

Ecosystem structures and functions and their valuation in Ecological Risk Assessment



CHAIRS: Ralf Bernhard Schaefer, Kelly Martinou, Sabine Apitz, Mario Schirmer

Thursday 15th May 2014, 08:10 – 12:50, room: Osaka/Samarkand

Human societies are dependent on ecosystem services such as provisioning of food and water (Costanza et al., 1997). The Millennium Ecosystem Assessment highlighted that many of these services are under threat of deterioration or have already deteriorated in the last decades (MEA, 2005). The stressors responsible are multiple and include toxicants e.g. heavy metals, salinity, pesticides (MEA, 2005). Toxicants can change the structure of biotic communities, and these changes can propagate to alterations of ecosystem functions, which are essential for the provisioning of ecosystem services (Chapin et al., 2000). Such changes may also occur at the interfaces between ecosystems, for example the groundwater-surface water interface, which is governed by steep hydrodynamic and biogeochemical gradients and non-linear processes. Given the lack of a predictive framework for effects on ecosystem functions from alteration of the biotic structure (Woodward, 2009), it remains open whether current endpoints on the level of structural properties are protective for ecosystem functions and thus ecosystem services. Moreover, ecosystem functions and services form the basis for Ecosystem Service Valuation (ESV) that integrates often disparate measures into monetary or non-monetary simplified metrics to inform decisions. Although ESV may improve the consideration of environmental aspects in decision-making, there is growing concern regarding “putting a price on nature” in case of monetary valuation and regarding obscuration of impacts and benefits in case of non-monetary valuations. The aim of this session is to further elucidate (1) the relationship between effects of toxicants on biotic structures and ecosystem functions and services as well as (2) discuss the different valuation approaches. The session will include contributions on the effects of toxicants on ecosystem structure, functions and services, on approaches for the valuation of ecosystem services and for the measurement of ecosystem functions and include presentations focusing on the groundwater-surface water interface. The session will bring together people from academia, industry and the regulatory sector dealing with the effects of toxicants on ecosystem functions and services and therefore spur future collaboration. Finally, the session topic will stimulate the bridging of the gap between ecological and ecotoxicological research and link them to the social sciences and highlight deficits of current approaches.

Cited literature:

- *Chapin, F.S.I., Zavaleta, E.S., Eviner, V.T., Naylor, R.L., Vitousek, P.M., Reynolds, H.L., Hooper, D.U., Lavorel, S., Sala, O.E., Hobbie, S.E., Mack, M.C. & Diaz, S. (2000) Consequences of changing biodiversity. *Nature*, 405, 234-242.
- *Costanza, R., Darge, R., Degroot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., Oneill, R.V., Paruelo, J., Raskin, R.G., Sutton, P. & Vandenbelt, M. (1997) The value of the world's ecosystem services and natural capital. *Nature*, 387, 253-260.
- *Millennium Ecosystem Assessment (2005) *Ecosystems and Human Well-being: Synthesis*. Island Press, Washington, DC.
- *Woodward, G.U.Y. (2009) Biodiversity, ecosystem functioning and food webs in fresh waters: assembling the jigsaw puzzle. *Freshwater Biology*, 54, 2171-2187.

SESSION TYPE: Platform and Poster

ADVISORY GROUP: Ecosystem Services Advisory Group (Global)