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FLAMINGO FEEDING BEHAVIOURS AID IN WETLAND NUTRIENT CYCLING AND CARBON CAPTURE

(Based on a document prepared by the UK Government)

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Ecosystem - wetlands

Wetlands occur all over the world, from the tundra to the tropics, and whilst there is no exact figure for how much of the earth's surface is composed of wetlands, they are estimated to cover between 5-8% of the worlds surface. They among the world's most productive environments, being a great source of biological biodiversity and providing a variety of ecosystem services including playing a large role in capturing and storying carbon (Ramsar Convention Secretariat 2016; Salimi, Almuktar and Scholz 2021). These important habitats are considered to be some of the most threatened in the world, with more than one-third disappearing since 1970. They are threatened by pollution, human urbanisation, agricultural expansion, invasive species and climate change (Delfino and Carlos 2024a).

Species – Flamingos

Flamingos play an essential role within wetland food webs, with their filter feeding behaviours aiding in vital nutrient cycling and sediment bioturbation (Delfino and Carlos 2024a). There are 6 species of flamingo which are all found in tropical and sub-tropical areas; four species are distributed throughout the Americas (including the Caribbean) whilst the other two occur throughout Africa and Eurasia. Flamingos have a unique, nomadic style migration which varies significantly among species, populations and even individuals. The migration between wetlands occurs based on what their needs are at that time (Delfino and Carlos 2024a). All species are listed on Appendix II of the CMS, with the Andean (*Phoenicoparrus andinus*) and James's (*Phoenicoparrus jamesi*) flamingo also being listed on Appendix I (CMS 2024). The conservation status of these species varies from Least Concern (e.g. the Caribbean flamingo, *Phoenicopterus ruber*) to the Vulnerable Andean flamingo (*Phoenicoparrus andinus)* (BirdLife International 2016, 2018a, 2018b, 2019, 2020, 2021). Key threats to flamingo populations can be linked with those faced by wetlands, which are often a result of human activity, such as energy production and mining, the retention, redistribution and abstraction of surface and ground water, habitat loss due to agricultural activities and expansion and general urbanisation, and biological resource use which causes disturbance and removal of food resources (Delfino and Carlos 2024a).

Climate Change Nature-Based Solution(s)

Wetlands provide a number of ecosystem services which benefit both humans and nature, and help mitigate climate change. Functioning wetlands can aid in storm protection by providing a physical barrier slowing storm surges, aid in flood mitigation and retain nutrients, sediments and pollutants (Ramsar Convention Secretariat 2016). They also actively capture and store carbon as plant biomass or organic matter in soil, with wetlands comprising 20-30% of the worlds carbon pool (Salimi, Almuktar and Scholz 2021). Flamingos are considered to be keystone wetland species, acting as ecosystem engineers helping to maintain the delicate balance of their habitats. They are bottom filter-feeders that feed on aquatic invertebrates,

algae and plant material. Their bioturbation method of foraging, referred to as pit-foraging, creates donut-shaped depressions which improve the productivity and nutrient flow in wetlands, along with enhancing biofilm production (Delfino and Carlos 2024b, Salvador *et al*. 2022). Without flamingos feeding behaviours there would be a reduction in vegetation control, an increased build-up of organic matter and potential habitat degradation. This disruption to wetland habitats could impact the vital ecosystem services they provide (Salvador *et al*. 2022).

Conservation actions

Efforts to reduce anthropogenic impacts to both flamingos and their habitats, such as human disturbance and urban expansion, and raising awareness of the benefits they have on their ecosystems, and in turn for humans, is key to their conservation. The CMS High Andean Flamingo MoU, targeting the more endangered of the species, aims to improve the conservation status of the species and their habitats. AEWA, a CMS family agreement, and the Ramsar Convention are key multilateral agreements that co-ordinate international activities to conserve species such as flamingos and the wetland habitats they rely on.

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