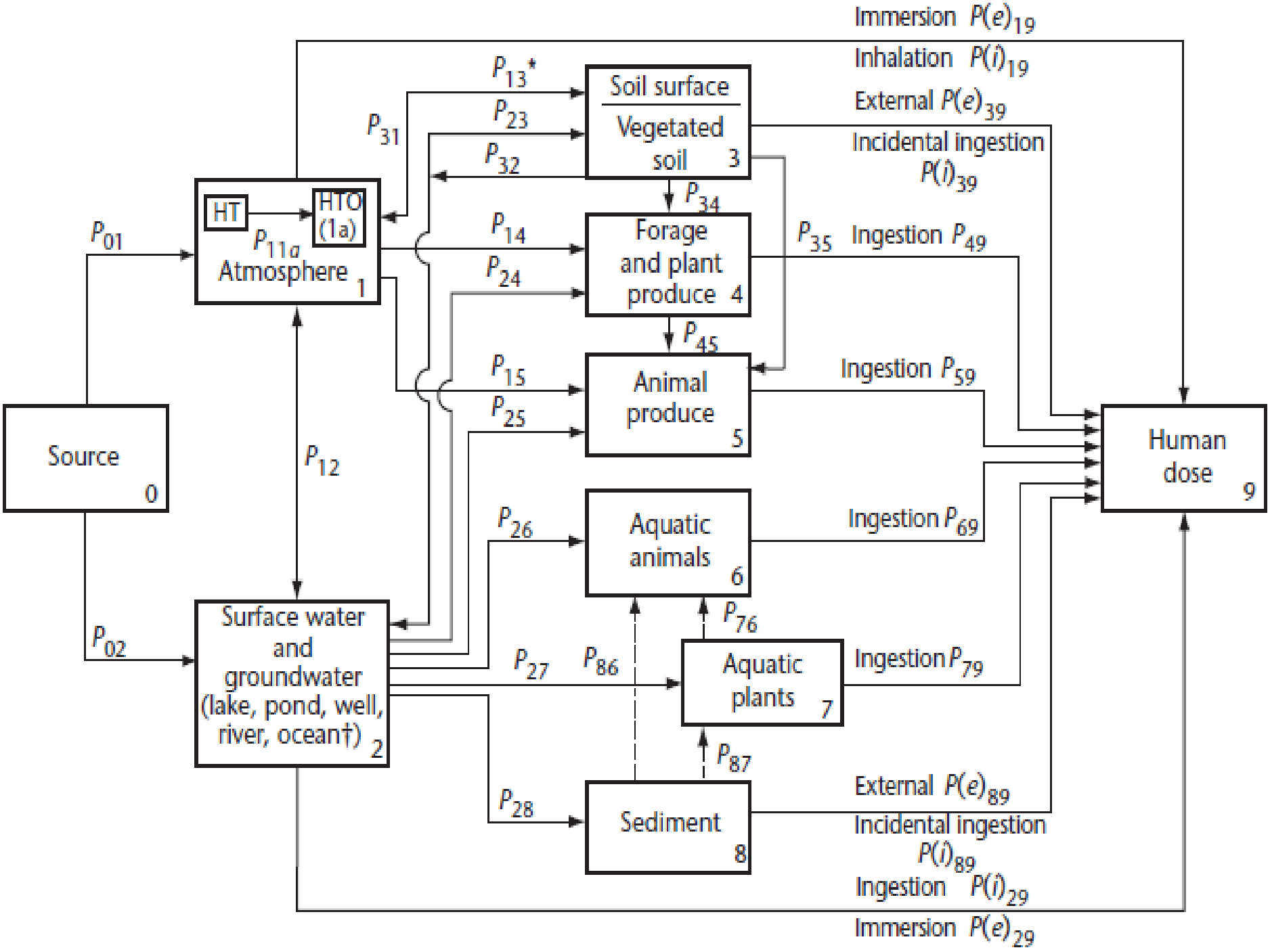

Immersion $P(e)_{19}$
Inhalation $P(i)_{19}$
External $P(e)_{39}$
Incidental ingestion $P(i)_{39}$
Ingestion P_{49}
Ingestion P_{59}
Ingestion P_{69}
Ingestion P_{79}
External $P(e)_{89}$
Incidental ingestion $P(i)_{89}$
Ingestion $P(i)_{29}$
Immersion $P(e)_{29}$
P_{13}*
P_{23}
P_{31}
P_{32}
P_{34}
P_{35}
P_{14}
P_{24}
P_{45}
P_{15}
P_{25}
P_{26}
P_{76}
P_{27}
P_{86}
P_{87}
P_{28}
P_{01}
P_{02}
P_{12}
HT
HTO (1a)
P_{11a}
Atmosphere 1
Soil surface
Vegetated soil 3
Forage and plant produce 4
Animal produce 5
Aquatic animals 6
Aquatic plants 7
Sediment 8
Surface water and groundwater (lake, pond, well, river, ocean†) 2
Source 0
Human dose 9

Table 1. Groundshine dose factors (Sv/a)/(Bq/m^2) [Oak Ridge]

	Adult and Children	Infants
Cs-137	1.75E-08	2.28E-08
Sr-90	5.18E-11	5.18E-11
I-131	3.65E-10	4.76E-10

Table 6. Human consumption of traditional foods (kg/a) (Hatchet Lake dietary survey)

Food item	2 -10 year old	11-20 year old	Adults
Caribou	88.97	77.56	114.7
Moose	0.29	0.11	0.9
Small mammals	0.00	0.58	1.6
Ground birds	0.04	0.91	1.0
Water birds	1.48	2.57	3.6
Traditional fruits	6.02	4.42	1.2
Fish	29.09	14.22	52.9

Table 7. Water consumption (L/d)
[US Environmental Protection Agency]

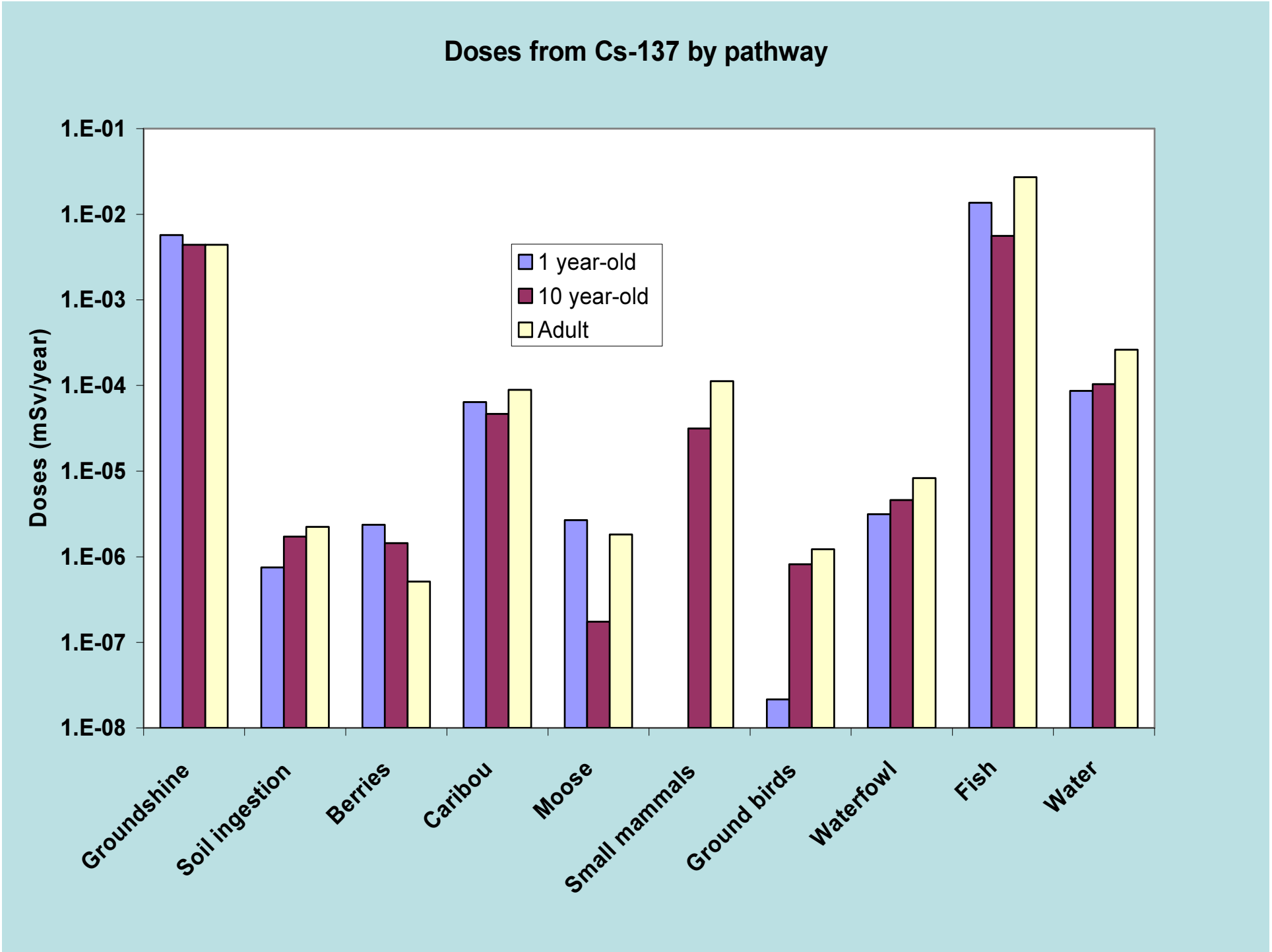
	Mean	90th %ile
Infant	0.5	0.98
Child	0.72	1.4
Adult	1.4	2.3

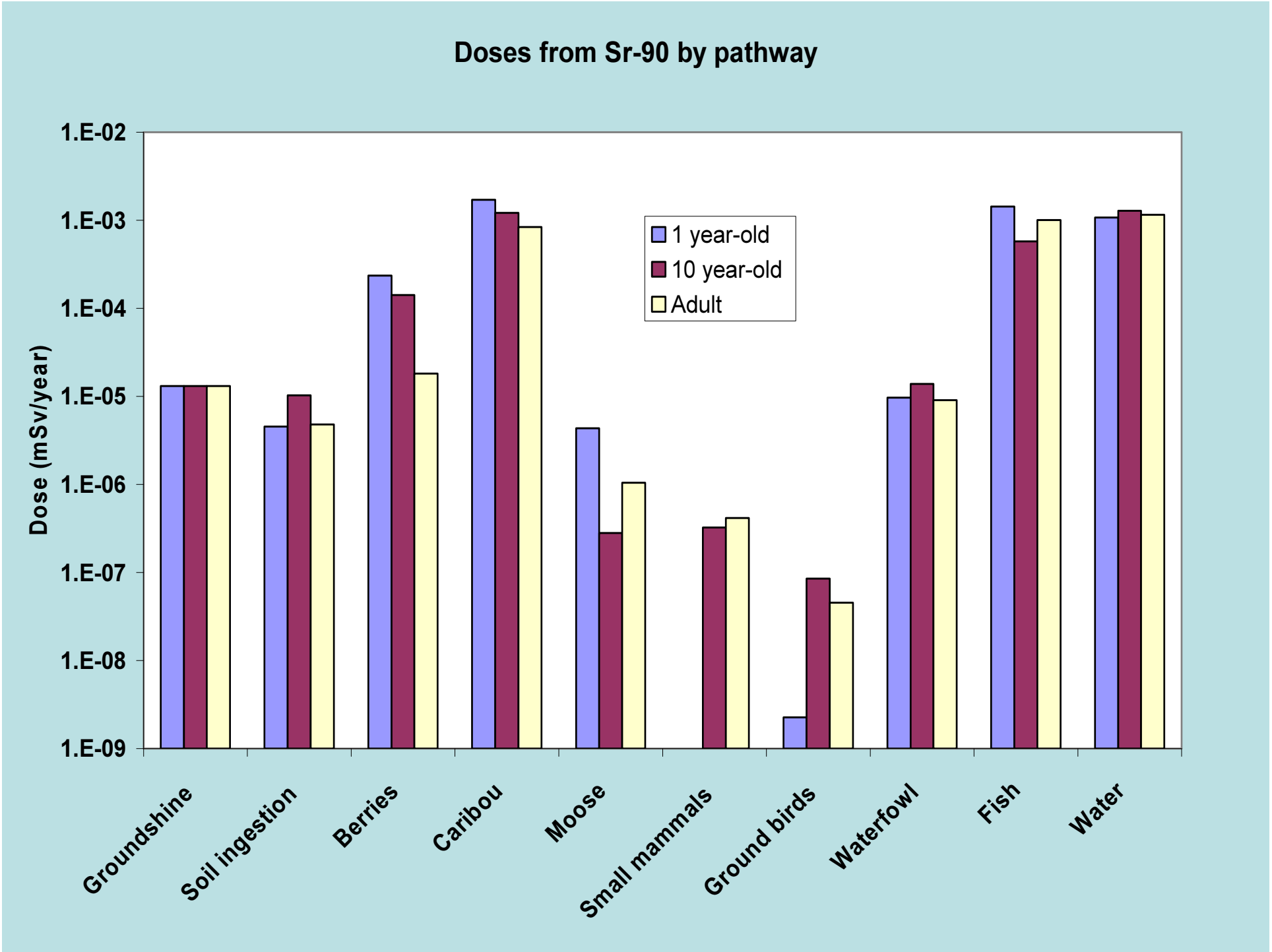
Table 8. Average concentrations in water and fish in year one from Lake Øvre Heimdalsvatn (from Luigi Monte's contribution)

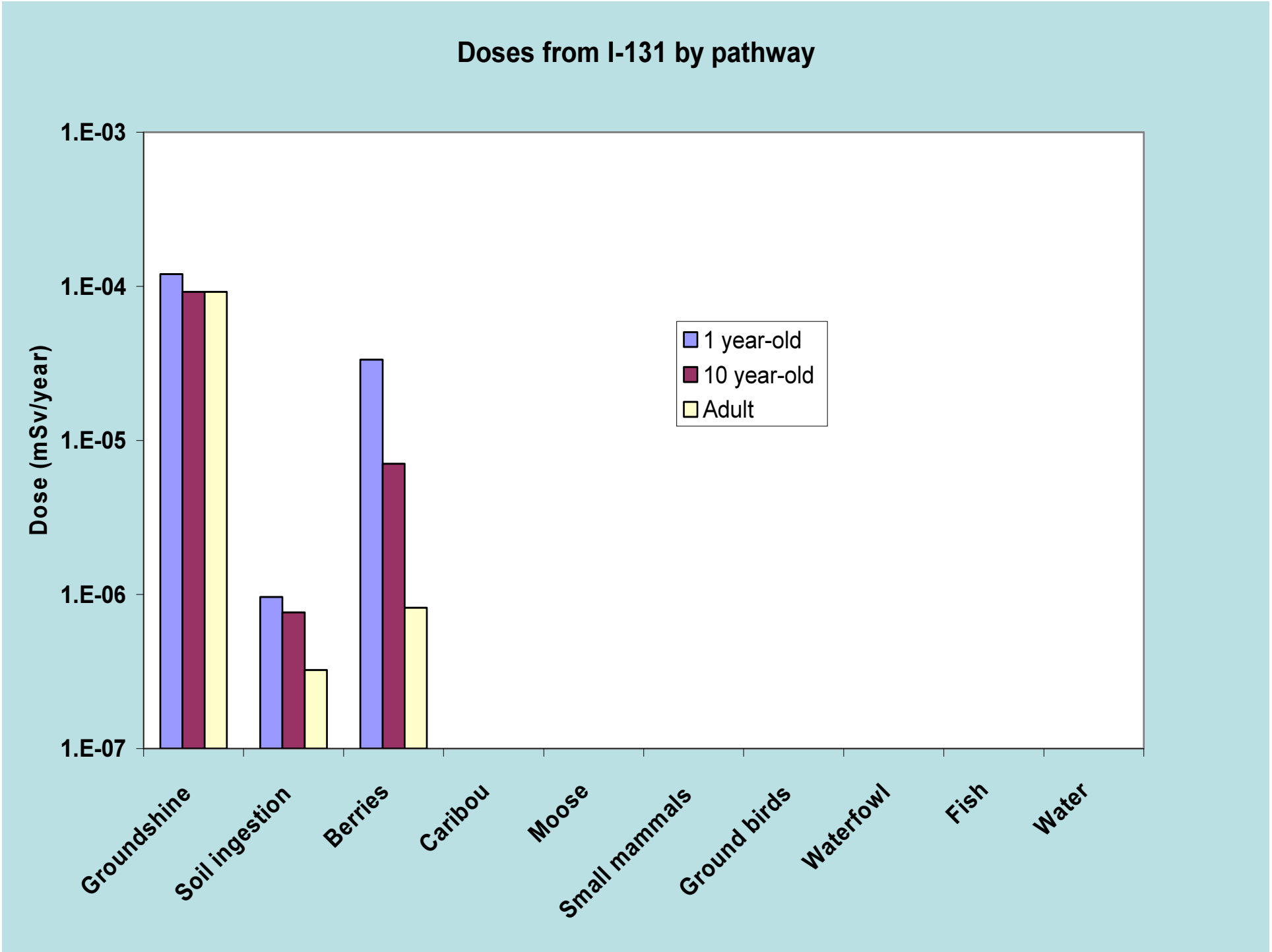
	Cs-137	Sr-90
Concentrations in water (Bq/L)	0.039	0.081
Concentrations in fish (Bq/kg)	39.16	0.68

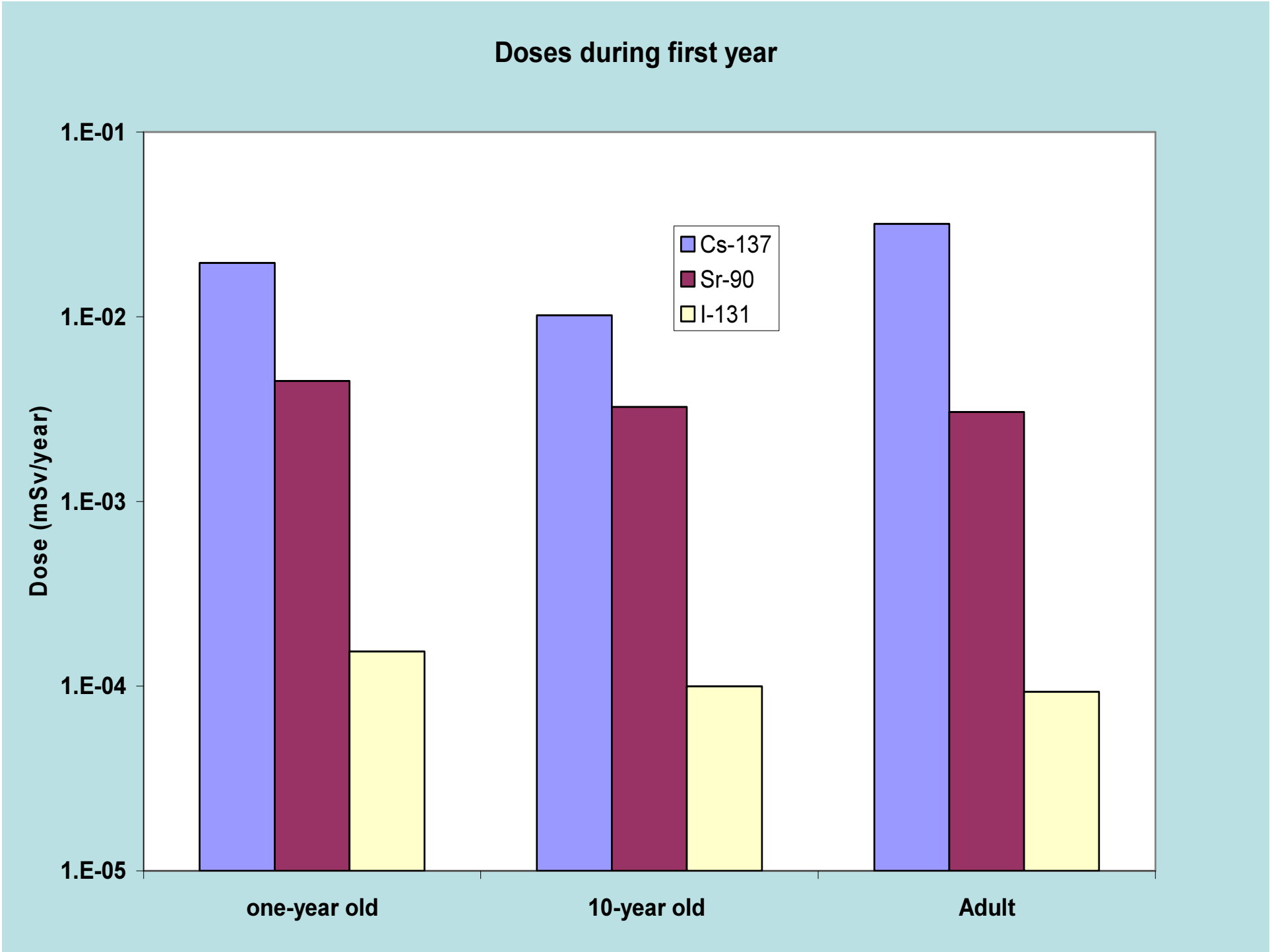
Table 9. Summary of doses to humans during year one (mSv/a)

Radionuclide	one-year old	10-year old	Adult
Cs-137	0.01958	0.01017	0.03184
Sr-90	0.00448	0.00325	0.00305
I-131	0.00015	0.00010	0.00009
Total	0.02421	0.01352	0.03498


Doses from Cs-137 by pathway
Doses (mSv/year)
1.E-01
1.E-02
1.E-03
1.E-04
1.E-05
1.E-06
1.E-07
1.E-08
1 year-old
10 year-old
Adult
Groundshine
Soil ingestion
Berries
Caribou
Moose
Small mammals
Ground birds
Waterfowl
Fish
Water

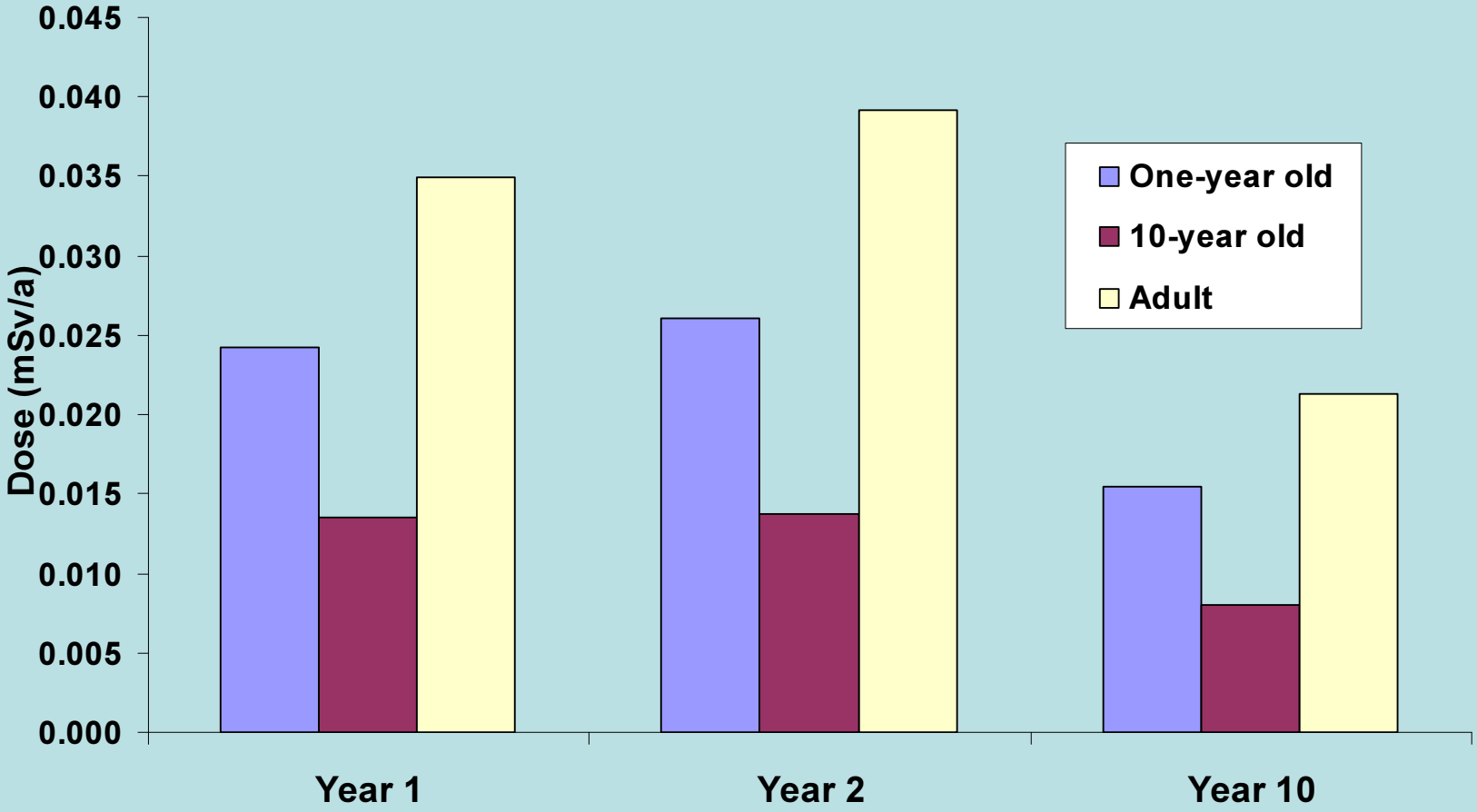

Doses from Sr-90 by pathway
Dose (mSv/year)
1.E-02
1.E-03
1.E-04
1.E-05
1.E-06
1.E-07
1.E-08
1.E-09
1 year-old
10 year-old
Adult
Groundshine
Soil ingestion
Berries
Caribou
Moose
Small mammals
Ground birds
Waterfowl
Fish
Water


Doses from I-131 by pathway
1.E-03
1.E-04
1.E-05
1.E-06
1.E-07
Dose (mSv/year)
1 year-old
10 year-old
Adult
Groundshine
Soil ingestion
Berries
Caribou
Moose
Small mammals
Ground birds
Waterfowl
Fish
Water


Doses during first year
1.E-01
1.E-02
1.E-03
1.E-04
1.E-05
Dose (mSv/year)
Cs-137
Sr-90
I-131
one-year old
10-year old
Adult

Ecological half-lives of Cs-137 and Sr-90

	Food Item	Sampling Region	Observation Period	Ecological Half-life (a)	Decay Constant
Cs-137	Whole Diet	Germany	1967-1985	8.1	0.0856
Sr-90	Whole Diet	Germany	1967-1985	14.1	0.0492


0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
Dose (mSv/a)
One-year old
10-year old
Adult
Year 1
Year 2
Year 10