The influence of eco-tourism and farming co-existence on the quality of East Mediterranean altered wetland soils and waterways

M. Iggy Litaor[1*], Elad Dande[1] & M. Shenker[2]
(1) Tel Hai College, Israel
(2) Hbrew University Jerusalem Fac. Agric, Israel

Agmon Hula in Northern Israel is a small (1.1 km2) artificial lake that was constructed in 1994 in the formally swampy area that was drained for farming in the 1950s. Following the establishment of this new aquatic system huge flocks of Grus grus (> 50,000) and other avian have adapted this area for wintering or seeking temporary shelter on their seasonal migratory route to East Africa. To minimize the crop damage the Agmon & farming authorities have began a planned feeding in an area of 70 ha adjacent to the Agmon that may have added up to1.0 ton P annually to the system. The objective of this study was to evaluate the influence of this massive feeding operation on the P status of these altered wetland soils and waterways. We installed a series of shallow wells across the feeding area at two depths (40- & 90 cm) between two major waterways and monitored the hydraulic heads and collected groundwater samples for elemental analyses. We also collected sediments from the waterways and conducted sequential P extraction. We found significant increase in groundwater SRP (> 0.5 mg l-1) in 2010 compared with the period prior to the feeding (SRP ~ 0.05 mg l-1). On the other hand, we found significant decrease in Fe(II), Ca, and SO4 concentrations in the shallow groundwater in 2010 (15-, 100-, and 20 mg l-1 respectively) compared with the period prior to the feeding (60, 700, 200 mg l-1 respectively). The sequential extraction experiment showed a shift in P fractionation from mostly inorganic P in the period before the feeding to organic P and NaOH extracted P as well as significant increase in total P (~ 4000 mg P kg-1 sediment) in 2010. On the basis of hydraulic head monitoring, sediment analysis, and periodic grass harvesting of the feeding area we concluded that about 0.3 to 0.8 ton of P has been removed by the harvesting practice. The significant decrease of Fe(II), Ca, and SO4 suggest that the geochemistry of the feeding area has shifted from Fe-P sorption sink and Ca-P precipitation sink into P source that has been removed by harvesting with little impact on waterways.