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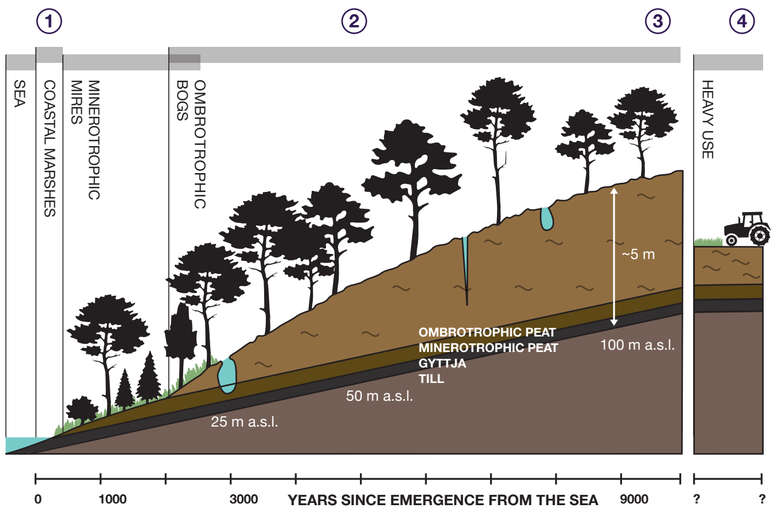
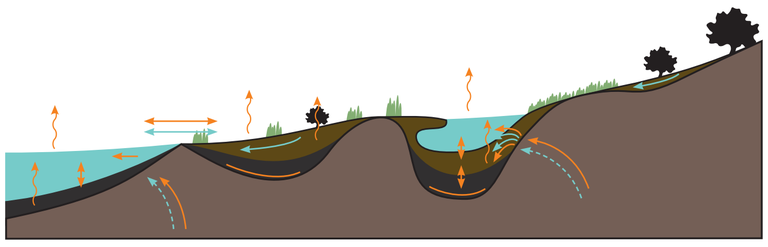
Conceptual models of groundwater-related radionuclide transport in different development stages of mires

MIRE SUCCESSION WITH TIME

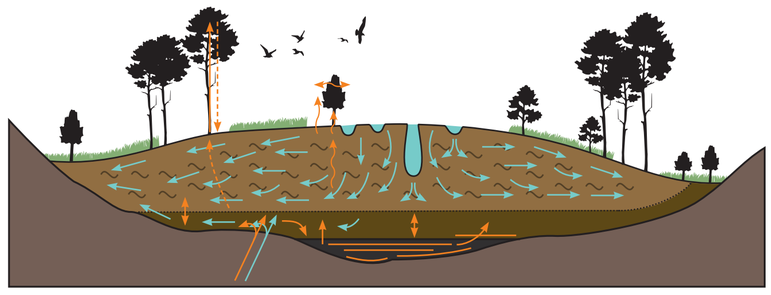


1. Coastal marches

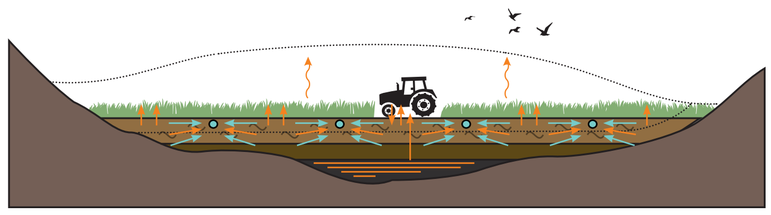


- Mires are typical recipients of potential releases from geological radioactive waste repositories in boreal regions
- Characteristic time frames of the releases are 10 000 years or longer – mire development needs to be taken into account
- In older mires the connection of the surface to the groundwater is lost, but radionuclides may enter the biological circulation as gas, through preferential flows to bog pools, or as a consequence of drainage for peat harvest, agriculture or forestry
- With drainage, considerable deposits of radionuclides accumulated earlier in the bottom peat may become accessible or washed out
- Radionuclide source to the mire can be also from the upstream areas

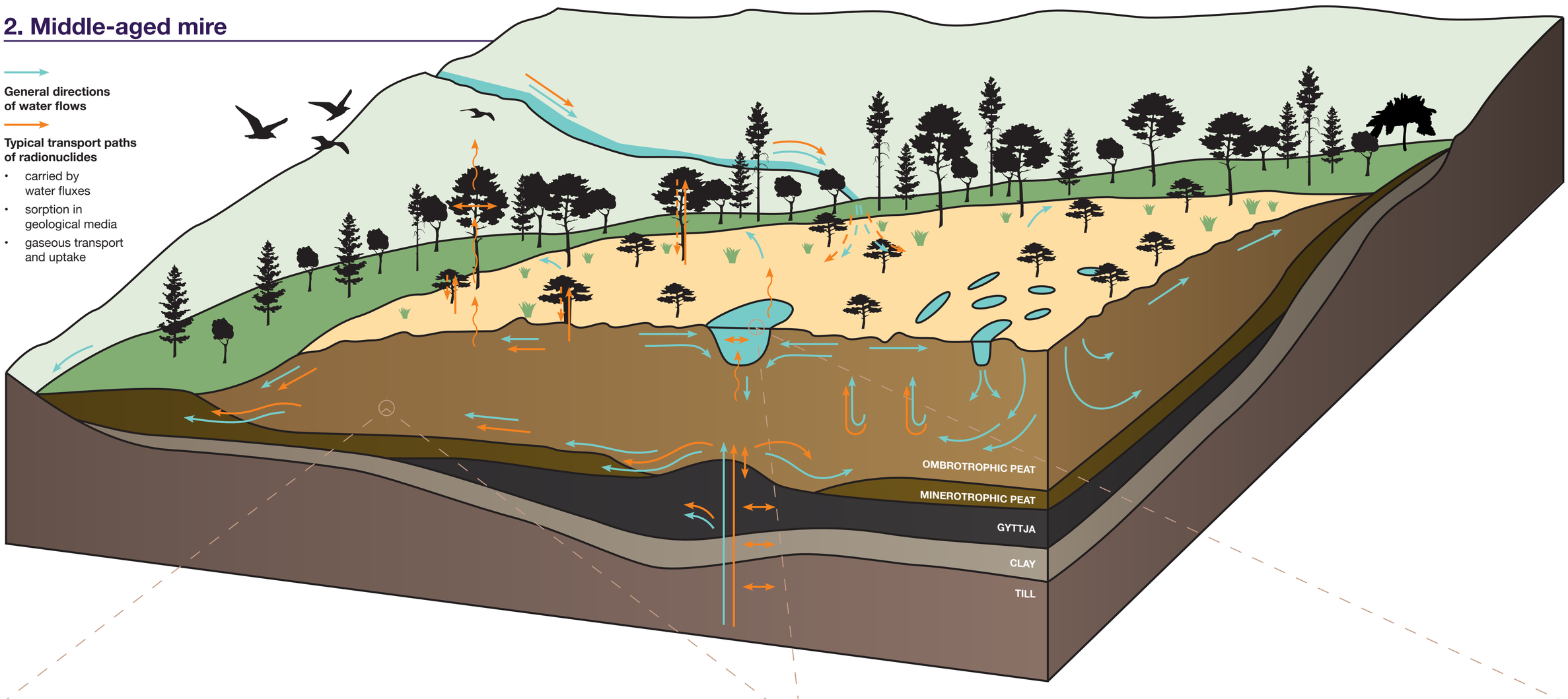
3. Old ombrotrophic peat bog



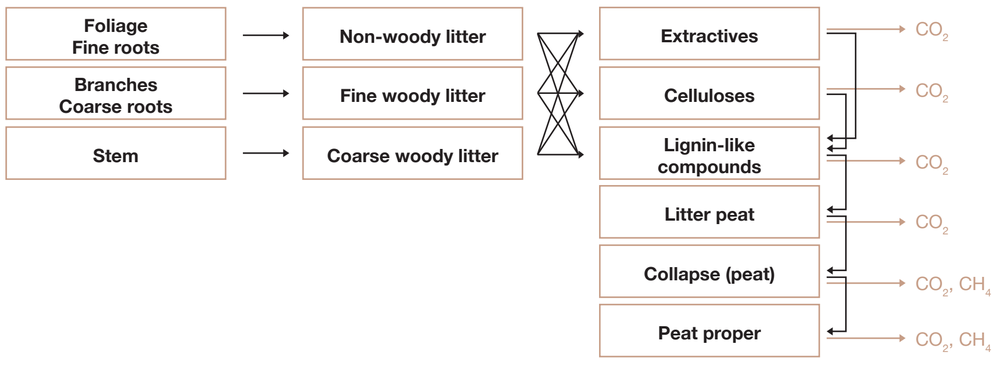
4. Drained for cultivation of crops



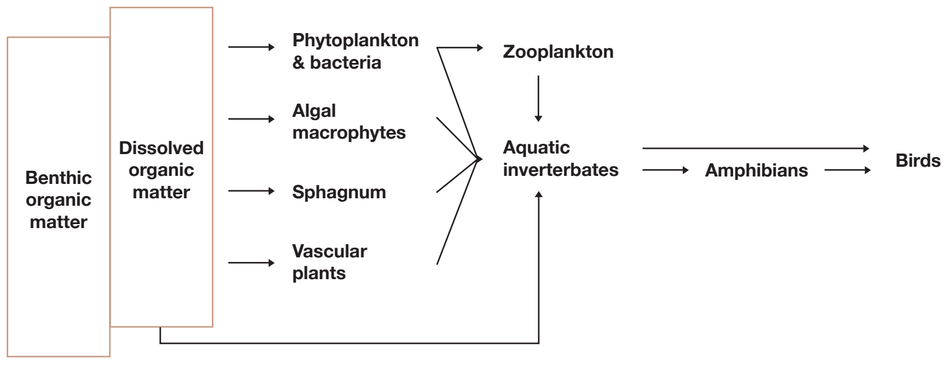
2. Middle-aged mire



Plant-derived carbon pools and decomposition



Food web structure in bog pools



THIS PRESENTATION HAS BEEN INSPIRED BY: Aario, L. 1932. Pflanzentopografische und paläogeographische Mooruntersuchungen in N-Satakunta. *Fennia* 55: 1–179. (As cited *e.g.* by Sauramo (1940).) • Beadle, J.M., Brown, L.E. & Holden, J. 2015. Biodiversity and ecosystem functioning in natural bog pools and those created by rewetting schemes. *WIREs Water* 2: 65–84. • Clymo, R.S. 1992. Models of peat growth. *Suo* 43(4–5): 127–136. • Eurola, S. & Kaakinen, E. 1980. Soiden kasvipeite (in Finnish; Vegetation on mires). In: Havas, P. (ed.). Suomen luonto 3: Suot (Nature in Finland, 3: Mires). Kirjayhtymä, Helsinki. pp. 25–82. • Häyrinen, U. 1978. Suo (in Finnish; Mires). Kirjayhtymä, Helsinki. • Kellner, E. 2003. Wetlands – different types, their properties and functions. Technical Report TR-04-08. Swedish Nuclear Fuel and Waste Management Co. (SKB), Stockholm. • Kivinen, E. 1948. Suotiede (in Finnish; Peatland science). WSOY, Porvoo, Finland. • Korhola, A. & Tolonen, K. 1998. Suomen soiden kehityshistoria ja turpeen pitkäaikaiskertymät (in Finnish; Development of mires in Finland and long-term accumulation of peat). In: Vasander, H. (ed.). Suomen suot (Mires in Finland). Finnish Peatland Society, Helsinki. pp. 20–26. • Laitinen, J., Rehell, S., Huttunen, A., Tahvanainen, T., Heikkilä, J. & Lindholm, T. 2007. Mire systems in Finland – Special view to aapa mires and their water-flow pattern. *Suo* 58(1): 1–26. • Liski, J., Palosuo, T., Peltoniemi, M. & Sievänen, R. 2005. Carbon and decomposition model Yasso for forest soils. *Ecological Modelling* 189: 168–182. • Päivänen, J & Hånell, B. 2012. Peatland ecology and forestry – a sound approach. Departmnet of Forest Sciences, University of Helsinki & Department of Forest Ecology and Management, Swedish University of Agricultural Sciences. • Sauramo, M. 1940. Suomen luonnon kehitys jääkaudesta nykyaikaan (in Finnish; Development of nature in Finland since the glaciation). WSOY, Porvoo, Finland. • Seppä, H. 1998. Suomen soiden pinnanmuodot. In: Vasander, H. (ed.). Suomen suot (Mires in Finland). Finnish Peatland Society, Helsinki. pp. 27–33.

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