
Smelly wetlands in the Sahara: Role of sewage ponds in bird migration across Egypt.

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Wetlands are crucial habitats to birds, during both breeding and migration seasons. Millions of Western Palearctic birds cross over 2000 km over desert every year to reach their wintering grounds in Africa. Through this vast arid landscape with very limited natural wetlands, artificial wetlands are mainly used as stopover and wintering sites by some bird species. In North Africa, natural wetlands are the most inhibited places by humans. Thus, next to wetlands along, for instance the Nile, high bird richness and abundance are observed in artificial wetlands, such as in aquaculture and sewage treatment ponds. Although, there is some evidence that sewage ponds attract high numbers of birds, their functions as stopover, wintering and conservation sites are not well understood. The establishment of sewage ponds is a developmental requirement in most developing countries, as wastewater treatment is part of the SDGs. So, it is crucial to determine the potential of sewage ponds in bird ecology and as bird conservation sites. In this PhD project, I will quantify the contribution of sewage ponds as stopover and wintering sites across three different aridity gradients of landscape in Egypt (Red Sea migration corridor, Nile migration corridor and Western desert oases path). A species-level bird count will be carried out in representative samples of sewage ponds in each corridor, as well as their nearby natural wetlands. Aridity levels, as well as habitat fragmentation degrees will be calculated in each of the three corridors, using remote sensing. Different environmental variables will be measured in each site so the contribution of each sewage pond system is clearly understood and quantified. In the second part, I will determine the long-term effect of sewage ponds usage, as wintering sites by waterbirds. Many studies have shown direct relationships between wintering habitat conditions and reproductivity of birds in their breeding grounds. Yet, the effect of sewage pond conditions on bird reproductivity is not understood. In the third part, I will carry out an experiment of sewage ponds site rehabilitation to enhance their functions as wintering habitats. I will compare socio-economic costs of bird conservation in natural wetlands vs rehabilitated sewage ponds. Finally, I will model wintering birds distribution in Egypt according to different future scenarios of sewage ponds expansion and conservation level.