

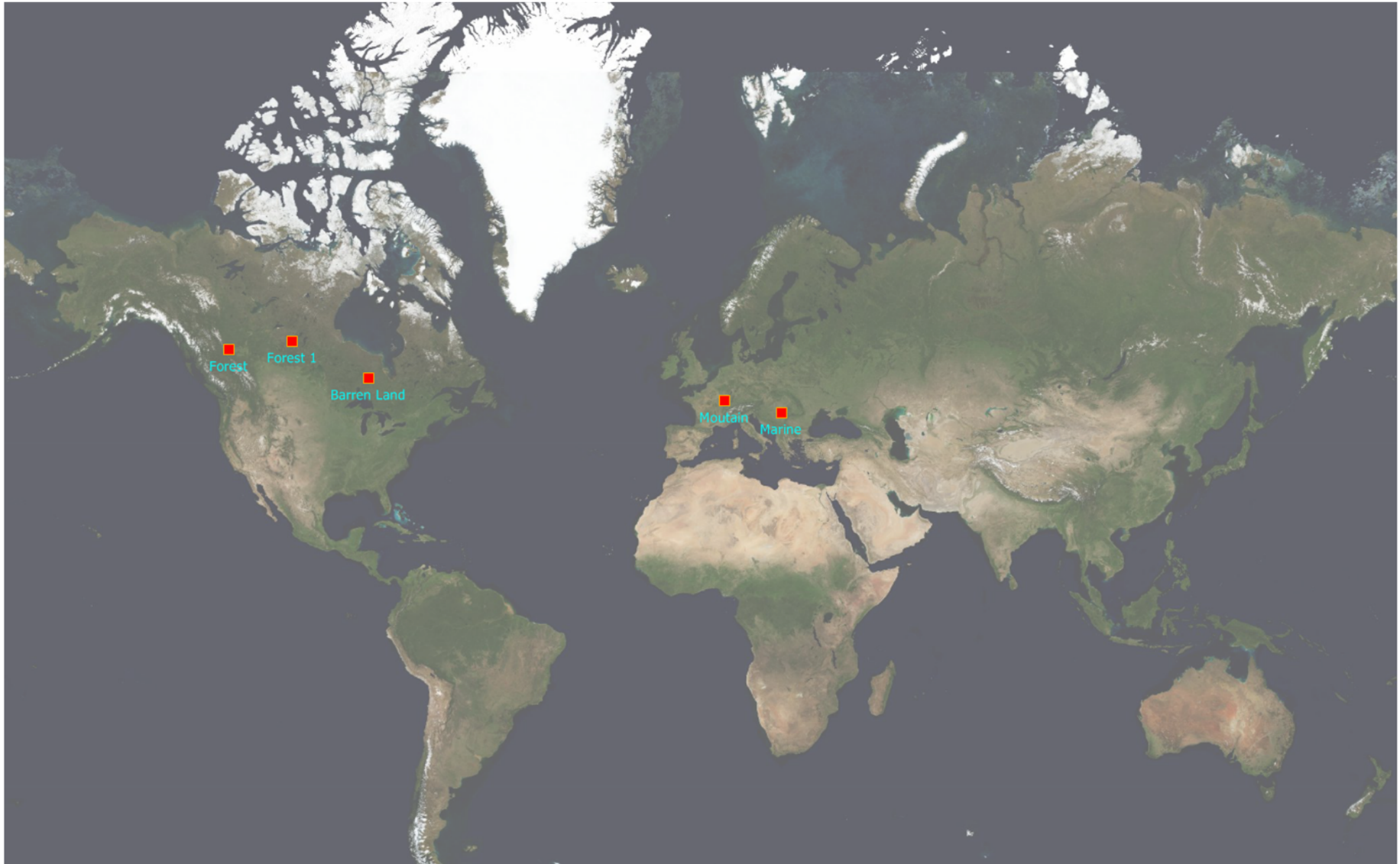
5<sup>th</sup> Meeting of the EMRAS II Working Group 8  
“Environmental Sensitivity”  
27-28 September 2011

SCK CEN Headquarters  
Av. Herrmann-Debroux 40, 1160 Brussels, Belgium

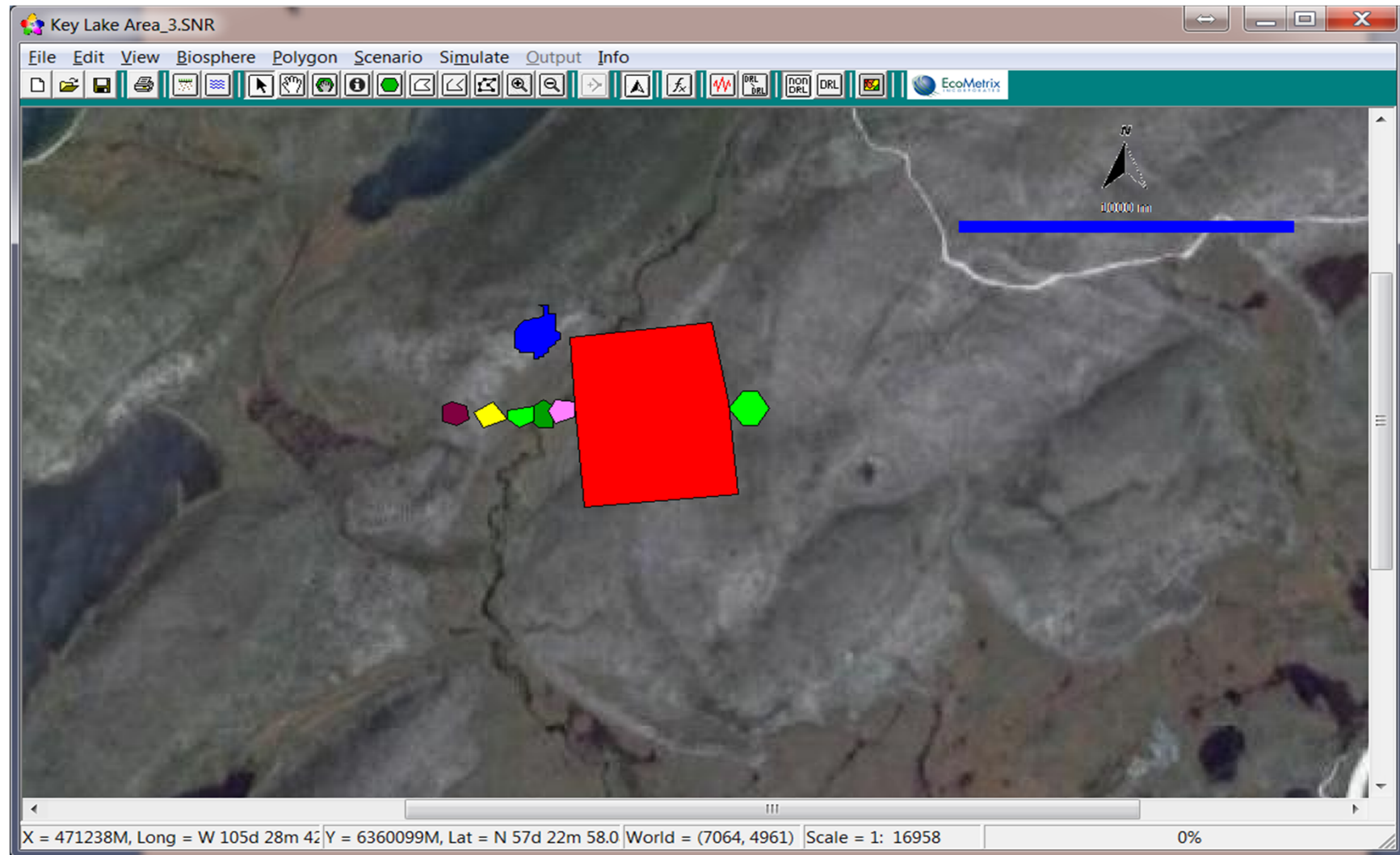
# Presentation: Forest Scenario

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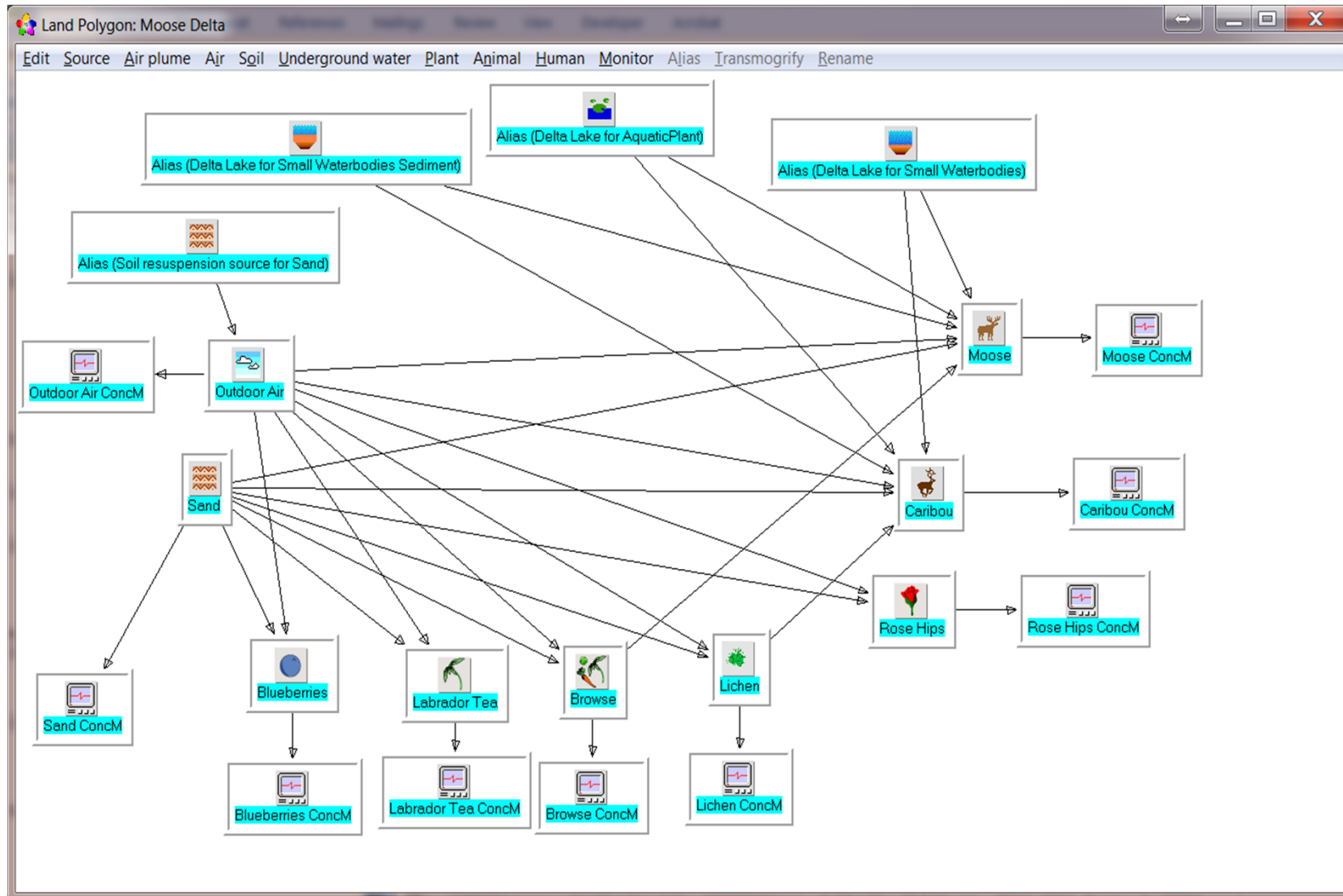
# Scenario Location



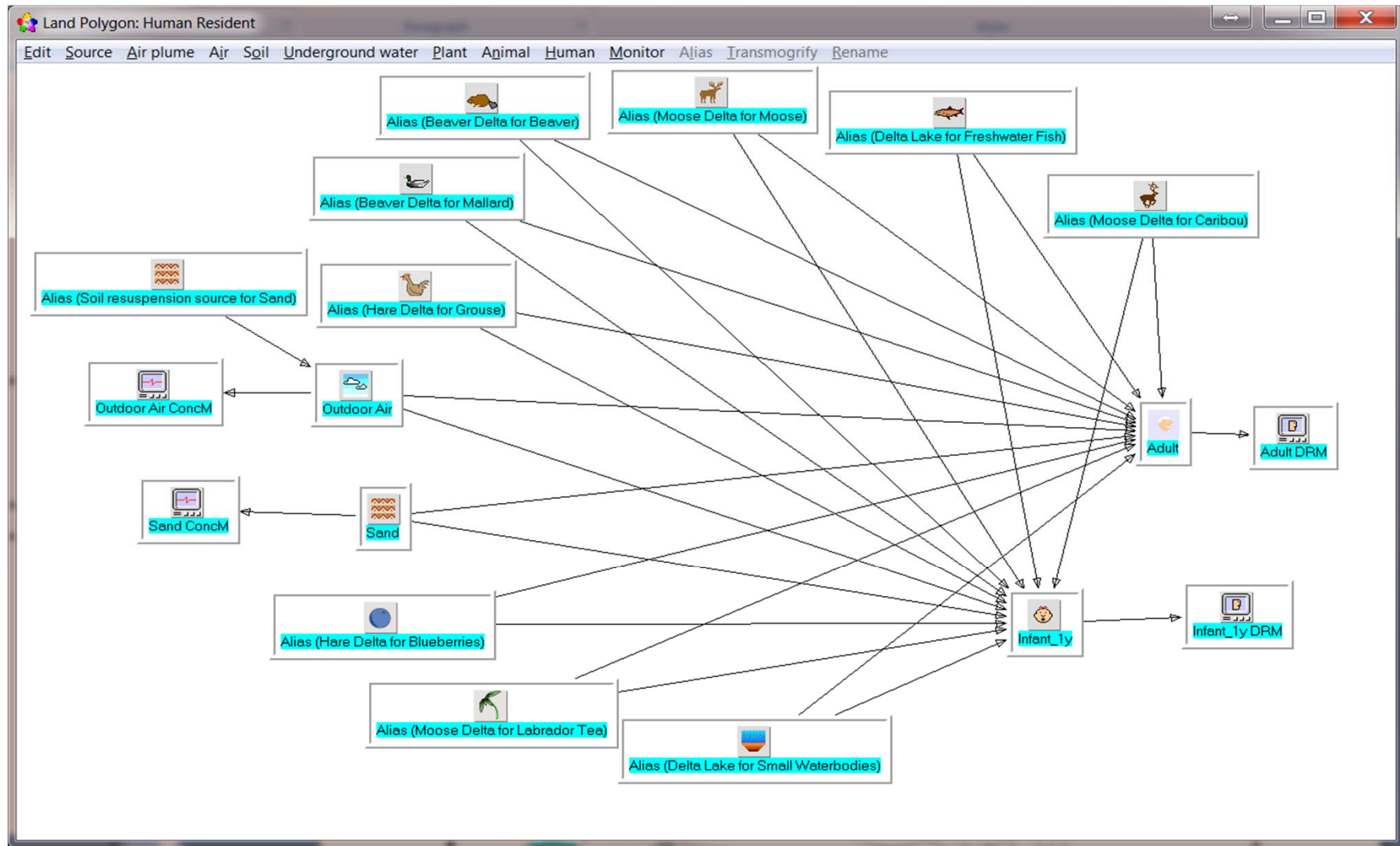
# Scenario Setup



# Considered Pathways 1



# Considered Pathways 2

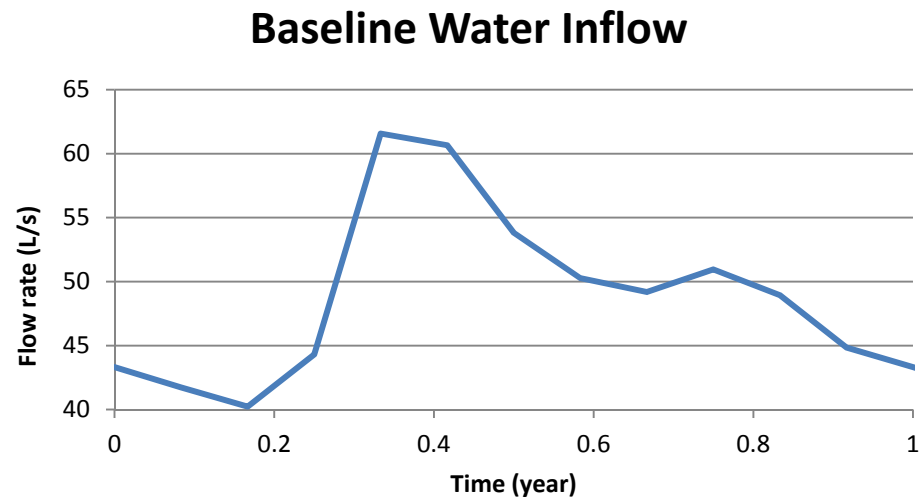


# Scenario Assumptions

- Progenies: Y-90;
- Background radiation levels are neglected;
- Source loading assumptions: soil in mass basis (Bq/kg) and water in volume basis (Bq/L)
- Animal diet assumptions: all animals of interest are wild animals (no human feeds) and live in the site all year around (no migration) and only consume local foods.
- Human diet assumption: local residents live in the site 100% of time, plant and fish foods are from local produce, and 1/3 of adult intake meat and ¼ infant meat intake are from local meat sources.

# Seasonal Variation

The seasonal variation consideration: the baseline water flow on a monthly basis.

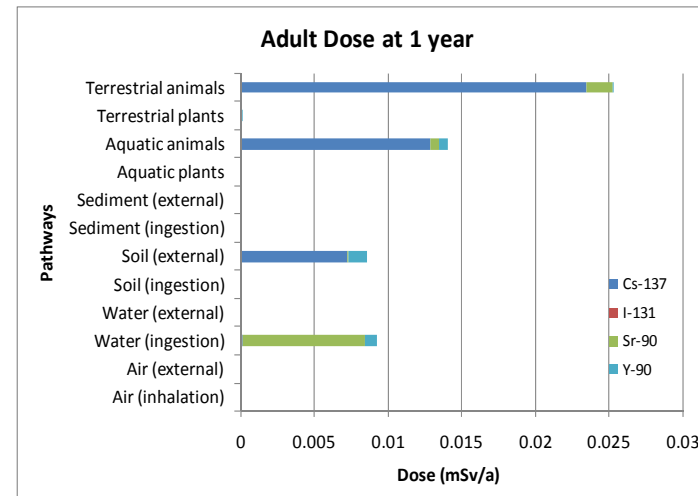
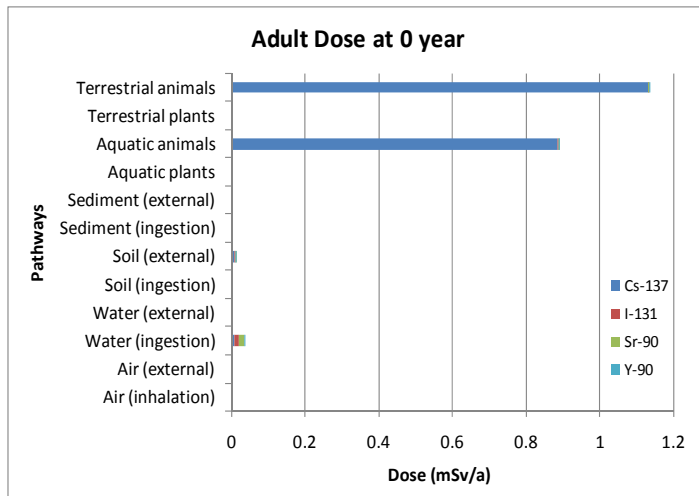
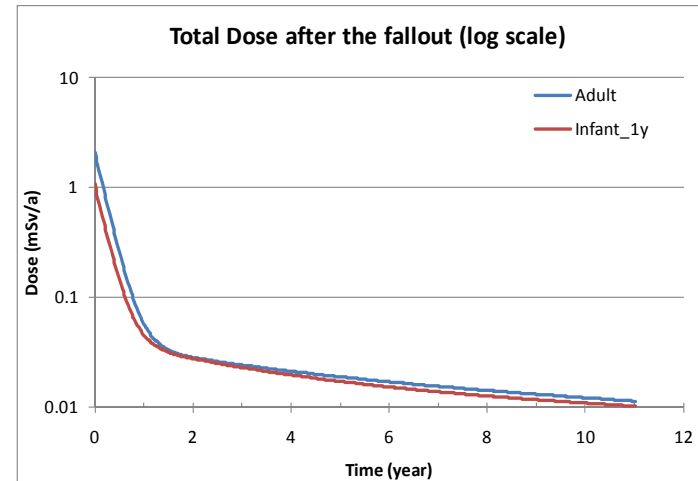
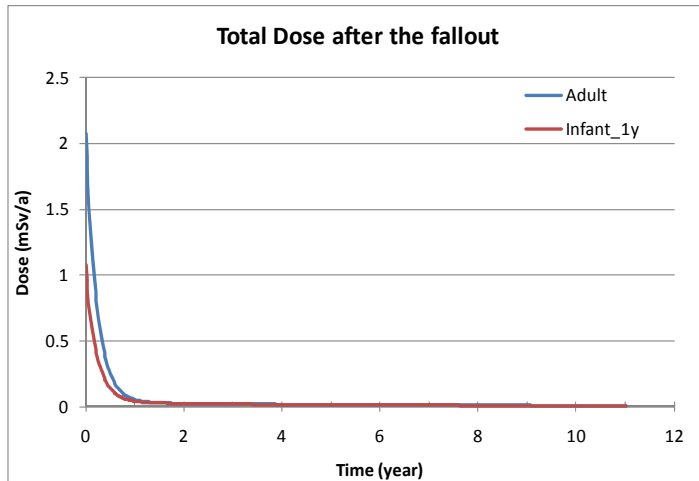


Animal dietary data are on annual average basis from CSA N288.1-08.

Annual averaged human dietary data are used:

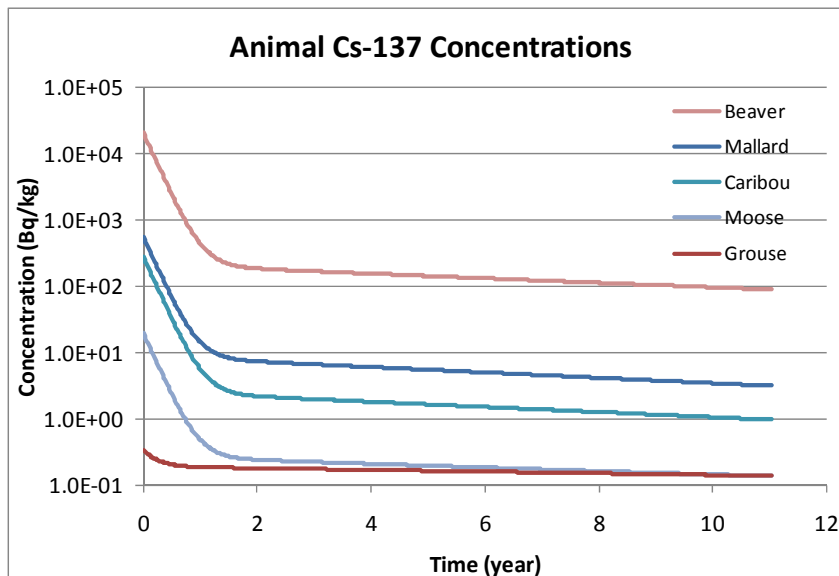
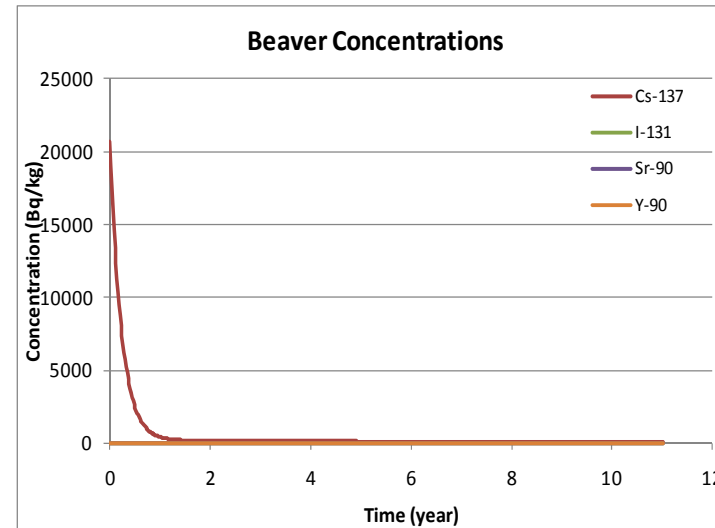
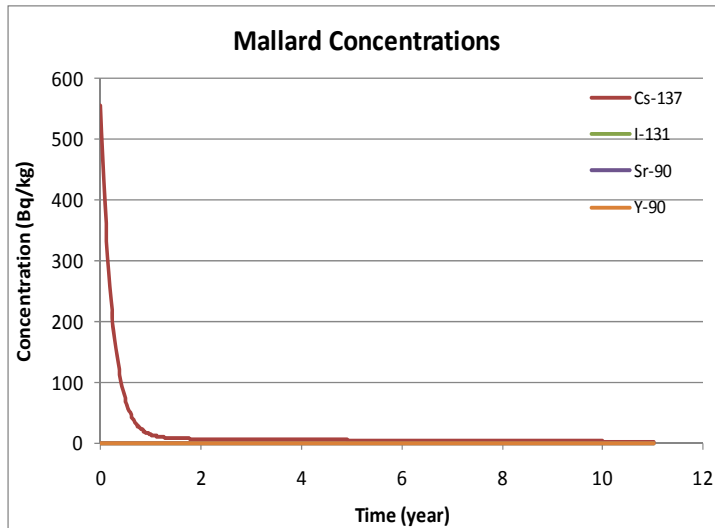
- Look at human doses at the end of certain years;
- I-131 approaches to 0 after 2 months. Cs-137 and Sr-90 have effective half life of about 2 months. The human doses are hardly show difference due to the diet changes over seasons;
- The human diet assumptions are already much conservative. To apply the seasonal diet variation doesn't increase accuracy.

# Human Dose (mSv/a)



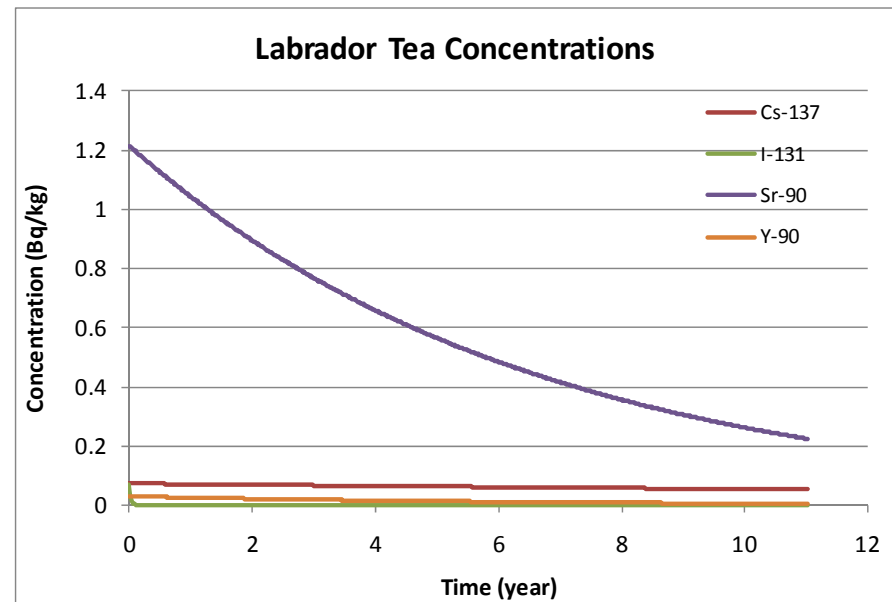
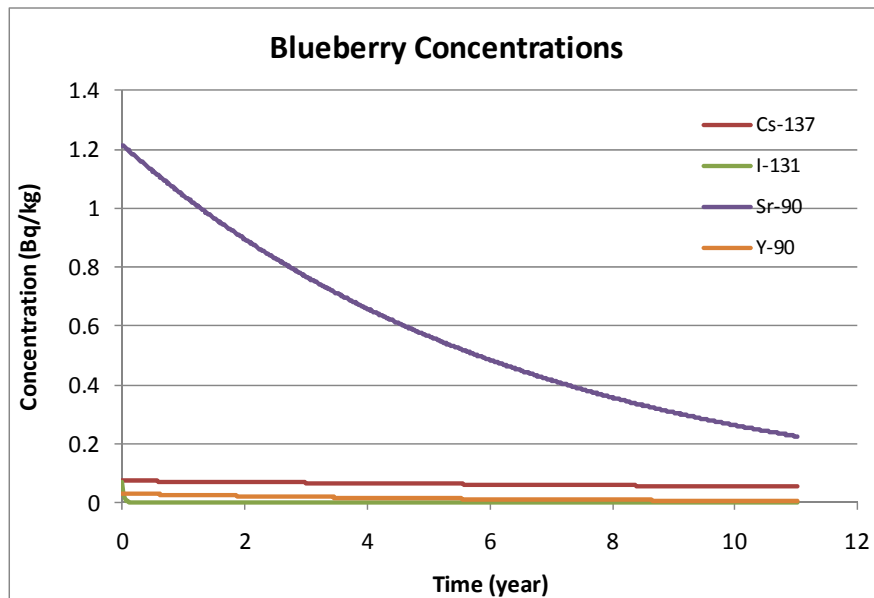


# Animal Concentrations



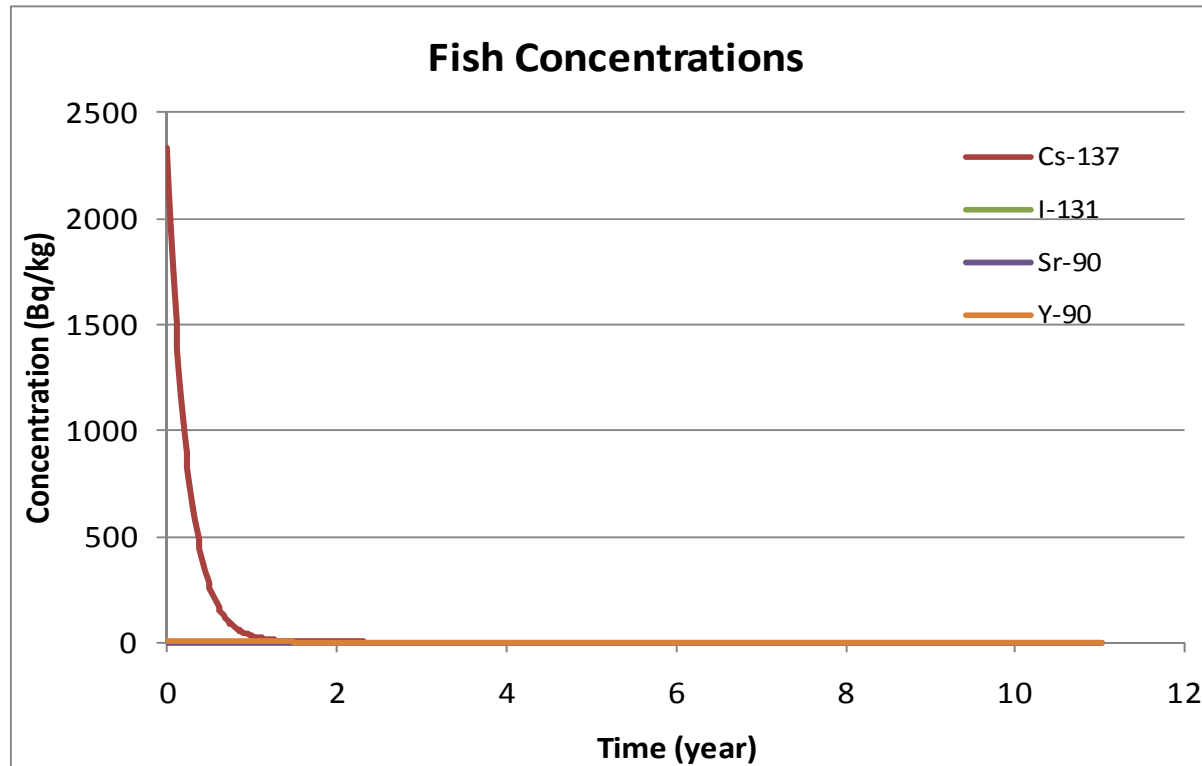
- The whole body concentrations for “Hare”, “Loon”, “Muskrat”, “Vole”, “Scaup”, “Lynx”, “Mink”, “Wolf” are available;
- Animal rad doses and risk quotients can be calculated in the scenario.

# Plant Concentrations



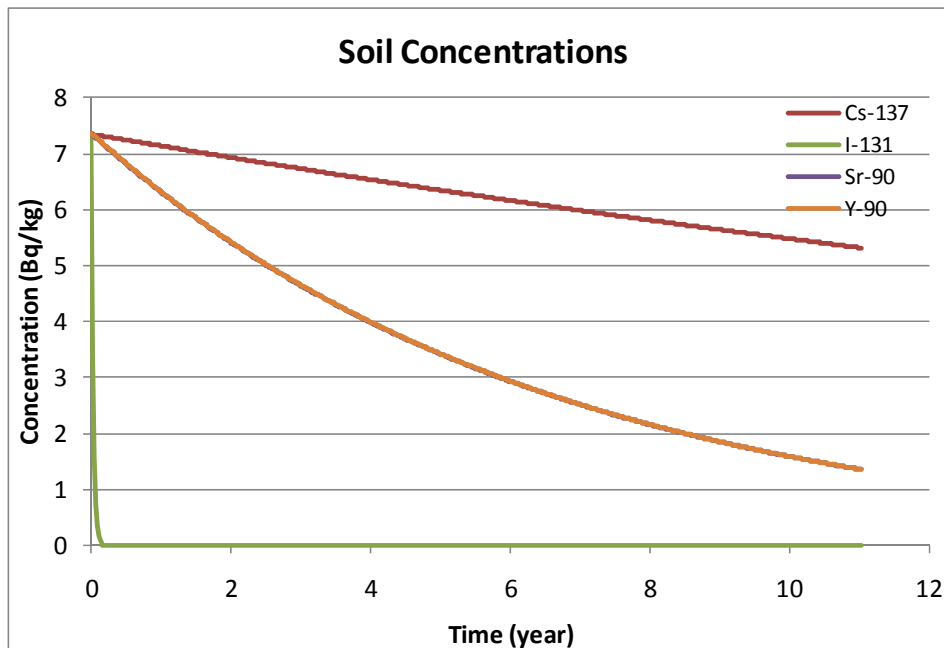
The plants have two sources: soil and air. The soil source is the dominating source.

# Fish Concentration



The fish concentration in fresh weight basis is in equilibrium condition with the water concentration assuming the water/fish reaches equilibrium instantly.

# Soil Concentration

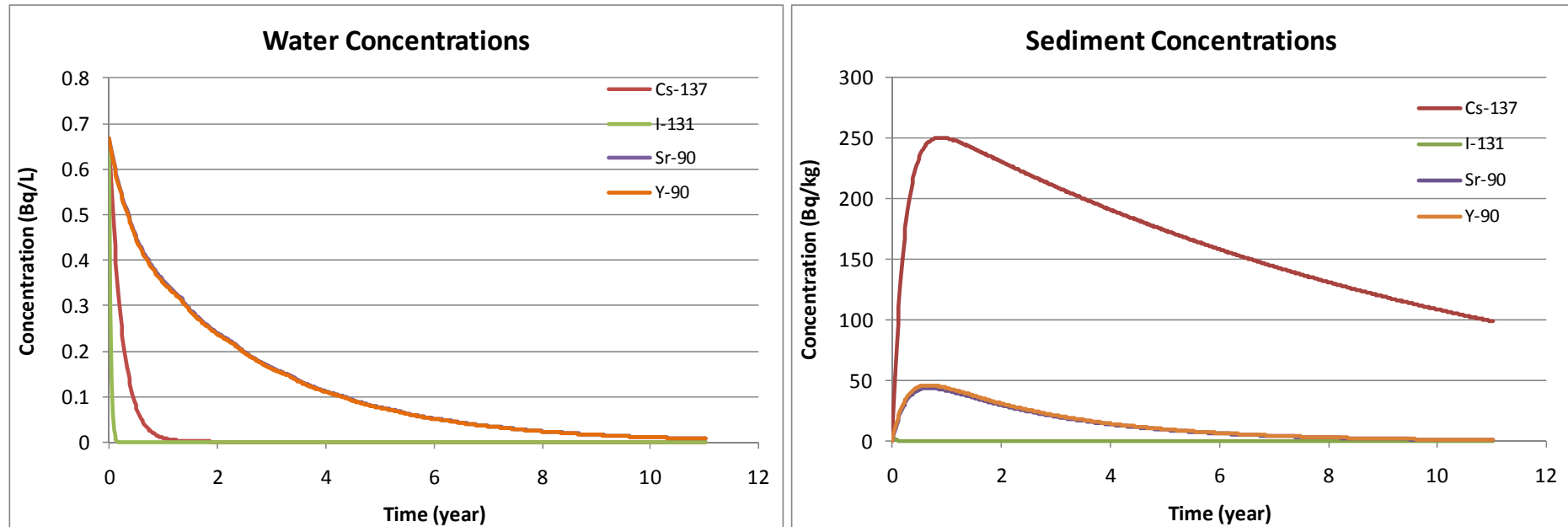


- Assume the initial  $1000\text{Bq/m}^2$  ground activity uniformly distributed over the top 10cm layer.
- The dry bulk density is  $1.6\text{kg/L}$
- The water content is 0.15

That is:

The soil initial concentration is  $7.35\text{Bq/kg}$  (dry weight basis). This value applies to Cs-137, I-131, Sr-90 and Y-90.

# Water/Sediment Concentrations

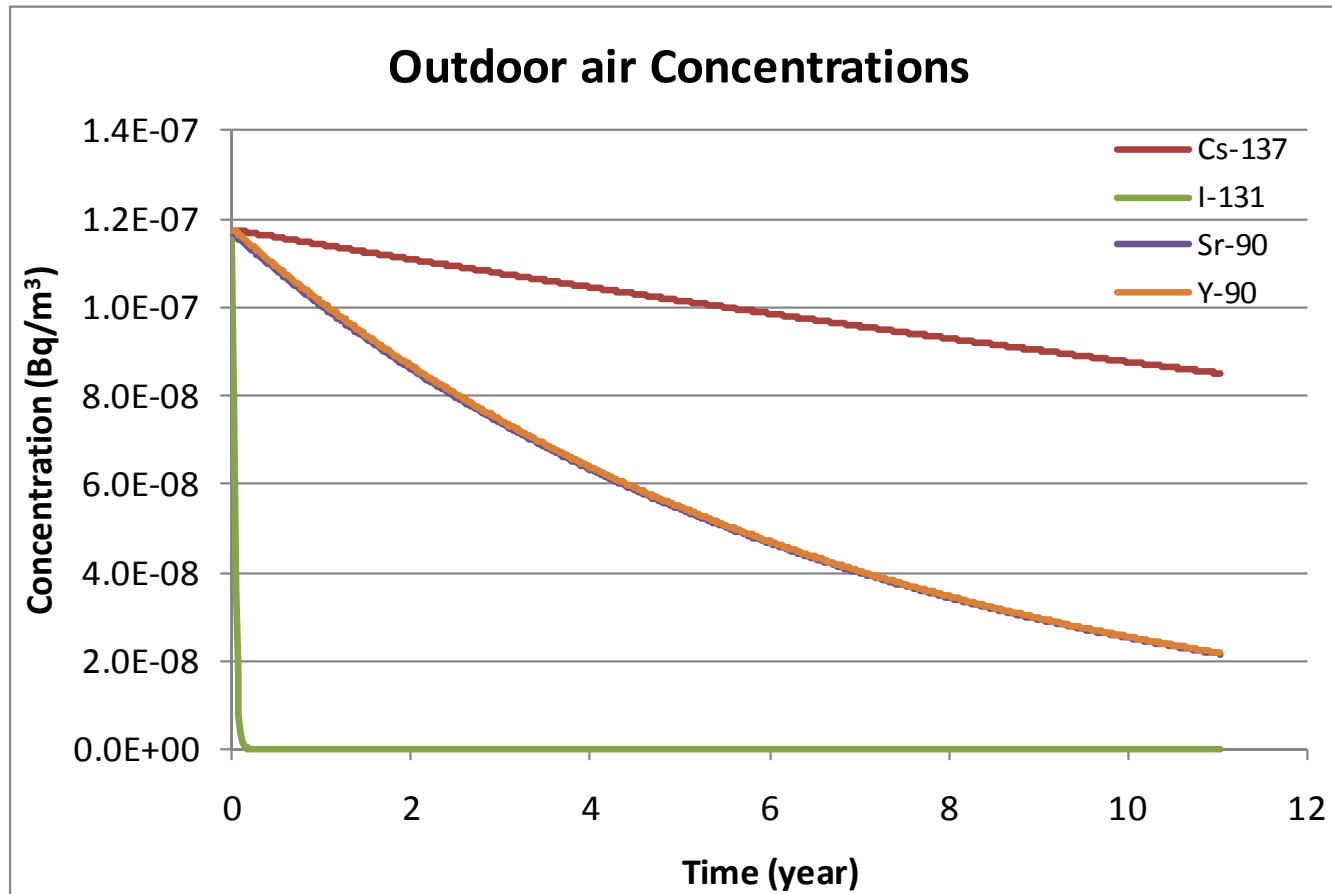


- Assume the pond water  $1000\text{Bq/m}^2$  is applied to all water depth;
- The water depth is 1.5m;
- Assume the sediment has no initial activity at time 0 from the fallout event.

That is:

- The initial water concentration is  $0.667\text{Bq/L}$ . This applies to Cs-137, I-131, Sr-90 and Y-90;
- The sediment initial concentration is 0.

# Air Concentration



The air concentration is in equilibrium condition with the soil concentration by a soil re-suspension process.