A wetland scenario

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Wetlands

- Many types exist, many names used in the literature –might be confusing
- A common system: marshes, swamps, bogs, and fens

- Provide ecological services –flood prevention
- ”Kidneys of the landscape”
- Can accumulate nutrients and contaminants

Swamps

- Dominated by trees or shrubs
- High biodiversity
- Often riparian, flooded by rivers or streams, affected by overbank sedimentation
- Can function as sinks for radionuclides

A wetland scenario

- Not enough data from one wetland, so here we combine data from three swamps:

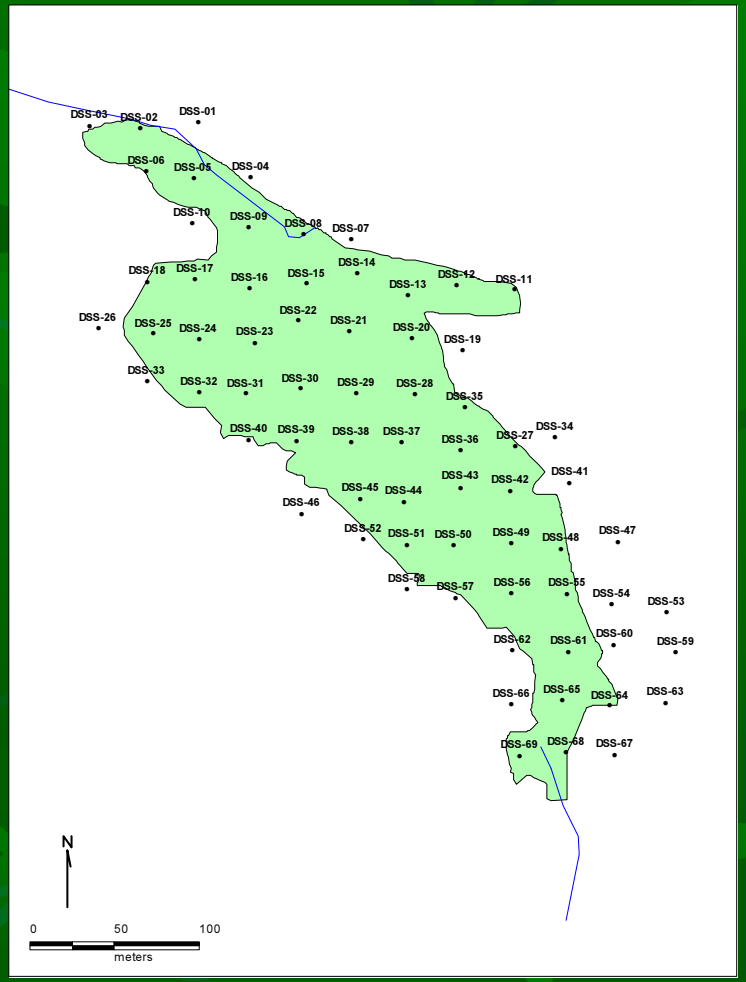
- Steel Creek Swamp (floodplain), USA
- Duke Swamp, Canada
- Utnora Swamp, Sweden

Steel Creek Swamp

- Situated in Steel Creek watershed on the Savannah River Site, a DOE nuclear site in South Carolina, USA
- River water was used as cooling water to reactors, about 10.35 TBq of ^{137}Cs was discharged down Steel Creek between 1954 to 1974
- When river levels were high the floodplain swamp was flooded resulting in deposition of radioactive material in the swamp

Duke Swamp

- Duke Swamp is a 0.102 km^2 wetland that has received historical inputs of radionuclides, including ^{14}C and tritium, from an up-gradient Waste Management Area in Canada.
- Past assessments of the area have indicated that the primary contributor to dose to resident flora and fauna is likely ^{14}C.



Utnora Swamp

- A riparian swamp next to Verkmyra stream coming from Hille Lake, Sweden
- Has received fallout following the Chernobyl accident 1986
- Verkmyra stream is flooding the swamp every spring resulting in deposition of radioactive material (mainly ^{137}Cs)

Input-Output data – Steel Creek Swamp

- Participants will be given input data on mean (upper 10 cm) ^{137}Cs activity concentrations in soil, sediment, and water

- **In phase I:** will be asked to estimate ^{137}Cs activity concentration in vegetation (grass, sedges, shrubs, and trees) and in animals (spider, beetle, grasshopper, treefrog, snake, and racoon)

- **In phase II:** will be asked to estimate total absorbed dose rates to the same organisms and interpret the results in terms of risk

Input-Output data - Duke Swamp

- Participants will be given input data on ^{14}C activity concentrations in air and soil
- **In phase I:** will be asked to estimate activity concentrations in vegetation (grass, fern, shrubs, trees, mushroom, and sphagnum moss) and in animals (insects, frog, toad, snake, shrew, vole, mouse, rabbit, fox, deer)
- **In phase II:** will be asked to estimate total absorbed dose rates to the same organisms and interpret the results in terms of risk
- In addition, specific activity concentration models for ^{14}C can be compared to the data from this site

Input-Output data - Utnora swamp

- Participants will be given mean (upper 10 cm) ^{137}Cs and ^{90}Sr activity concentrations in soil, sediment, and water

- **Phase I:** will be asked to estimate ^{137}Cs and ^{90}Sr activity concentrations in vegetation (grass, fern, trees) and in animals (*worm*, moor frog, *small mammal*)

- **Phase II:** will be asked to estimate total absorbed dose rates to the same organisms (can compare to phantom measurements) and interpret results in terms of risk

Time table

- Send out instructions and data-file to participants by October (?) 2010
- Hand in estimates in phase I by January (?) 2011
- Hand in estimates in phase II by August (?) 2011

- Questions?
- Thoughts?