

SUSTAINABILITY OF COASTAL FRINGE ECOSYSTEMS AGAINST ANTHROPOGENIC CHEMICAL STRESSORS

Plant-dominated coastal ecosystems provide least 21 ecological services including shoreline protection, contaminant removal and nursery and breeding habitat for biota. The value of these ecological services is as great as \$28000/h. These ecosystems which include intertidal wetlands, seagrass meadows and mangrove forests/wetlands have declined by as much as 50% worldwide during the last 20 years due in part to urbanization of coastal shorelines. If urbanization continues without effective resource management, economic loss and environmental damage can be expected. This presentation evaluates the ability of the published toxicity database for anthropogenic chemicals including petrochemicals to support the risk assessment process and the use of current regulatory effects-based criteria to protect near-coastal ecosystems. The phytotoxicities of contaminated sediments, tissue accumulated chemicals and water column contaminants are unknown for most near-coastal plants based on reviews of almost 900 published papers. This is particularly true for petrochemicals which are presented as an example of the data trends. Dose-response tests are uncommon as are traditional calculations such as LC50, EC50 and NOEC concentrations. Sensitive species, life stages and effect parameters are almost unknown for most chemicals. Consequently, there is a lack of predictive ability and scientific basis for management of these plant-dominated habitats as related to the presence of contaminants, either alone or in combination with other stressors. The lack of a sufficient database restricts effective risk assessments for chemicals originating from land-based runoff as well as those from episodic events such as large oil spills. The question also remains whether current water quality criteria and sediment quality guidelines are protective for coastal emergent and submerged plants. Effective risk assessments and the availability of relevant numerical protective criteria have been elusive but necessary goals to achieve sustainability of near-coastal ecosystems. Therefore, a proactive approach is needed to support these efforts such as obtaining data on the magnitude, temporal variability and biological significance of common shoreline contaminants.