

Session: Climate Change, Flood Variability and Landscape Change  
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## **Ecological consequences of diurnal flooding in tidal freshwater wetlands**

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Diurnal flooding can be observed in the upper end of tidal estuaries, where flooding water originating from the river is constantly fresh. Here, the input from the river is confronted with a tidal wave, so that the sand banks, mud flats, low and high marshes and tidal forests are flooded mostly twice a day. A sequence of processes is linked to these flooding conditions. First, the physical processes organize new locations with sedimentation where succession can start, or they start sedimentation or erosion in existing types of vegetation. Second, the mixing of river water with the estuarine water starts chemical processes with cycling of nutrients and metals and the precipitation of suspended matter. Balance studies with water flowing in and out of a wetland indicate that within a few hours the nitrification and denitrification is high (10-60 %). Most phosphorus is fixed in the soil by iron. Silica is recycled to a structure that is bio-available. Third, the ecological conditions indicate that biomass production is extremely high because nutrients and water are not limiting. The two most important factors that explain the variation in the vegetation are the elevation, with the ecological consequence of the flooding frequency and period, and the succession with the accumulation of organic matter in and on the soil. Next to this, the vegetation might develop into woodland, or remain as a marsh, also depending on the human impact. The animals in tidal freshwater wetlands live in a range from aquatic to terrestrial habitats. The flooding frequency is a determining factor in (semi)terrestrial animal distribution comparable with the vegetation. At least three guilds are given in the flooding frequency: the aquatic, the humid terrestrial and the intermediate animals; the latter characteristic for shorelines. The fish fauna is complex, since there are groups from estuarine - even from saline - conditions, from riverine conditions, and anadromous species that use these wetlands in their migration or use the tidal wetlands to mature. Such wetlands are used by society for all kind of purposes. Many areas are reclaimed for agriculture, housing and to create harbours; cities like Hamburg, Antwerp, Philadelphia and Washington DC are created in between wetlands of this type. Restoration projects are applied at many locations, for the profits for men and nature. The most severe threat in future is the seawater rise, because these wetlands are the first that will be flooded or changed by inflow of saline water.

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