



4th International Flamingo Symposium
10-15 November 2025
Venice, Italy

ABSTRACTS

Results of the High Andean Flamingo Banding Program (2002-2025): Distribution, movement, and longevity patterns in the Andean ecosystem.

Aguilar, Sol¹, G.Bruno², F.Moschione², A.L. Sureda², E.Ortiz², O.Rocha¹.

¹ Centro de Estudios en Biología Teórica y Aplicada (BIOTA), Bolivia

² Grupo de Conservación Flamencos Altoandinos (GCFA)

Since 2002, an annual banding program has focused on monitoring three species of flamingos, focusing primarily on the high Andean flamingos (*Phoenicoparrus andinus* and *P. jamesi*) in Laguna Colorada, Bolivia. The program utilizes alphabetic coded plastic bands with high visibility to study various aspects of the biology and ecology of these species. Since 2012, Chile joined with their distinct banding system, forming the regional High Andean Flamingo Banding Program. To date, 9,270 individuals have been banded in Bolivia with 1,532 post-banding sightings recorded in Argentina, Bolivia, Chile, and Peru. This information is collated into a continuously updated database, utilized in the present study to analyze spatial distribution patterns, local and regional movements, age at reproductive onset, and longevity. The results reveal significant cross-border movements. Specifically, *Phoenicopterus chilensis* and *Phoenicoparrus andinus* banded in Surire (Chile) were observed in Peruvian and Bolivian wetlands. Meanwhile, individuals banded in Laguna Colorada, Bolivia were sighted in SW Potosí and Lake Uru Uru (Bolivia), Vilama and Pozuelos lagoons (Argentina), and the Ite, Parinacocha, and Salinas wetlands (Peru). Movements exceeding 1,000 km have been documented, including records in Mar Chiquita and Melincué (Argentina) and Parinacochas (Peru). In total, sightings were reported in more than 80 wetlands across the range. Of particular note, a *P. andinus* banded in Chile was sighted in Bolivia with an estimated lifespan of 37 years. The work carried out over 23 years of banding at Laguna Colorada is of fundamental importance for developing targeted conservation actions for flamingos in South America.

Status and trends of American Flamingo (*Phoenicopterus ruber*) nesting sites in Cuba

Aguilar Mugica¹, Susana, L. Mugica¹, M. Acosta¹, O. Labrada², E. Vergara¹, J. Fobles², E. Hernández², E. Ruiz³, C. la Guardia²

¹Universidad de la Habana, Cuba

²Grupo Empresarial Flora y Fauna, Cuba

³Gaviota S.A, Cuba

The Cuban population of the American Flamingo (*Phoenicopterus ruber*) is one of the most important in the insular Caribbean. However, to date, no research has compiled historical and current nesting data for the management of this species in Cuba. This species specializes in coastal habitats, which increases its

vulnerability to habitat loss and climate change. In this study, we updated the status and trends of American Flamingo nesting in Cuba and documented current breeding sites. We also established historical nesting site trends over the past 40 years (1984–2023). Data were collected through publications, personal communications, field data and project reports. Drones were also recently used to search for nesting sites in inaccessible coastal wetlands. We recorded 10 breeding sites during the study period. Currently, the only confirmed active site is the Refugio de Vida Silvestre Delta del Cauto in Granma province. The main factors contributing to the disappearance of nesting sites are rising sea levels, drought, disturbances, and hunting and egg collection. We conclude that the number of nests has declined dramatically over the past 10 years, with 80% of reported sites disappearing. Our results provide scientific information for management decisions regarding this species in Cuba and the Caribbean and highlight the urgent need for flamingos nesting site monitoring and conservation.

Baseline of the Caribbean Flamingo (*Phoenicopterus ruber*) in Yucatan, Mexico

Alonzo Parra, David E.¹, E. Serrano Alcocer, A. Garrido, G. Mendez Saint Martin

¹Fundación Pedro y Elena Hernández, Mexico

The Caribbean Flamingo (*Phoenicopterus ruber*) plays an essential role as an ecological connector between islands and continents due to its wide distribution in the Western Hemisphere. In the Yucatán Peninsula, Mexico, it primarily uses the northern coastal wetland strip, approximately 524 km in length. This study aims to establish a baseline of reproductive phenology in relation to climatic seasons, evaluate population trends, and analyze changes in spatial distribution for conservation purposes. Historical data, recent observations, aerial censuses, and satellite tracking were integrated. Reproductive phenology revealed three main phases: courtship and pair formation (January–April), colony formation and incubation (April–July), and chick nursery (May–August). In 2023, an estimated 5,270 chicks were recorded, with a hatching success rate of 45% and an overall reproductive success of 7%. The average population size during the non-breeding season was 10,828 individuals, with a slightly declining trend between 2017 and 2024. The average age in the wild was 9.46 years, with a maximum recorded of 34 years. Home range varied by season: larger during the rainy season (552.27 km²) and smaller during the cold front season (46.05 km²). The highest monthly displacement was recorded during the rainy season (1,075 km). Long-distance movements between subpopulations were documented, including displacements of up to 866.51 km between Yucatán and Cuba, underscoring the flamingo's importance as a species with regional connectivity and multinational conservation requirements.

Breeding of the Greater Flamingo (*Phoenicopterus roseus*) in Morocco: Recent Developments and Conservation Efforts

Amezian, Mohamed¹, M. Radi, R. El Hamoumi, GREPOM Team

¹GREPOM/BirdLife, Morocco

In Morocco, nesting of the Greater Flamingo was recorded at Lake Iriki between 1957 and 1968, with breeding numbers ranging from 500 to 1,500 pairs. This site was abandoned following the construction of the El-Mansour Eddahbi Dam near Ouarzazate in the 1970s, which cut off the water from the wetland. Around the same period, other breeding attempts were reported at various Moroccan wetlands, but none were verified. For more than fifty years, no confirmed nesting or breeding attempts of the species were recorded in Morocco. This changed in 2022, when a GREPOM team discovered a breeding colony at Khnifiss Lagoon, a Ramsar site located on Morocco's Atlantic coast. The colony comprised 274 pairs; however, chick survival was notably low. To better understand and support this recolonisation, GREPOM

is implementing a project aimed, among other objectives, at identifying the factors influencing breeding success at Khnifiss Lagoon. The insights gained will help enhance breeding success in future seasons at the site. In parallel, monitoring at other Moroccan wetlands with potential to host Greater Flamingo colonies will help us understand better the local factors and inform broader conservation strategies for the species.

Flamingo conservation in wetlands under pressure from lithium mining development in South America.

Arengo, Felicity^{1,3}, P. Marconi^{2,3}

¹Center for Biodiversity and Conservation, American Museum of Natural History, New York, USA

²Fundación YUCHAN, Salta, Argentina

³Grupo de Conservación Flamencos Altoandinos (GCFA)

The high Andean arid plateau is a desert matrix with wetlands that provide essential resources for human activity, and habitat for biodiversity highly adapted to extreme temperatures, altitudes, and salinity gradients. The unique biodiversity and human lifeways are now confronted with an unprecedented level of development from lithium mining for rechargeable batteries. Our comprehensive regional censuses have recorded >70% of the area's iconic Andean and Puna flamingo populations and all breeding sites occurring within the "lithium triangle" which extends across the altiplano of Argentina, Bolivia, and Chile. We have identified several of the area's wetlands as priority sites in the Network of Important Sites for High Andes Flamingos proposed by the Grupo de Conservación Flamencos Altoandinos (GCFA). Direct environmental impacts of lithium mining on wetlands include habitat loss and degradation, disturbance, alteration of biological communities, and pollution. In addition, the sustained extraction of groundwater brines and surface waters over decades will likely affect the hydrological balance, salinity, and unique biodiversity of these wetlands. These impacts are difficult to assess in the short term because water recharge rates, residence times, and interbasin connectivity are just now being studied. In addition, time lags in the response of the system to the impacts further confound the definition of response metrics. Flamingos are an ideal flagship for conservation of high Andean wetlands because of the landscape scale at which they use these wetlands, and their distribution, abundance, and behavior can guide priority conservation actions.

Two Decades of the Greater Flamingo Network - Collaborative Breeding and Dispersal Research for Conservation

Arnaud, Antoine¹

¹Tour du Valat, France

The Network for the study and conservation of Greater flamingos (*Phoenicopterus roseus*) in the Mediterranean and West Africa (hereafter Greater flamingo network) was created in March 2002. Since then, it has expanded to new countries and now constitutes an important regional community, illustrating how a volunteer network can advance the conservation of a species. From Mauritania in the west to Türkiye in the east, our members span over 15 countries. The network relies on two legs: sharing breeding monitoring data and sharing ring-resighting data on a common database. This long-term colony monitoring and ring-resighting efforts around the Mediterranean let us assess breeding-colony dynamics and track population dispersal to better shape conservation policies. Monitoring shows that breeding colonies established around the Mediterranean range widely in size and age. Collecting data from all partner countries makes it possible to re-evaluate the breeding population over time and at a broad scale, allowing to compare the relative importance of natural sites vs active salt production areas, and others,

and to assess the number of sites that have been specifically managed for the Greater flamingos. We take advantage of the parallel consolidation of the Mediterranean Waterbird Network, which has gathered long-term monitoring of Greater flamingo wintering numbers to compare both figures, i.e., wintering and breeding numbers of the species in the Mediterranean.

Influence of El Niño Southern Oscillation and wetland conditions on the abundance and spatial distribution of two flamingo species in lowland wetlands of central Argentina

Asmus, Jorgelina P.¹, I. Barberis^{1,2,3}, C. Barisón^{1,2}, M. Romano², F. Arengo^{2,4}

¹Facultad de Ciencias Agrarias, Universidad Nacional de Rosario, Zavalla, Santa Fe, Argentina.

²Grupo de Conservación Flamencos Altoandinos (GCFA).

³Instituto de Investigaciones en Ciencias Agrarias de Rosario, CONICET. Zavalla, Santa Fe, Argentina.

⁴Center for Biodiversity and Conservation, American Museum of Natural History. New York, NY, USA.

The lowland wetlands of southern Santa Fe Province, Argentina, are key wintering areas for two flamingo species: the year-round resident Chilean Flamingo (*Phoenicopterus chilensis*) and the overwintering Andean Flamingo (*Phoenicoparrus andinus*). We studied the association between the abundance of both species, wetland conditions (area and conductivity), and flood conditions driven by the El Niño Southern Oscillation (ENSO) over 15 consecutive winters (2008–2022) across 24 wetlands in the Pampa de las Lagunas system. Due to ENSO events, the area and water conductivity of each wetland varied significantly between years. Both species showed fluctuations in their numbers, with the Chilean Flamingo consistently more abundant. The Chilean Flamingo was recorded at least once in every wetland, whereas the Andean Flamingo was absent from several wetlands and not observed in two years of the study. The Chilean Flamingo was recorded in wetlands covering a broader range of water conductivity values than the Andean Flamingo (2.53–58.23 mS/cm vs. 2.94–16.20 mS/cm, respectively). The abundance of both species was higher at intermediate conductivity values and declined at very high or low values. Conserving a diversity of wetlands with a wide range of environmental conditions is essential to support flamingo populations, especially considering strong interannual climatic variation and ongoing threats from channeling, drainage, and agricultural expansion. A deeper understanding of the factors influencing their movement patterns, particularly the occasional absence of Andean Flamingos, is crucial for developing effective conservation strategies in the face of climate change and other threats across their range.

Dispersal of Tunisian-born greater flamingos *Phoenicopterus roseus*

Azazaf, Hichem¹

¹AAO/BirdLife, Tunisia

This work aims to contribute to the knowledge of the metapopulation dynamics of the Greater Flamingo *Phoenicopterus roseus* in the Mediterranean region, in particular dispersal and migration, based on the observation data of flamingos born and ringed in Tunisia. In June 2015, greater flamingos that hatched in Tunisia were ringed for the first time. Although this species is regularly observed in the country and is considered an occasional breeder, there was no certainty about the dispersal and movements of flamingos born in Tunisia. Of the forty-five (45) flamingos ringed in the Korba lagoon, one of the 46 Important Bird Areas (IBAs) in northern Tunisia, nineteen (19) birds were controlled between 2015 and 2025 at least once. The number of rings reported per country in 10 years is as follows: Tunisia (4), Algeria (1), Morocco (1), Spain (3), France (7) and Italy (7) observed in twenty (20) sites around the

Mediterranean Sea and 1 site on the Atlantic coast.

Range expansion by Greater Flamingos in Italy lasted 30 years; and now?

Bacetti, Nicola¹, G. Arveda, F. Cilea, R. Ientile, L. Panzarin, S. Nissardi, M. Scutellà, M. Zenatello, C. Zucca

¹Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA), Italy

The pink army of Mediterranean flamingos has been particularly successful in gaining eastern positions at the turn of the millennium. By now, the frontline progress is over. Or, rather, the progress is somewhere else and no longer within Italy. We discuss what is presently going on after the human enthusiasm has faded and having flamingos is no longer a big piece of news. Is the population still effectively monitored? Is it wisely managed? What are the perspectives for the future? Did we take full advantage from having such a bold flagship species at hand? The answer to most of these questions is unfortunately negative, and underlines the fact that citizen science alone has not been enough. But at the same time, we face sudden co-ordination problems, possibly caused by our faults in offering adequate feedback to monitoring activities and continuity of commitment. Even gathering (existing) population data to be presented at this conference required a disproportionate effort and was, in the worse cases, unsuccessful. A discussion on these themes is recommended within the regional sessions of this conference and beyond, as what has happened in Italy may occur elsewhere.

Rediscovery in the Altiplano: Flamingo nesting colonies return after a decade in Lithium mining landscapes

Barisón, Caterina^{1,2}, E. Derlindati^{1,3}

¹Grupo Conservación Flamencos Altoandinos (GCFA).

²Facultad de Ciencias Agrarias, Universidad Nacional de Rosario, Santa Fe, Argentina

³Facultad de Ciencias Naturales, Universidad Nacional de Salta, Salta, Argentina

During the VII International Simultaneous Census of Flamingos, conducted in February 2024 across Andean wetlands of Argentina, Bolivia, Chile, and Peru, an unexpected and significant finding was recorded in the high Andean and Puna wetlands of Salta province, Argentina. The survey team, composed of rangers and specialists from the Grupo de Conservación Flamencos Altoandinos (GCFA) and the provincial Biodiversity Program, documented the presence of two James's flamingo (*Phoenicoparrus jamesi*) nesting colonies—one of them mixed with Chilean flamingos (*Phoenicopterus chilensis*)—after a ten-year absence of breeding records in the region. The discovery is especially notable considering that these nesting events occurred in wetlands embedded within lithium mining landscapes, raising critical conservation concerns. One of the mixed colonies included chicks of different broods, suggesting extended breeding activity. This finding provides evidence of reproductive behavior in areas where environmental pressures from climate change and land-use transformation, particularly linked to lithium extraction, are intensifying. The recorded colonies highlight the ecological importance of these wetlands for flamingo conservation at a continental scale and emphasize the need for continuous monitoring and adaptive management strategies. The census results will be analyzed in conjunction with data from other sites in the Argentine Puna and across the Andean flamingo range. The ultimate goal is to develop conservation guidelines that ensure the protection of biodiversity and enhance the resilience of high-Andean wetlands under increasing anthropogenic pressure.

Heavy metals (Pb, Hg, and Cd) in the American flamingo (*Phoenicopterus ruber*) and its feeding sites in natural reserves of the Yucatan Peninsula, Mexico

Bastar-Sierra, Adriana G.¹, G. Escalona-Segura¹, P.L. Enríquez¹, J. Rendon-Von Osten²

¹El Colegio de la Frontera Sur (ECOSUR), Campeche, México.

²Instituto de Ecología, Pesquerías y Oceanografía del Golfo de México, Mexico

Persistent environmental pollutants, such as heavy metals, are toxic to biota due to their ability to accumulate in organisms and biomagnify through food webs. Wading birds, especially the American flamingo (*Phoenicopterus ruber*), show high sensitivity to these pollutants because of their feeding habits and habitat use near contaminated areas. This study assessed concentrations of lead (Pb), mercury (Hg), and cadmium (Cd) in feathers, eggshells, and bones of wild American flamingos from coastal localities spanning northern Campeche to eastern Yucatán. It also included sediment and water analysis from their feeding habitats across coastal natural protected areas (NPAs) in the Yucatán Peninsula, southeastern Mexico. The hypothesis tested was that no differences exist in metal levels among sampled sites. Additionally, toxic heavy metals (THM) were measured in feathers of captive American flamingos for comparison. Progreso showed the highest THM concentrations in feathers (Pb: 543 ng·g⁻¹; Hg: 1351 ng·g⁻¹; Cd: 159 ng·g⁻¹). Mercury (Hg) was consistently detected in all wild flamingo samples, as well as in water and sediment from their feeding sites, exceeding biota thresholds and posing a serious risk to aquatic life. Lead (Pb) concentrations in water surpassed the chronic exposure limit (8.1 ng·g⁻¹) for benthic organisms in marine ecosystems, indicating chronic exposure risk for flamingos. Cadmium (Cd) showed the lowest levels overall, except in feathers from captive birds (191 ng·g⁻¹). These results clearly demonstrate that American flamingos in the Yucatán Peninsula are exposed to hazardous concentrations of toxic heavy metals in both their tissues and feeding environments.

Migration shapes senescence in the Greater flamingo

Béchet, Arnaud¹, S. Roques², H. Cayuela³, A. Arnaud¹, C. Germain¹, J. Champagnon¹

¹Tour du Valat, France

²CEFE, Univ Montpellier, CNRS, EPHE, IRD, Montpellier, France

³Laboratoire de Biométrie et Biologie Evolutive, Université Lyon 1, CNRS, UMR 5558, Villeurbanne, France

Each year, billions of animals migrate across diverse spatial and temporal scales. Migration behaviour thus plays a fundamental role in the life cycle and fitness of many organisms. While the influence of migration on early-life survival and reproduction is well documented, its effects on senescence (aging) in advanced age remain largely unexplored. Using a unique 44-year ring-resighting dataset from the long-lived, partially migratory species, the Greater Flamingo (*Phoenicopterus roseus*), we show that migration plays a key role in shaping age-specific trajectories of mortality and reproduction. Resident flamingos exhibit higher early-life demographic performances, with lower baseline mortality than migrants, resulting in longer adult lifespan. Residents also have a higher probability of breeding than migrants, though their breeding success was similar. However, residents seem to pay for their early-life advantages in old age, experiencing accelerated actuarial and reproductive senescence compared to migrants. Overall, our study highlights the critical impact of migration on survival and reproduction throughout life, thereby illustrating the role played by behavioural decisions in the biology of ageing in long-lived vertebrates.

Colonisation of Greater flamingo rings by barnacles: description and analysis

Boudard, Loïz¹, C. Germain¹, N. Baccetti², M. Scutellà³, H. Azafzaf⁴, A. Béchet¹, A. Arnaud¹

¹Tour du Valat, Arles, France

²Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA), Bologna, Italy

³Ringed Greater flamingo network, Roma, Italy

⁴Association "Les Amis des Oiseaux", Ariana, Tunisia

Barnacles are known to attach themselves on various fixed or non-fixed abiotic substrates (e.g. boats) and parasitise living organisms (e.g. whales). These crustaceans are much less known to colonise bird rings, which, to our knowledge, has only been formally reported in Lesser black-backed gulls. Greater flamingo rings are affected, with a few uncertain lethal effects following leg infection, which recently caused the end of ringing in Italy. Besides impacting individual survival, ring colonisation can make rings unreadable, which may introduce new biases in demographic studies, especially if it affects a homogeneous part of the metapopulation (e.g. age or sex-dependent ring colonisation). Using resighting data, we provided a quantitative and spatio-temporal description of this phenomenon. Furthermore, we aimed to (i) determine the probability of ring colonisation based on individual traits at fledging; and (ii) identify traits favouring early ring colonisation in individual life history. Results show that, since 2008, individuals with colonised rings (N=178) are observed in all ringing countries, with higher prevalence for those ringed in Italy (N=60; 0,55%) and France (N=111; 0,38%). Among affected individuals, there were much more males (82%) than females (18%), which cannot be solely explained by differences in resighting rates between sexes. The probability of ring colonisation does not seem to vary with body condition at fledging. However, among affected individuals, those with a lower body condition at fledging seems to be affected earlier. Further analysis, including a better accounting for individual life history, should help to improve our understanding of this concerning phenomenon.

The Caribbean Flamingo Project: Protocols for Rehabilitation, Reintroduction, and Post-Release Monitoring of Captive *Phoenicopterus ruber*

Carreño, Tatiana¹, E. Fernandez

¹ZOODOM Parque Zoológico Nacional, Dominican Republic

Initiated in 2020, the Caribbean Flamingo Project emerged from conservation concerns raised by photographer Eladio Fernández about the increasing number of *Phoenicopterus ruber* kept in captivity at hotels and private estates in the Dominican Republic. These concerns prompted joint action from the Ministry of the Environment, the National Zoological Park, and Grupo Acción Ecológica. The National Zoological Park assumed responsibility for rehabilitating and reintroducing confiscated or voluntarily surrendered flamingos. Upon admission, flamingos are placed in specialized enclosures designed to minimize stress and disease transmission. Each bird receives a unique identification band, is weighed, and undergoes thorough veterinary evaluation, including hematology, fecal analysis, and serological testing for avian pathogens. Health assessments occur at intake and twice more during rehabilitation to establish baselines and confirm readiness for release. Throughout rehabilitation, flamingos transition to a balanced diet correcting deficiencies caused by improper captive feeding. Behavioral management minimizes human habituation and encourages natural social interactions. Birds with irreversible injuries, such as amputations, are deemed non-releasable but still removed from private collections to discourage illegal ownership under national wildlife laws. Post-release monitoring combines field surveys, resightings of color-banded individuals, and reports from conservation partners to assess survival, integration, site

fidelity, and breeding. Although GPS telemetry remains limited by funding, results are promising: many released flamingos exhibit natural behaviors and occupy key wetlands. As of 2025, the project has released 84 flamingos—71 rehabilitated and 13 captive-bred—contributing to the restoration and genetic reinforcement of wild populations.

Seasonal dynamics of plumage coloration in captive Greater Flamingos (*Phoenicopterus roseus*)

Castiglioni, Roberta¹, V. Levati^{1,2}, A. Milesi²

¹ Darwin Ricerca e Divulgazione Naturalistica, Milano, Italy

² Università degli Studi di Milano, Milano, Italy

Feather coloration in *Phoenicopterus roseus* is a physiological trait primarily influenced by carotenoid intake. The species is monogamous, and exhibits reversed sexual dichromatism, with females typically displaying more intense pigmentation than males. In flamingos, plumage color also serves as an indicator of individual condition and a high-quality interspecific communication signal, closely linked to reproductive health and success. Even in captivity, under constant and pigment-free dietary regimes, seasonal variation in plumage coloration can still be observed. This study was conducted over a two-year period (2018–2019), with five data collection sessions in the first year and seven in the second. A semi-captive population of 100 individually ringed adult flamingos with a balanced sex ratio was monitored; juveniles were excluded. Color intensity was assessed monthly at the dorsal base of the neck using a standardized 3-point visual scale. Observations were carried out using a consistent, validated protocol designed to ensure inter-observer reliability and data consistency. Females consistently scored higher than males. Color intensity declined in spring, reaching a minimum in July during the chick-rearing period, when the majority of the colony exhibited pale plumage. In autumn, both pigmentation and make-up behavior increased, with individuals actively applying carotenoid-rich uropygial secretions, peaking in November. The results confirm that photoperiod, self-maintenance behavior, and endogenous factors significantly influence plumage coloration, even under controlled dietary conditions, with implications for communication and reproduction.

Reproductive behavior in a colony of Greater Flamingos (*Phoenicopterus roseus*) in a controlled environment

Castiglioni, Roberta¹, V. Levati^{1,2}, A. Milesi²

¹ Darwin Ricerca e Divulgazione Naturalistica, Milano, Italy

² Università degli Studi di Milano, Milano, Italy

This study analyzes the reproductive behavior of a colony of 100 Greater Flamingos (*Phoenicopterus roseus*) housed in a controlled environment within a wildlife park in Northern Italy. The aim was to investigate pair formation, egg-laying strategies, incubation, and chick rearing, in order to expand ethological knowledge of the species and provide insights for conservation management. The colony was monitored for 300 hours in 2018 and 280 hours in 2019. All individuals were identified using colored leg rings and sexed based on morphometric traits. An ethogram including 29 behavioral categories was compiled through ad libitum observations and comparison with existing literature. Based on copulation events, pair-specific vocalizations, and proxemic behavior, 35 stable pairs were identified in 2018 and 38 in 2019. During the 2019 breeding season, 33 of these pairs (87%) laid eggs, and were monitored to assess parental investment during incubation. In addition, morphometric data (length and diameter) were collected from 51 selected eggs over the two-year study. A 70-hour focal sampling protocol was applied to three randomly selected pairs to document incubation shifts, egg rotation, and the temporal distribution of nest attendance by each sex, in order to evaluate the respective parental contributions of males and

females. In 2019, despite the deposition of 55 eggs (reproductive success: 10.91%), only 7 chicks hatched. These were monitored daily to assess survival, growth, and parental behavior, with particular focus on the frequency and duration of feeding by both parents. The results offer new insights into the organization of biparental care and the reproductive dynamics of the species in a controlled environment. This work enriches the ethological profile of *P. roseus* and supports the refinement of ex-situ conservation strategies, particularly in the absence of well-established reference data from wild populations.

Flooded Homes, Fading Flocks

Chebii, Ezekiel¹

¹Rift Valley Conservation Center/Baringo County/Lake Bogoria National Reserve.

Lake Bogoria National Reserve, a UNESCO-designated Ramsar site in Kenya, is a globally significant habitat for lesser flamingos (*Phoeniconaias minor*). In recent years, increasing flooding and the spread of invasive species have emerged as serious threats to the survival of flamingo populations in the reserve. This summary examines the dual impact of these ecological disturbances on flamingo nesting and feeding behaviors. Rising lake levels, largely driven by regional climate change and altered catchment hydrology, have inundated traditional nesting sites. Flamingos rely on exposed mudflats and shallow saline waters for breeding; when these areas are submerged, nests are washed away, and entire colonies may abandon breeding attempts. Simultaneously, the proliferation of invasive plants, such as *Prosopis juliflora* and aquatic vegetation, has choked shallow shorelines and interfered with flamingo mobility. In several instances, flamingos have become trapped in dense mats of invasive growth, unable to access feeding areas or escape predation. Field data, remote sensing imagery, and historical records collectively reveal a troubling trend: declining chick survival and reduced flock stability over the past decade. These changes underscore the complex interactions between hydrological extremes and biological invasions in sensitive wetland systems. To safeguard Lake Bogoria's flamingos, urgent conservation interventions are needed. Key strategies include managing invasive species, restoring hydrological balance, and implementing land use controls within the lake's watershed. Protecting this habitat is essential not only for flamingos but for the broader biodiversity and ecological services the lake provides.

The greater flamingo: a key species for the success of the Po Delta Park

Costa, Massimiliano¹

¹Ente di gestione per i Parchi e la Biodiversità-Delta del Po, Italy

The Po Delta Park was established in 1988. In the first 12 years of activity the natural protected area was difficult to tolerate, poorly understood by local communities, and not much appreciated by tourists (despite the extraordinary naturalistic values, in particular due to the waterbird populations of global importance). Then the flamingos started arriving. Since the arrival of this fascinating, large, colourful, easily observable and relatively confident species, present in large flocks, it has become an icon for the Park and has changed the perception of both citizens and tourists. Over the following 25 years the Park, together with ISPRA and the local ornithological association, carried out many activities to study the evolution of the local population and to conserve the species, which is now present with a large nesting colony in the Valli di Comacchio and a high number of specimens. In particular, the Park has done its utmost to focus attention on this species, aware of the fact that it could become an umbrella species for the conservation of lagoon environments, salt marshes and the Po Delta Park in general. Territorial installations have been created, such as the flamingo windows, shielded observatories positioned in strategic points to admire the flamingos from a few meters away, without disturbing them; birdwatching towers and hides in strategic

points; boat trips and cycling routes to observe from distance the large feeding flocks; visitor centres dedicated to this species. Many communication activities were carried out: the campaign for the adoption of flamingos; photographic exhibitions; a specific brochure; the constant dissemination of monitoring results. Now, all visitors to the protected area want to see flamingos and, thanks to this bird, the Po Delta Park enjoys a much better perception and expenditure for active biodiversity conservation is more easily accepted (such as the recent reconstruction of the flamingo colony's historic nesting island).

South Africa Lesser Flamingo Crisis Overview

Conrad, Laurie

Kamfers Dam is a privately-owned wetland spanning over 400 hectares and home to tens of thousands of flamingos and a critical breeding location for the lesser flamingo (*Phoeniconaias minor*). In 2019, environmental pressures combined with new predator accessibility to the nests increased until the nesting adults abandoned thousands of chicks and eggs. 1800 chicks were rescued from the dire situation on 24 January 2019 in an unprecedented, unplanned rescue project in South Africa. Rescuers found eggs, hatching chicks, and hatched chicks baking in the hot sun without any adults in sight. Hundreds of chicks were dead. Thousands of chicks were dying. Eggs were left sitting atop mud cones. The financial cost of the response likely rose into millions of dollars. In addition to lack of guidelines, the lack of an org chart and established guidelines highlighted a need for a cohesive plan and communication network to facilitate future flamingo mass rescue events. Lessons learned included development of diets, short term housing for 500 plus flamingos, and release methodology. The collaboration between zoological professionals, community members, government organizations and NGOs saved hundreds of animals. Without the collaboration, the number of deaths undoubtedly would have significantly increased.

Flamingos in relation to reconstructed wetlands in the Venice Lagoon

da Mosto, Jane¹, A. Sartori

¹We are here Venice ETS, Venice, Italy

Since the early 2000s, extensive areas of artificial salt marsh have been created in the Venice lagoon to compensate for major habitat losses and to enable the reuse of suitable dredged sediments. However, recent analyses indicate that results in terms of biodiversity, ecological functioning, morphology, and resilience have been inconsistent. We are here Venice ETS, manager of the Italian action site within the WaterLANDS initiative—funded by the EU Horizon programme and focused on demonstrating effective and scalable wetland restoration approaches across Europe—has been investigating ways to reactivate natural salt marsh dynamics on reclaimed infills. Alongside planning and implementing targeted nature-based solutions in selected sites of the central lagoon, the work aims to establish robust parameters for ecological performance and to evaluate the societal benefits of healthy, restored salt marshes. Comparisons are made with a nearby natural marsh subject to similar environmental forces. A notable recent development in the area is the arrival of flamingos, a phenomenon that introduces new considerations regarding their ecological impacts and potential as indicators of restoration success. Their presence provides valuable insight into the biodiversity outcomes of restoration and the broader cultural and social values associated with a thriving lagoon ecosystem. Through these efforts, the project seeks to refine strategies for achieving resilient, functioning salt marshes that support both nature and people, contributing to the long-term sustainability of the Venice lagoon as a dynamic and living landscape.

Meet Bob, the flaming with a job

Doest, Odette^{1,2}

¹Fundashon dier en onderwijs Cariben, Curaçao

²Veterinary Practice Doest, Curaçao

In fall of 2016 a male Caribbean Flamingo got injured as he crashed into a Hotel, on the Caribbean island Curacao. After rehabilitation at veterinary practice Doest., it resulted that he was not able to be returned to the wild due to permanent injuries to both his feet and the left wing. Local veterinarian Odette Doest has a education program where she visits schools with local wildlife, to educate and win the hearts over for the amazing wildlife of the island. She decided to add the flamingo to the education team and named him Bob. Besides his education job, Bob also helps to show flamingos that are submitted to the hospital how to feed reducing the need to force-feed/ reduce their stress. Bob story was published in the national geographic of February 2020, in a article of Jasper Doest. This gained Bob international fame. Through his Instagram his story inspired education programs in the region. Purpose of the presentation is to show the potential of an education program with local rescue birds, how they are trained to minimize stress for them during a presentation. the importance of specialized veterinary care. and the effect of the education session on the children and their surroundings.

One health in connection with migrating birds in the Caribbean

Doest, Odette^{1,2}

¹Fundashon dier en onderwijs Cariben, Curaçao

²Veterinary Practice Doest, Curaçao

Every year migrating bird come down to south america , leaving from north America and Canada. During their stop over at the Caribbean islands they rest in the same areas as endemic species. this occurs in the months September through October, in march/ April of the following year they migrate back to North America and Canada. We have sampled birds that came in from the wild to search for zoonotic diseases like aviary influenza, bird were either rescued because they were found weak, or injured. samples were submitted to the pathology department of Utrecht university and Erasmus university in the Netherlands. results will be discussed as an article is awaiting publication. Avian influenza was detected in two flamingo, one juvenile that was released just 2 months prior to infection and one adult flamingo was affected. during the presentation health risk for the public will also be discussed conform one health principle.

Multidisciplinary studies of American Flamingo in the Yucatan Peninsula

Dzib Chay, Jorge A.¹, C.E. Cáceres Cantón

CONANP, México

The multidisciplinary studies of the Yucatan peninsula is a long term research based on 10 years, where different studies occur at the same time taking in count all the different changes that are occurring at the flamingos nesting colonies such as: the study of sedimentary nesting colonies (comparing Drone Images of different years and years that have been impacted by storms), Using Drone Technology to study nesting sites on a mangrove swampy areas, where access is limited and a few years ago was difficult or impossible this method help us to study the flamingos nesting sites and counting the nest by the method

of occupied nest on the 9th day of incubation, then counting the number of hatching at 75 days before they fly to measure the size of survival individuals to flying age, other studies are the banding programs, and creating groups of band readers across Yucatan. The Gps Radio transmitters in order to studies the best feeding areas where flamingos disperse after hatching time, this will allow us to understand the best way to protect best feeding sites as well fresh waters sources. The gps short term studies also is used as to understand the interactions that occur during the tropical storms, hurricanes as there are some flamingos which are forced migrants do to the threaten conditions of a extreme weather event. As the ambitious program of the Yucatan, we are using different types of methods but combining all of them in order to have results that can be used in aid of our flamingo colonies as well to preserve nesting sites. Such results could be share during the flamingo symposium.

Flamingo Simultaneous Census on the coast of Venezuela

Espinoza, Frank¹, L. Torres¹, A. Marcano¹, N. Diaz¹

¹Grupo Conservación del Flamenco en Venezuela, Venezuela

A standardized simultaneous census of Caribbean Flamingos (*Phoenicopterus ruber*) was conducted by 57 volunteers on December 9, 2023 in 37 wetlands localities in the Venezuelan coast and offshore islands. Total numbers of flamingo's nationwide accounted to 129,875 individuals (102,980 matures, 16,895 immatures and 10,000 chicks). The highest numbers of flamingos were in Olivitos Wildlife Refuge (63,700 matures 16,300 immatures and 10,000 chicks) and at the Solar Saltworks of Produsal (18,693 flamingos), representing both localities 83,70 % of the country total's flamingos. Follow by Falcon state with 12,245 flamingos, highlighting Cuare Wildlife Refuge with 7,252 individuals. In the states of Anzoategui and Sucre 3,046 flamingos were registered. Censuses in Margarita Island (where the second breeding colony of Venezuela is located) accounted to 3,323 flamingos. Our data represents an increase of 50,122 flamingos with respect to census from December 13, 2009. Five countries participated in this survey to better estimate how flamingos are distributed in the southern Caribbean this time of the year. The combined estimates were 137,321 flamingos, distributed as follows: Venezuela-129,875, Bonaire-3,635, Colombia-3,564, Curacao-186 and Trinidad and Tobago-61. The flamingo population estimated does not meet the IUCN criteria for vulnerable status. For next flamingo surveys it is recommended the use drones for more accuracy and cover larger wetlands areas such the breeding colony in Olivitos Wildlife Refuge.

Use of geospatial tools for the conservation of high Andean Flamingos.

Fabricante, Irene¹, P. Marconi^{2,3}, F. Arengo^{3,4}, D. Blanco¹, R. Baigún¹, A. Lesterhuis⁴, R Clay⁴

¹Fundación Humedales/Wetlands International, Argentina

²Fundación YUCHAN, Salta, Argentina

³Grupo de Conservación Flamencos Altoandinos (GCFA)

⁴Center for Biodiversity and Conservation, American Museum of Natural History, New York, NY, USA

⁵Manomet, Paraguay

The high Andean wetlands of the South American altiplano are key ecosystems for the breeding, feeding, and resting of the Puna (*Phoenicoparrus jamesi*), Andean (*P. andinus*), and Chilean flamingos (*Phoenicopterus chilensis*). However, these environments are under pressure by the expansion of lithium brine mining. In response to these threats, we developed a GeoServer that centralizes and makes available geospatial information on the distribution and abundance of flamingos and shorebirds, as well as the location of wetlands and lithium extraction projects. Data layers from field monitoring, satellite

images, public databases, and scientific studies were compiled and integrated into this platform. The result is an interactive tool that enables users to visualize the spatial distribution of flamingos, identifies priority conservation sites, and overlays them with areas affected by lithium mining thereby facilitating impact analysis and informed decision-making. This platform represents a significant advance for the conservation of high Andean flamingos and other waterbirds, by improving access to integrated and updatable data. It also strengthens the link between science, environmental management, and civil society, promoting more effective conservation actions in a context of increasing extractive pressure on high Andean wetlands.

The importance of effective protection of the Sebkhet Sejoumi Ramsar site for the population of the Greater Flamingo (*Phoenicopterus roseus*) in Tunisia and the Western Mediterranean region

Feltrup-Azafzaf, Claudia¹, H. Azafzaf¹, S. Rebah¹, C. Germain², L. Dami², L. Ben Nakhla³, A. Béchet², A. Arnaud²

¹Association "Les Amis des Oiseaux" (AAO/BirdLife in Tunisia), Ariana, Tunisia

²Tour du Valat, Arles, France

³Regional Activity Centre for Specially Protected Areas (RAC/SPA), Tunis Cedex, Tunisia

The Greater Flamingo *Phoenicopterus roseus* is one of the waterbird species that can be observed throughout the year in Tunisia and is considered an occasional breeder. In this paper, the authors analyse data from 20 years (2006-2025) of waterbird surveys and monitoring of ringed greater flamingos in Sebkhet Sejoumi, an internationally important wetland located near the capital Tunis in northern Tunisia. Population figures for the Greater Flamingo of Sebkhet Sejoumi, in particular those from the annual International Waterbird Census (IWC), will be compared with national results and the total population size of the western Mediterranean to illustrate the importance of the site for the species. The connectivity of the threatened Ramsar site with at least 25 wetlands in five Mediterranean countries hosting breeding colonies and numerous other wetlands will be analysed and documented by examining more than 2,800 sightings of ringed flamingos in Sebkhet Sejoumi. The results will highlight the need for better and more consolidated consideration of the network of critical wetlands if the species is to be effectively conserved in the western Mediterranean.

Estimation of the Population of Wild Flamingos (*Phoenicopterus ruber*) Through a Simultaneous Census Conducted in the Caribbean

Galvez Aguilera, Xiomara¹, F. Espinoza², E. Fernandez³

¹Caribbean Coastal Conservancy

²Grupo para la Conservación del Flamenco en Venezuela y el Caribe

³Jardín Botánico Nacional, Dominican Republic

Flamingos often inhabit remote and difficult-to-access areas, forming a wide geographic range. They are birds capable of covering great distances in a short time, making them difficult to track and count. A simultaneous census was conducted in 15 Caribbean countries during the week of February 19-25, 2024. A coordinator was appointed in each participating country to oversee the census, and methodologies for aerial and ground surveys were developed to ensure accuracy and consistency. Data collection sheets were provided for recording and submitting observations. In each territory, previously identified key sites were assessed, and the number of adult and immature flamingos was recorded. A total of 243 locations were censused, georeferenced, and mapped, allowing for future comparisons. Key results are discussed by country. The study estimated a minimum population of 196,678 mature individuals. The population

does not meet the criteria for vulnerable status, the study highlights several threats to the species, including the limited number of breeding colonies that could jeopardize it in the medium and long term if we do not act. specie is classified as Least Concern according to the current IUCN 2024 population estimate. Despite the Least Concern status, the study recommends repeating the census every five years to monitor the flamingo population and track any changes in its status.

Breeding attempts of the Greater Flamingo, *Phoenicopterus roseus*, in Maharloo Wetland, Southern Iran: threats and management

Gholamhosseini, Ali¹, M. Jafari¹, M. Javad Armanmehr², L. Julaie²

¹Ornithology Research Lab, Department of Biology, College of Science, Shiraz University, Iran ²Office of Wildlife Conservation and Management, Fars Department of Environment, Iran

The Greater Flamingo, *Phoenicopterus roseus*, stands as the most widespread and largest member of the flamingo family. Saline wetlands are among the most important breeding habitats of the species. This study reports six successful breeding attempts of the Greater Flamingo in the Maharloo saline Wetland, southern Iran, from 2007 to 2024 using off-road vehicles, on-foot searches, binoculars, and drone. The fieldwork has not been continuous and systematic; therefore, the number of reproductive attempts may be higher than the reported. Results reveal that the species breeds in the northwest, east and in the south of the wetland. The largest number of nests were observed in the spring of 2022. However, the breeding success of this species was influenced by several climatic and anthropogenic factors, notably water level decline, resulting from recent droughts in this arid region, which posed a significant challenge to the flamingo breeding. In years with low rainfall, the lake dries up in May or June, leading to chick mortality. The combination of these factors threatens the Greater Flamingo population in Maharloo Wetland, highlighting the need for integrated conservation strategies to mitigate human impacts and manage water resources effectively. Future research should focus on the relationship between water levels and breeding attempts, effects of sewage entering the northern parts of the wetland on flamingo reproduction, to help enhance conservation efforts and improve breeding success for this species.

Movement ecology and survival of rescued and captive-reared Lesser Flamingos *Phoeniconaias minor* from Kamfers Dam, South Africa, 2019-2024

Harebottle, Douglas M.¹, V.L. Goodall², J. Werth³

¹Department of Biological and Agricultural Sciences/Sol Plaatje University, Kimberley, South Africa

²Department of Statistics, Nelson Mandela University, South Africa

³Bayworld Centre for Research and Education, South Africa

Movements and migration patterns of Lesser Flamingos *Phoeniconaias minor* in southern and South Africa are generally poorly understood although previous studies have elucidated variable adult movement patterns. Juvenile dispersal and movement patterns are unknown and not been investigated. Here we present movement and survival data of selected rescued and rehabilitated Lesser Flamingo juveniles from Kamfers Dam, Kimberley, South Africa from 2019 – 2024. A total of 614 rehabilitated birds were fitted with engraved colour-bands and 26 birds with GPS/GSM tracking units. Overall dispersal from Kamfers Dam is variable and multi-directional; data from one bird revealed a previously unknown interior-coastal migratory route and pattern within South Africa. Survival of released birds ranged from 13 days to 1657 days. Longest straight-line distances travelled included two colour -banded birds resighted in Namibia, Lüderitz (976 km) and Swakopmund (1 223 km) respectively. Multi-state log-normal hidden Markov models were fitted to selected tracking data to understand patterns of movement in relation to

temperature, time of day, and moon phase. We found strong relationships between long relocations, and nocturnal flights, and moon phase, the latter showing significant relationship between behavioural state and 'full moon' phase (Chi-square = 10.243, 3 d.f, $p = 0.016$). The value of GPS/GSM tracking devices in better understanding movement patterns of flamingos is highlighted.

Rescue and rearing of Andean Flamingo chicks in captivity at the Vesty Pakos Municipal Biopark, La Paz, Bolivia.

Hazelton, Brad¹, A. Quispe², O. Rocha^{2,3,4}

¹Fort Worth Zoo, Fort Worth, Texas, USA

²Bioparque Municipal Vesty Pakos, La Paz, Bolivia

³Centro de Estudios en Biología Teórica y Aplicada (BIOTA), Bolivia

⁴Grupo de Conservación de Flamencos Altoandinos (GCFA)

Forty eggs of Andean flamingos (*Phoenicoparrus jamesi* and *P. andinus*) were rescued during an egg harvest carried out by an Indigenous community at Laguna Colorada, in southwestern Potosí, Bolivia, on December 20, 2016. The eggs were transported in a portable incubator to the Vesty Pakos Municipal Biopark in the city of La Paz. They were weighed daily and rotated three times a day, with embryonic viability monitored during incubation. The eggs of *P. jamesi* are slightly smaller than those of *P. andinus*. Eighteen chicks hatched between January 2 and 20, 2017—13 *P. jamesi* and 5 *P. andinus*. The chicks' average initial weight was 77.25 g. All chicks were fed by tube using a nutritional formula rich in protein and fat. Tube feeding ended on day 85, after which they were gradually given extruded bird feed. In December 2023, six eggs were collected from an abandoned colony in Laguna Colorada and brought to the Biopark to be reared. Currently, 14 individuals of *P. jamesi* and one of *P. andinus* are healthy and living at the center. No significant morphometric differences (in weight, beak length, wing, and tarsus) were found between captive and wild flamingos at an average age of three months. However, significant differences were observed in adults. At present, the Biopark is the only place where *P. jamesi* flamingos have been successfully reared. The results and lessons learned from the rearing of high-Andean flamingos contribute to enhancing both ex situ and in situ conservation efforts for these threatened species.

Satellite tracking greater flamingos from Abu Dhabi, United Arab Emirates

Javed, Salim¹, S. Khan¹, S. Ahmed¹

¹Environment Agency-Abu Dhabi, United Arab Emirates

Since 2005, the Environment Agency—Abu Dhabi has tracked 30 Greater Flamingos (*Phoenicopterus roseus*) using satellite telemetry, providing valuable insights into their movement ecology, habitat use and migration patterns. This long-term study has enhanced understanding of flamingos wintering in the UAE and their reliance on both coastal and inland wetlands within the country and along their migratory routes. Our study further highlights the connectivity between wetland sites and flamingos' responses to environmental changes, emphasizing the need to protect a network of key sites. This study further contributed to the establishment of a protected area in coastal Abu Dhabi and its designation as a Ramsar site, demonstrating the critical role of tracking studies in conservation. These findings support evidence-based conservation and management of wetlands and underscore the urgency of safeguarding crucial sites to mitigate the impacts of habitat loss and climate change.

Phenological Shift and Breeding Success of Greater Flamingos (*Phoenicopterus roseus*) in a Man-Made Hypersaline Wetland in UAE: Implications for Climate Adaptation

Khan, Shahid¹, S. Javed, S. Ahmed, A. Ali

¹Environment Agency Abu Dhabi, United Arab Emirates

Over the past 15 years, the Greater Flamingo (*Phoenicopterus roseus*), a relatively new breeding species in the UAE, has consistently bred at Al Wathba Wetland Reserve—a 500-hectare artificial hypersaline wetland in a predominantly desert environment. Between 2010 and 2025, 16 of 18 breeding attempts were successful, producing 6,669 chicks (mean: 416, range: 17–992), underscoring the reserve's critical role in sustaining the species' breeding population in the Arabian Peninsula. This success is attributed to provision of an artificial nesting island and strict disturbance mitigation. Notably, nesting has shifted gradually from summer (April/May) to winter (November)—a nearly 20-week change—likely reducing heat stress. Number of chicks hatched in a breeding event and the breeding success (Number of eggs vs chicks fledged) improved over time, suggesting learned adaptation. With better wetland management and thermal avoidance strategy, the flamingo breeding population is expected to grow. These findings provide insights into how species may adapt reproductive timing to rising temperatures, offering a potential model for conservation in warming climates.

Wintering Greater flamingos in Cyprus: Status, trends, pressures and conservation actions

Kassinis, Nicolaos¹, C. Ieronymidou², A. Christou²

¹Game and Fauna Service, Cyprus

²BirdLife Cyprus

The wetlands of Cyprus regularly host one of the largest wintering populations of Greater Flamingo in the East Mediterranean. Ring recoveries indicate that Cyprus receives influxes of birds from the West Mediterranean and Southwest Asian populations. The flamingos frequent five natural wetlands on the island, with the largest populations overwintering at the Larnaca and Akrotiri Salt Lakes. On average, 5,000-10,000 individuals winter at these wetlands, representing more than 1% of the Eastern Mediterranean population. Wintering flamingos arrive from November and leave by early March. Depending on water levels, some birds (usually subadults and juveniles) may stay longer and oversummer in Cyprus. Failed nesting attempts have been recorded on several occasions during the last 20 years. Monthly waterbird counts are carried out jointly by the Game and Fauna Service and BirdLife Cyprus for over 2 decades. The Greater Flamingo wintering population has been stable since 1992, but over the shorter term, the trend is decreasing, with numbers declining by 14-31% since 2013. The decline at Akrotiri Salt Lake is even greater, estimated at 18% per year on average. Pressures from development, changes in water quality and quantity, presence of lead sediments, as well as habitat changes, including reed encroachment, have been identified as important threats and potential drivers of decline. Conservation actions planned to be carried out under the 10-year LIFE Integrated Project Pandoteira, aim to address these pressures and improve feeding and resting conditions in specific NATURA 2000 sites in Cyprus.

Socio-Ecological Assessment of the Lesser Flamingo's Breeding Habitat at Lake Natron: Implications for Conservation and Community Livelihoods

Komba, Atupelye W.¹

¹Ardhi University, Tanzania

Lake Natron in northern Tanzania, the primary breeding ground for over 75% of the global population of the lesser flamingo (*Phoeniconaias minor*), represents a critical yet fragile socio-ecological system. While indispensable to this near-threatened species, the lake also sustains the agropastoral livelihoods of indigenous Maasai communities. However, escalating pressures; including land-use conversion, upstream agricultural expansion, and climate-induced hydrological shifts threaten to destabilize this delicate balance between biodiversity conservation and human subsistence. Grounded in socio-ecological systems (SES) theory, this study examines the interdependencies between ecological integrity, livelihood strategies, and institutional frameworks governing resource use in the Lake Natron basin. Using a mixed-methods approach combining geospatial analysis (GIS/remote sensing), semi-structured interviews, and participatory mapping, we assessed spatiotemporal habitat fragmentation and evaluated key socio-economic drivers. Results reveal a reduction in suitable flamingo nesting areas driven by variable climatic conditions and increased sedimentation from upstream farming. Additionally, the critical yet underappreciated role of Maasai transhumance pastoralism and traditional wetland management in maintaining habitat connectivity is emphasized. Systemic vulnerabilities also emerge from conflicting governance priorities among national conservation agendas, private sector interests, and community land rights. This study identifies leverage points for resilience-oriented management, including hydrological monitoring co-developed with local communities, payment-for-ecosystem-services schemes that align conservation with pastoralist welfare, and governance reforms that integrate Tanzania's 2022 Wildlife Policy with customary land tenure. By foregrounding indigenous agency, the findings contribute to equitable stewardship of flagship species habitats and offer transferable insights for balancing conservation and livelihoods in socio-ecological systems under global change pressures. Ultimately, this research enhances understanding of the threats and local capacities shaping the future of lesser flamingos at their most critical breeding site.

Living amidst high inter-annual fluctuations in precipitation. Early-life exploration of greater flamingos from distinct Mediterranean breeding areas

López Ricaurte, Lina¹, M.G.W. Vansteelant, A. Antoine, O. Duriez, F. Jiguet, S. Nissardi, D. Scridel, L. Serra, S. Tillo, A. Béchet, J. Champagnon

¹Tour du Valat, Research Institute for Conservation of Mediterranean Wetlands, Arles, France

Understanding how early-life exploration shapes adult annual cycle routines in migratory animals remains challenging, particularly in long-lived species. Delayed recruitment in such species suggests that first breeding attempts are often preceded by a protracted learning phase during which individuals develop annual itineraries through extensive exploration. This behavior may lead inexperienced young to wander beyond traditional population areas. Using GPS-tracking data from 83 greater flamingos (*Phoenicopterus roseus*) tagged as nestlings in the Mediterranean, we analyzed ontogenetic changes in mobility and space use up to 8 years of age. 3. Flamingos were more exploratory during their early years, gradually transitioning to a more sedentary lifestyle with age. Each additional year reduced the number of staging events by 16% while increasing their average duration by 8 days. Birds remained faithful to the non-breeding staging sites where they spent most of their time during the first year of life. Over time, they returned progressively closer to their natal sites, even after years of exploration at non-traditional locations. Breeding was rare (8%) and occurred at a relatively late age (≥5 years), highlighting an

extended exploratory phase, a pattern observed in other long-lived species. Older birds were more likely to use traditional sites and spent more time at these locations, particularly after age 5. Our study reveals the individual exploration process underlying natal and non-breeding dispersal patterns previously laid bare by ring-resighting studies and shows that flamingos retain long-term memory of sites learned in early life.

Resilience and Movement Patterns of Lesser Flamingos (*Phoeniconaias minor*) in Response to Climate-Induced Habitat Changes in East African Rift Lakes

Magile, Daud Stanley¹

¹My Birthday Tree Organization, Tanzania

The East African Rift Valley soda lakes are vital habitats for Lesser Flamingos (*Phoeniconaias minor*), providing critical breeding and foraging grounds. However, these ecosystems face increasing threats from climate change, water extraction, pollution, and land-use alterations, raising concerns about flamingo population stability. This study aims to assess how Lesser Flamingos are adapting their movement patterns and habitat use in response to environmental changes, and to identify emerging conservation priorities. From 2022 to 2025, we have employed a combination of satellite telemetry, field surveys, and remote sensing (Landsat and Sentinel imagery) to monitor flamingo distribution, water quality indicators, and habitat conditions across major sites, including Lakes Natron, Manyara, Bogoria, and Nakuru. Preliminary data suggest significant shifts in flamingo use of traditional breeding and feeding areas, with increasing reliance on smaller, ephemeral wetlands during periods of drought and habitat degradation. Final predictive modeling of habitat suitability under future climate scenarios is ongoing and will be completed prior to the symposium. While Lesser Flamingos exhibit adaptive resilience to environmental change, the degradation and fragmentation of key habitats pose serious threats to their long-term survival. Our findings advocate for a shift in conservation strategy towards protecting dynamic networks of habitats rather than isolated key sites. Flexible, climate-resilient conservation approaches are essential to support flamingo populations amid accelerating ecosystem transformations.

Conservation of Flamingo Satellite Habitats in Kenya

Malaki, Philista¹, T. Mwinami¹

¹National Museums of Kenya, Kenya

Kenya is home to significant populations of Lesser (*Phoeniconaias minor*) and Greater Flamingos (*Phoenicopiterus roseus*), primarily found in Rift Valley lakes such as Nakuru, Bogoria, and Elementaita. However, satellite habitats—smaller, often overlooked wetlands like Ondago Swamp, Lake Simbi, and Lake Logipi play a crucial role in sustaining flamingo populations. These sites provide essential foraging, breeding, and refuge areas, particularly during ecological fluctuations in primary lakes. Despite their importance, these satellite habitats face severe threats from habitat degradation, pollution, climate change, and unsustainable land-use practices. Agricultural expansion, water abstraction, and siltation reduce wetland suitability, impacting flamingos and associated biodiversity. Additionally, limited conservation focus and policy gaps exacerbate their vulnerability. This study highlights the ecological significance of satellite habitats and assesses key threats and conservation challenges. We propose integrated conservation strategies, including community-led wetland management, restoration efforts, and policy frameworks to safeguard these critical ecosystems. Recognizing and conserving both primary and satellite flamingo habitats enhances the resilience of Kenya's wetlands, ensuring the survival of flamingo populations amid growing environmental pressures. Collaborative action among conservation

organizations, researchers, policymakers, and local communities is vital for effective and sustainable wetland management where flamingos can thrive.

Importance of the Laguna de las Marites as a breeding site of the Caribbean Flamingo (*Phoenicopterus ruber*), Margarita Island, Venezuela

Marcano, Anahy¹, G. Figueroa¹, Zenaida Martínez¹, F. Espinoza²

¹ Instituto Nacional de Parques, Venezuela

² Grupo para la Conservación del Flamenco en Venezuela y el Caribe

The flamingo is a charismatic species with a historical distribution on Margarita Island, which for unclear reasons disappeared in the last two decades of the last century. However, since 2006, the species began a process of recolonization of the island's wetlands (Sanz, 2019, 2020), and its successful reproduction in Las Marites Lagoon was confirmed in 2017 (Marcano et al. 2023). This demonstrates the importance of this protected area as a vital breeding site for flamingos, making it the third largest breeding colony in the southern Caribbean, after Los Olivitos and Bonaire. In 2023, the island's population was estimated at 3,323 flamingos (Espinoza, pers. comm.). The presence of healthy populations of Caribbean Flamingos in Las Marites not only indicates the good health of the lagoon ecosystem but also has significant implications for sustainable tourism and biodiversity conservation in the region. The protection and responsible management of this wetland are therefore essential to ensure the long-term survival of this iconic species and the maintenance of a valuable natural heritage. Securing resources will allow us to continue monitoring the breeding ecology and performing chick banding, which will allow us to differentiate the island's flamingos from those born in other breeding colonies in the southern Caribbean.

The first assessment of the genetic structure in South American flamingos in an era of rapid change

Marcolongo, Abril A.¹, A.E. Jahn², B. Mahler¹, J.C. Reboresda¹

¹ Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Argentina

² Department of Integrative Biology, Oregon State University, USA

Human-driven habitat loss, overexploitation, and climate change are driving a sixth mass extinction, with rates up to 1,000 times higher than the historical ones. Effective conservation strategies rely on understanding species' biology, ecology, and threats. South American flamingos are species of high conservation concern, yet little is known about their genetic structure and connectivity across breeding and non-breeding grounds. Understanding population structure is key to informing conservation in the face of habitat degradation and anthropogenic pressures. We present preliminary results of a genomic analysis of the three South American flamingo species: Chilean flamingo (*Phoenicopterus chilensis*), Andean flamingo (*Phoenicoparrus andinus*), and James's flamingo (*Phoenicoparrus jamesi*). We sampled blood from flamingos at sites located from central to northern Argentina, which make up a large portion of their range. Our dataset comprises samples of 46 *P. chilensis* from two sites (Laguna Mar Chiquita and Laguna del Toro), 22 *P. jamesi* and 7 *P. andinus* from three high-Andean sites (Laguna Brava, Laguna del Toro, and Laguna Vilama). DNA was extracted with DNeasy kits and 20,000 SNPs were obtained using a RAD-seq procedure. Preliminary PCA and AMOVA analyses indicate no significant genetic structure within or between sites in any of the three species, suggesting high gene flow and/or recent connectivity among colonies. We are currently expanding our sampling to include sites across a broader geographic range and developing a demographic history model to conduct a more detailed evaluation of population connectivity of these threatened species.

Seventh International Simultaneous Census of High Andean Flamingos in South America: Preliminary Analysis

Marconi, Patricia^{1,12}, F. Arengo^{2,12}, A.L. Sureda^{3,12}, O. Rocha^{4,12}, S. Aguilar^{4,12}, A. Castro^{5,12}, E. Ortiz^{6,12}, F. Moschione^{3,12}, H. Sosa^{7,12}, M. Valqui^{6,12}, P. Michelutti¹², C. Pizarro⁵, M. Romano^{8,12}, I. Barberis^{9,12}, C. Barisón^{9,12}, L. Castro^{10,12}, E. Derlindati^{11,12}, M. Michelutti¹²

¹Fundación YUCHAN, Argentina

²Center for Biodiversity and Conservation, American Museum of Natural History, New York, USA

³Administración de Parques Nacionales, Argentina

⁴Centro de Estudios en Biología Teórica y Aplicada (BIOTA), Bolivia

⁵Corporación Nacional Forestal, Chile

⁶Centro de Ornitología y Biodiversidad (CORBIDI), Perú

⁷Fundación para el Estudio e Intervención Socioambiental, Argentina

⁸Centro de Investigaciones en Biodiversidad y Ambiente EcoSur, Argentina

⁹Facultad de Ciencias Agrarias, Universidad Nacional de Rosario, Argentina

¹⁰Natura International, Argentina

¹¹Universidad Nacional de Salta, Argentina

¹²Grupo de Conservación Flamencos Altoandinos (GCFA)

The 7th International Simultaneous Census (ISC) of High Andean Flamingos carried out from 26 January to 5 February 2025 surveyed 328 wetlands in Argentina, Bolivia, Chile and Peru. The census encompassed the entire summer distribution range of the Andean Flamingo (*Phoenicoparrus andinus*) and the Puna Flamingo (*Phoenicoparrus jamesi*). A total of 74,198 Andean Flamingos and 166,502 Puna Flamingos were counted. Over the 28 years of conducting ISCs, we observe a sustained increasing trend in the global abundance of Puna Flamingos. However, for the first time, a slight decline in Andean Flamingo numbers was detected in this past census. Key summer sites for the Andean Flamingo were reaffirmed, highlighting the area centered on the tripartite border of Argentina, Bolivia, and Chile. The decrease in Andean Flamingo numbers is cause for concern given its current Vulnerable status according to the IUCN Red List and the increasing expansion of lithium mining across the South American Andean plateau. These extractive activities demand high volumes of water consumption, threatening the depletion of groundwater reserves. The impacts on surface wetlands, including degradation, desiccation, and land subsidence are already evident in the Andean region. Climate models predict increased temperatures and decreased precipitation in the Andean plateau, patterns that have already been documented in several localized studies, exacerbating pressure on flamingo wetland habitats. Continued monitoring through future ISCs and strengthened conservation strategies will be critical to mitigating risks to these emblematic species and their fragile habitats.

Getting hands on with our Flamingos: Managing Health Checks and Records Across Seven Species in a Zoo Setting

Matthews, Simon¹

¹WWT Slimbridge Wetland Centre, Slimbridge, UK

Catching and handling flamingos in a zoo environment presents unique logistical and welfare challenges, particularly when managing multiple species with differing behaviors and group dynamics. This presentation outlines the planning, execution, and outcomes of a comprehensive health check and record update for all flamingos at our facility—representing all seven recognized species. We will discuss safe

and effective catching techniques tailored to different species, strategies for minimizing stress and maintaining biosecurity, and the coordination required across multiple teams. Key learnings include refining flock management during large-scale procedures, ensuring accurate data collection, and applying lessons to make future improvements. This case study demonstrates how thorough preparation and species-specific knowledge can enhance both animal welfare and institutional record accuracy in complex zoo operations.

Fostering Community Stewardship for Flamingo Conservation in Lake Natron Ramsar Site

Mgimwa, Emmanuel¹, K. Mwathe²

¹Nature Tanzania, Tanzania

²BirdLife International, Kenya

Lake Natron in northern Tanzania is a globally important Ramsar Site and the sole breeding ground for 75% (1.5–2.5 million) of the Near Threatened Lesser Flamingos. The lake also holds deep cultural and economic value for the Maasai people. However, it faces growing threats from soda ash mining, land degradation, and climate change, requiring urgent and sustainable management. BirdLife International and Nature Tanzania are working together to strengthen community stewardship for flamingo and habitat conservation. Their initiatives include promoting community-based ecotourism, improving access to finance, and building youth capacity for site monitoring and catchment restoration. Over 5,500 indigenous trees have been planted in key catchment zones, public areas, and homesteads. A Darwin-funded project (2017–2020) advanced an eco-tourism model for sustainable livelihoods, following the successful 2008 “Think Pink” campaign that halted soda ash mining by TATA. This project enhanced local skills, particularly for guides, and established a Community Revolving Fund (CRF) supporting ecotourism and restoration. The CRF continues to grow, demonstrating strong community ownership and sustainability. Community-based monitoring through the national waterbird census highlights climate impacts on the ecosystem. Between 2018 and 2024, severe flooding disrupted flamingo breeding by diluting the lake’s high-pH waters vital for their food sources. Despite these challenges, more than 50,000 chicks successfully hatched between January and April 2025. Nature Tanzania continues to lead community advocacy against renewed soda ash mining proposals, proving that empowered local stewardship is vital to conserving this globally significant ecosystem.

Response to Flamingo Nesting Island Restoration at the Ría Lagartos Biosphere Reserve, Yucatan, Mexico

Migoya, Rodrigo¹, M. Rendón-Martos², J. García Barrón³, M. Tabasco Contreras¹, E. Sansores Font⁴, J. Fernández¹, L. Poot Canché¹, F. Be Estrella⁵

¹Niños y Crías, Mérida, Yucatan, Mexico

²Reserva Natural Fuente de Piedra, Spain

³SEMARNAT, Mexico

⁴Industria Salinera de Yucatán, Mexico

⁵CONANP, Mexico

Aerial surveys and nesting colony data from the Yucatán Peninsula showed that coastal breeding sites between the late 1980s and early 2000s were insufficient to sustain existing flamingo populations. Jaguar intrusions at Petén Hu in 1993 and 2000 prompted restoration of Punta Mecoh, a 5,187 m² island once used by flamingos in the 1980s. The site had been abandoned due to nest degradation, tidal movement, Hurricane Gilbert, and erosion. Restoration aimed to provide a safer nesting site, protected from predators and tidal egg loss. Two methods were applied: burlap bags filled with sand were manually

carried to the island, and a mud pump on a 7 m boat elevated the area to 60 cm. Orientation, groins, and plywood retaining walls were designed to minimize erosion and encourage sedimentation. The first restoration in 2003 successfully attracted flamingos in 2004–2005, with chick production increasing 452% and 340%, respectively. After Hurricane Wilma (2005), a second restoration occurred in 2007, though recolonization began only in 2011, increasing chick production by 355%. Since then, flamingos have reused Punta Mecoh and an adjacent site, La Angostura, supporting 10,000–20,000 chicks across eight seasons, including 2025. Continued erosion highlights the need for ongoing research and maintenance. Conservation actions such as the 2000 rescue and hand-rearing of 1,000 Petén Hu eggs (220 fledglings) have aided the Caribbean Flamingo, though Punta Mecoh restoration proved more beneficial. The loss of Cuba's Río Máximo colony in 2012 and sightings of over 20 Yucatán-ringed birds there confirm the species' interregional mobility and dependence on protected breeding habitats.

Movement and distribution of near threatened Lesser Flamingo (*Phoeniconaias minor*) within east African lakes

Mwinami, Timothy¹, J. Kimaru², M. Kimel², J. Edebe³, H. Ndithia¹, E. Mulamba¹, A. Carvey¹, T. Imboma¹, F. Achieng¹

¹National Museum of Kenya, Nairobi, Kenya

²Baringo County Government, Kenya

³Wildlife Research and Training Institution (WRTI), Kenya

The Lesser Flamingo (*Phoeniconaias minor*) is the smallest and most numerous of the six extant flamingo species. Over 75% of its global population inhabits the shallow alkaline lakes of Africa's Eastern Rift Valley. Despite its ecological importance, published data on the species remains limited. Over the past decade, rising water levels, human activities, and climate change have altered the ecological balance of historic alkaline lakes, including the renowned "Pink Carpet." These changes have disrupted primary food source cyanobacteria leading to large flocks dispersal to small group. This study assessed the population status, movement patterns, and distribution of Lesser Flamingos, at three key section along Lake Bogoria: the Lobo River Delta (Northern Shore), Old Gate, and Submerged Hot Springs Shores. Flamingos were captured using bal-chatri and mist nets traps, simultaneously and Two water samples per site collected to analyze food availability, focusing on the concentration of blue-green algae (cyanobacteria). From the traps 40 individuals were captured, ringed, biometric data recorded, and one individual was fitted with a solar-powered microsatellite transmitter. The Old/Submerged Hot Springs Shore had the highest estimated density of blue-green algae, averaging approximately 954 colonies per litre. The Lesser Flamingo population estimated was 158,871, comprising 70% adults, 25% sub-adults, and 5% immature birds. This total includes an average of approximately 360 Greater Flamingos (*Phoenicopterus roseus*). The study also launched a community-based initiative called "Friends of Flamingos" to support a long-term monitoring program. This initiative aims to enhance understanding of flamingo population dynamics, movement, and distribution across the Eastern Rift Lake system, despite climate and human pressures.

Engaging local communities in the conservation of migratory corridors for the Lesser Flamingo in Kenya

Nasirwa, Oliver¹

¹National Museums of Kenya, Nairobi, Kenya

The conservation of Lesser Flamingo (*Phoeniconaias minor*), a near-threatened species, is critical due to its ecological importance and vulnerability to environmental changes. In Kenya, migratory corridors

connecting the key soda lakes such as Nakuru, Bogoria, and Elmenteita are essential for sustaining Lesser Flamingo populations, yet these habitats face increasing threats from human activities, pollution and climate change. The paper will explore the role of local community engagement in the design and planning of migratory bird corridors to support the conservation of Lesser Flamingo. Drawing on case studies and participatory approaches, the research will highlight how community involvement can foster habitat preservation and sustainable land use practices. It will also examine the challenges posed by rising water levels in these soda lakes, which are diminishing the primary food source for Lesser Flamingo—and the impact of habitat fragmentation on migration patterns. By integrating traditional knowledge with scientific data, the study will work towards proposing a collaborative framework for corridor design that would balance conservation goals with community needs. The findings strive to underscore the importance of inclusive decision-making processes in mitigating threats to the Lesser Flamingo populations while promoting coexistence between wildlife and human livelihoods. This approach would offer a scalable model for biodiversity conservation in East Africa and beyond.

Ecological factors influencing Greater Flamingo breeding success in Molentargius Natural Regional Park (Cagliari, Italy).

Nissardi, Sergio¹, R. Facoetti, A. Murru, V. Paulis, C. Zucca¹

¹Anthus S.N.C., Cagliari, Italy

The study investigated the biotic and abiotic factors affecting the breeding success of Greater Flamingo *Phoenicopterus roseus* colonies in Molentargius Natural Regional Park (Cagliari, Italy) over 10 years (2014-2023). Pair counts were based on nest numbers on the embankments after breeding while reproductive success was assessed by counting chicks in the creches. Yellow legged Gull *Larus michahellis* predation was sampled through distance observations twice a week in 2023, from May to July. The following factors that may influence breeding success were evaluated: banks size (measured on aerial photos), colony establishment time and effect of gull predation. Colony size has varied over the years, with a maximum of 26,187 pairs in 2017 to a minimum of 8,974 in 2023; reproductive success has greatly varied, from a maximum of 88% in 2014 to a minimum of 7% in 2019. The quasibinomial model showed that the reproductive success was significantly positively correlated with the total area of banks ($p=0.008$) and negatively with the size of gull colony ($p=0.015$) as well as with negative quadratic term of the size of flamingo colony ($p=0.013$). Colony establishment time term was not found to be significant. The multiple linear regression between egg predation event per hour by gulls and time elapsed since laying (after 30 days from the first egg in colony) is significant ($F: 11.17, df=2, p=0.005$), with the time variable at the limit ($p=0.05$) and the bank width more significative ($p=0.018$). No specific trends in time from hatching emerge for chick predation from gulls.

Chilean Flamingos in Paracas Bay: Insights from 20 years of monitoring and conservation on the West Coast of South America

Ortiz, Enver^{1,2,3}, M.Valqui³

¹Centro de Ornitología y Biodiversidad (CORBIDI), Lima, Perú.

²Programa de Monitoreo Marino Costero de Pluspetrol, WSP, Perú

³Grupo de Conservación Flamencos Altoandinos (GCFA).

The Chilean Flamingo (*Phoenicopterus chilensis*) is the most widespread of the three flamingo species in southern South America. Its range spans the Pacific coast from Ecuador through the Andes of Peru, Bolivia, and Chile to Patagonia, and along the Atlantic coast from Argentina to southern Brazil. In Peru,

the national population is estimated at 30,000–50,000 individuals, primarily inhabiting high-altitude salt flats and lowland wetlands. During winter, many move to coastal areas, frequenting marshes, wetlands, and river mouths. Paracas Bay, located in the northern part of the Paracas National Reserve on Peru's south-central coast, has been monitored since 2005 through a long-term marine-coastal program developed by a gas company. This two-decade study has provided valuable insights on the year-round presence of Chilean Flamingos in the area. On average, around 550 individuals are observed during the non-breeding season (April–December), and about 350 during the breeding season (January–March). After Virrilá on Peru's north coast—which hosts over 5,000 individuals—Paracas Bay is likely the second-largest congregation site for Chilean Flamingos on the central and northwest coast of South America. It surpasses other known locations such as Salinas (Ecuador), Uripe, Medio Mundo, Paraíso and Ite wetlands (Peru), as well as Lluta, El Yali, Mataquito river mouths (Chile), where fewer than 300 individuals are typically recorded. Paracas Bay is also the primary Peruvian site for sightings of ringed flamingos from northern Andes of Chile, with 11 original sightings and 87 resightings recorded.

Northward movements of Chilean, Andean, and Puna Flamingos based on 30 years of resighting data from Peru: Ecological and conservation implications

Ortiz, Enver^{1,2,3}, M. Valqui³, J.K. Vizcarra⁴

¹Centro de Ornitología y Biodiversidad (CORBIDI), Lima, Perú.

²Programa de Monitoreo Marino Costero de Pluspetrol, WSP, Perú

³Grupo de Conservación Flamencos Altoandinos (GCFA)

⁴Administración Técnica Forestal y de Fauna Silvestre (ATFFS) Moquegua-Tacna, Servicio Nacional Forestal y de Fauna Silvestre (SERFOR), Tacna, Perú.

Flamingos are currently classified as nomadic or irruptive species, characterized by highly variable movement patterns in terms of number, direction, distance, and timing across years and colonies. Since the 1980s in Chile and the 2000s in Bolivia, banding programs have marked Chilean, Andean, and Puna flamingos to track their movements across South America. Between July 1994 and February 2025, 226 resightings were documented in Peru: 141 Chilean, 76 Andean, and 9 Puna flamingos. These individuals were originally banded in Chile (Antofagasta, Atacama, Huasco, Surire) and Bolivia (Laguna Colorada), and later observed at 8 sites along the Peruvian coast: Tacna (1), Arequipa (2), Ica (4), and Lima (1); and 18 highland sites: Puno (3), Moquegua (2), Arequipa (5), Cusco (2), Ayacucho (1), Lima (1), and Junín (4). Distances ranged from 230 km (Surire to Ite, Tacna) to 1,240 km (Antofagasta to Parinacochas, Ayacucho). From 121 sightings and 105 resightings, average ages were 5.6 years for Chilean, 4.4 for Andean, and 2.6 for Puna flamingos, with ages ranging from a few months to nearly 30 years. Key resighting sites included La Aguada Beach, Ica (87 records) and Ite wetlands, Tacna (66) for Chileans, and Parinacochas, Ayacucho (62) for Andeans. Notably, Parinacochas is the northernmost site where all three species are regularly observed, emphasizing its conservation value. Despite over 30 years of monitoring, no consistent seasonal or age-based movement patterns have emerged. However, these efforts have offered critical insights and highlight the need for strengthened conservation—especially at key sites like Parinacochas.

Evaluating the Status of flamingos in India

Panigrahi, Madhumita¹, T. Katti, R. Kumar

¹Wildlife Institute of India-Category 2 Centre under the auspicious of UNESCO, India

Greater and Lesser Flamingos are widely distributed across India, occupying diverse wetland habitats. The Greater Flamingo is predominantly found in inland and coastal wetlands of the peninsular and north-western states, with Gujarat's Rann of Kachchh serving as South Asia's only large, regular breeding colony in the past decade. In contrast, the Lesser Flamingo is largely restricted to coastal wetlands, with only limited inland records. Major breeding colonies of the Lesser Flamingo in Rann of Kachchh (Gujarat) and Sambhar Lake (Rajasthan) have shown irregular breeding patterns.

India lacks comprehensive data on flamingo population dynamics and habitat preferences. The 2019 Flamingo Count, led by BNHS, recorded 51,655 Greater Flamingos and 88,906 Lesser Flamingos across 88 sites, though actual numbers may be higher due to incomplete site coverage. Analysis from the State of India's Birds (2023) report, based on nationwide citizen science data, indicates a concerning 71% decline in Greater Flamingo populations since the pre-2000s, with annual declines of 7.5% for Greater Flamingos and 4.8% for Lesser Flamingos. However, coastal wetlands in Mumbai show differing trends, suggesting underlying factors that warrant further investigation. Regular, synchronized surveys are essential for a more accurate understanding of population trends and distribution.

Flamingos face multiple threats, including habitat loss, altered hydrology, invasive species, and collisions with infrastructure, all of which jeopardize their survival. This study consolidates insights from multiple surveys conducted over the past decade, providing a foundation for targeted conservation actions aimed at ensuring the long-term survival of flamingo populations in India.

Flamingos: Florida's Forgotten Wading Bird

Ridgley, Frank^{1,2,3}

¹Zoo Miami, Miami, FL, USA

²Florida International University, Miami, FL, USA

³Caribbean Flamingo Conservation Group

The Caribbean flamingo is an iconic bird and cultural staple of the state of Florida in the United States. Yet, its place in the natural history and ecological role in Florida was all but forgotten and contemporary sightings were relegated to being escapees from private menageries. Through historical research, discussions with regulatory agencies, monitoring sightings, and conducting banding with visual and satellite GPS tags, Zoo Miami has helped change the status of the bird within the state of Florida and helped it regain its rightful place as native avifauna. Ongoing efforts through advocacy, habitat restoration, and research hope to see the American flamingo return to Florida in more significant numbers and nest once again.

Conservation Challenges of the Caribbean Flamingo (*Phoenicopterus ruber*) Across its Range

Ridgley, Frank^{1,2,4}, X. Galvez Aguilera^{3,4}

¹Zoo Miami, Miami, FL, USA

²Florida International University, Miami, FL, USA

³Caribbean Coast Conservancy, Mérida, Yucatán, México

⁴Caribbean Flamingo Conservation Group

Caribbean flamingos (*Phoenicopterus ruber*) are an iconic symbol of tropical ecosystems. Recent population declines in breeding colonies raise concerns about their conservation. The Caribbean Coastal Conservancy (CCC) and the Caribbean Flamingo Conservation Group (CFCG) convened a meeting of member countries in 2023 to assess the status of the regional population. This presentation summarizes the data collected. Common pressures on breeding and feeding habitats and the species include salinization of freshwater wetlands, loss of breeding colonies, poorly protected colonies, persistent consumption, capture for commercialization, and poorly planned coastal urban development driven by tourism without carrying capacity studies that affect both breeding and feeding areas. Additional pressures caused by stochastic effects are extreme variations in precipitation, high tides that flood coastal wetlands in shallow water lagoons and increased high-intensity hurricanes that cause mortality and dispersal of birds to unsuitable habitats. In the past 10 years, more than half of the species' major breeding sites have been severely affected and some have been lost. The full impact of these negative effects on population dynamics is unknown. It is recommended to conduct comprehensive studies to assess the impact of habitat loss and other threats on the flamingo population, implement effective measures to protect breeding colonies and feeding grounds, establish an education and awareness program among local communities about the importance of flamingos, and develop and implement sustainable tourism practices that minimize impacts. Concerted and collaborative efforts by governments, NGOs, and local communities are essential to ensure their current status and continued recovery across the region. This presentation outlines some recommendations for conservation efforts.

The impact of war on flamingo reproduction in the National Nature Park "Tuzlivski limany"

Rusev, Ivan¹, O. Bronskov

¹National Nature Park "Tuzlivski lymany", Ukraine

Pink flamingos first nested in the National Nature Park "Tuzlivski limany" in 2023. Then the first formation of a flamingo colony was unsuccessful. Due to the impact of the war (the birds could not occupy safe islands for nesting, since the military was nearby and constantly trained there) and therefore occupied an unsuccessful nesting site on the shore of the Burnas estuary near the village. But strong anthropogenic pressure from local residents prompted the birds to abandon the built nests in the amount of 270. Then in early July 2023, the flamingos formed a new colony and they gave birth to 200 chicks, 18 of which were ringed. In 2024, flamingos formed two colonies in the national park at once. In the first, on the Karachaus estuary, the colony was destroyed by waves due to storms. In the second, on the Khajider estuary, 400 nests were built, each of which contained eggs. The nesting was unsuccessful because due to the frequent flight of shaheeds and other drones over the colony at an altitude of 100 m to 2 km, as well as a result of various explosions, the birds were frightened and often abandoned the clutches with eggs. When this happened for more than 1 minute, yellow-legged gulls flew to the colony and destroyed the nests, eating the flamingo eggs. And in 2024, all 400 pink flamingo nests were destroyed by yellow-legged gulls. Thus, we registered the negative impact of the war on the reproduction of pink flamingos.

The hidden art of flamingos: evidence of circular bedforms in intertidal habitats

Salvador, Paolo¹, A. Bezzi², D. Martinucci², S. Sponza², G. Fontolan^{2,3}

¹Department of Life Sciences, University of Trieste, Trieste, Italy

²Coastal Group, Department of Mathematics and Geosciences, University of Trieste, Trieste, Italy

³National Interuniversity Consortium for the Marine Sciences (CoNISMa), Rome, Italy

The Greater Flamingo *Phoenicopterus roseus* is known as an ecosystem engineer, rearranging sediment in peculiar bedforms as a consequence of its filter-feeding behaviour. In recent decades, the populations of the Greater Flamingo have notably increased, and now the species is one of the most abundant waterbirds in Mediterranean wetlands. Owing to its range expansion, it inhabits and exploits new and suitable foraging sites detectable by foraging structures left on the sediment. There are few images of the foraging morphologies in the literature, possibly due to their ephemeral nature and difficulty in detecting them. In this study, we present a very detailed UAV (Unmanned Aerial Vehicle) image of an aggregate of pit foraging structures of Greater Flamingo discovered on a back-barrier washover fan in the Marano and Grado Lagoon (Northern Adriatic, Italy).

The Greater Flamingo in Algeria: A conservation success story?

Samraoui, Boudjéma¹, A. Bouchecker^{1,2}, A. Bouzid^{1,3}, R. Nedjah^{5,6}, M. Boulkhssaim⁴, F. Samraoui^{5,6}

¹Department of Biology, University Badji Mokhtar, Annaba, Algeria

²Algerian Academy of Sciences and Technologies, Algeria

³Département of Biological Sciences, University of Ouargla, Algeria

⁴Biology Institute, University of Oum El Bouaghi, Algeria

⁵Laboratoire de Conservation des Zones Humides (LCZH), University 8 mai 1945, Guelma, Algeria

⁶Department of Ecology, University 8 mai 1945, Guelma, Algeria

The Greater Flamingo (*Phoenicopterus roseus*) is now a flagship species for wetland conservation in Algeria. However, its breeding status has been documented for only the past two decades, during which breeding success has been hindered by human pressures—initially through egg pilfering and, more recently, by uncontrolled media attention. Despite growing awareness of its ecological importance, the species remains highly vulnerable to anthropogenic disturbances. This study reviews conservation efforts for the Greater Flamingo in Algeria, assessing progress and emerging threats linked to its increasing popularity. A historical analysis of conservation measures was conducted, focusing on public awareness, habitat management, and monitoring programmes. Intensive ring observations of nearly 2,000 Algerian-born chicks provided key ecological insights into survival, dispersal, and site fidelity. Additionally, recent breeding disturbances were analysed, particularly the impact of photography, videography, and social media-driven tourism. Over the past two decades, flamingos have established breeding colonies at five sites across Algeria with numerous breeding attempts at other sites. However, increasing human disturbances have led to repeated colony abandonment and breeding failures. Ringing data have revealed important movement patterns and regional connectivity, reinforcing the need for coordinated conservation strategies. While early efforts reduced direct exploitation, new challenges have emerged, with excessive human presence at breeding sites disrupting nesting success. Despite past progress, the Greater Flamingo remains at risk. Urgent measures—including stricter site protections, visitor management, and public education—are needed to balance conservation with the species' popularity. Sustainable ecotourism and enforcement of disturbance regulations are essential to its long-term survival.

Breeding of the Greater Flamingo at Chott Tinsilt: A Victim of Fame and Footsteps

Samraoui, Farrah¹, A. Satour², A. Bouzid², R. Nedjah², M. Boulkhssaim², B. Samraoui²

¹University 8 May 1945, Guelma

²Laboratoire de Conservation des Zones Humides (LCZH), University 8 mai 1945, Guelma, Algeria

Over the past two decades, the Greater Flamingo (*Phoenicopterus roseus*) in Algeria has faced fluctuating breeding success, frequently disrupted by human disturbance and predation. Despite its status

as a flagship wetland species, it remains highly vulnerable to anthropogenic stressors, underscoring the need for targeted conservation efforts. This study examines the 2024 breeding event at Chott Tinsilt, a 1,000-ha salt lake in eastern Algeria, which hosted a significant flamingo colony after 13 years without nesting attempts. Field observations documented colony establishment, nesting success, chick development, and the impacts of human disturbance. The study also monitored human activity—including media coverage and visitor influx—to assess its effects on breeding success. Approximately 2,500 flamingo pairs nested, with chicks hatching in early May. However, increasing human disturbance led to the abandonment of the largest sub-colony, culminating in the collapse of the entire colony by late May, leaving hundreds of eggs unhatched. Around 550 chicks formed a crèche before the colony was deserted. A subsequent attempt to relocate chicks to a freshwater wetland further disrupted natural processes. Chott Tinsilt is a critical breeding and feeding site, yet its ecological potential is compromised by human interference. These findings highlight the urgent need for conservation strategies to mitigate human disturbance at breeding sites. Additionally, the study emphasizes the importance of public awareness and government intervention to prevent well-intentioned but harmful interventions, advocating for protective measures to ensure the long-term survival of flamingos and other waterbirds in North Africa.

From Breeding Grounds to Wintering Mudflats: Long-Term Monitoring of Greater and Lesser Flamingos Reveals Flight Paths and Spatial Use of Wintering Grounds in Mumbai Along Northwest Coast of India

Sankpal Shashank¹, Sathiyaselvam¹, S. Managave²

¹Bombay Natural History Society, Mumbai, Maharashtra, India

²Earth and Climate Science, Indian Institute of Science Education and Research, Pune, Maharashtra, India

Thane Creek, a Ramsar site, lies at the confluence of major metropolitan cities viz. Mumbai and Navi Mumbai. Each winter, it supports approximately 170,000 Greater and Lesser Flamingos. Despite its ecological significance, the region is increasingly impacted by anthropogenic activities, particularly coastal infrastructure development. Therefore, it is crucial to understand Flamingo's migratory paths, breeding origins and spatial utilization of wintering mudflats to form long-term evidence-based conservation strategy. Data was collected during 2018 to 2025, using systematic population counts and satellite tracking. The results indicated Greater Flamingos predominantly utilized the eastern bank and central portions of the creek, while Lesser Flamingos were more frequent in the central and downstream foreshore mudflats. Tracking data revealed migratory connectivity to breeding grounds in the Kutch region of Gujarat, with Bhavnagar serving as a key stopover site for both species. A correlation study indicated that (i) more than average rainfall at breeding region corresponded with delayed arrival of flamingos at Thane Creek, (ii) larger deviations from average rainfall corresponded to a lower proportion of juvenile Lesser Flamingos in the wintering population, and (iii) Greater Flamingos showed higher juvenile presence during below-average rainfall years. Stable isotope analysis of feathers is being carried out to assess diet and trophic level during the wintering period. These findings provide crucial insights into the flamingo connectivity and habitat requirements at Thane Creek. These outcomes serve as a baseline for action plans incorporated into the conservation blueprint of the area, one of the key objectives of the BNHS Long-Term Monitoring project.

Distribution and Abundance of Greater and Lesser Flamingos in Gujarat and Conservation Implications
Shah, Nita, Q. Qureshi,

We present a comprehensive assessment of the distribution and abundance of Greater (*Phoenicopterus roseus*) and Lesser (*Phoeniconaias minor*) Flamingos across Gujarat, India, based on aerial surveys, vehicle transects, and village-level interviews conducted between 2012 and 2014. Both species were observed across 14 districts, with key populations in the Gulf of Khambhat, Porbandar, Bhavnagar, Nalsarovar, and the Rann of Kutch. Population estimates ranged from 80,000–100,000 for Greater Flamingos and 200,000–250,000 for Lesser Flamingos. Distribution patterns were linked to saline and hypersaline wetlands, salt pans, and managed water bodies, with water depth and salinity playing key roles. CART-based habitat models showed that Lesser Flamingos formed clumped distributions in food-rich habitats, while Greater Flamingos exhibited more dispersed patterns. Time-budget data (3361 hours) revealed that both species foraged throughout the day, with seasonal variation in resting and feeding behaviors. Major threats include hydrological alterations from canal water discharge, habitat loss due to infrastructure development, pollution, and collision risks from power lines and wind turbines. Conservation measures must include habitat zoning, wetland management, and infrastructure redesign to reduce disturbance and mortality with focus on nesting and foraging grounds.

Impact of Restoration of Abandoned Saltpans on the Greater Flamingo *Phoenicopterus roseus* population in Kanyakumari District, Tamil Nadu, South India

Sivananthaperumal, Balachandran¹, Ritika Chatterjee¹, S. Shukla¹

¹Migratory Bird MonitoryTrust, Kanyakumari, Agasteeswaram, India

Migratory shorebirds rely on natural wetlands, which function as crucial wintering and stopover sites during their annual cycles. Globally, wetlands are declining at an alarming rate due to anthropogenic pressures like land reclamation, infrastructure development, pollution, and climate change. Saltpans act as functional wetlands and are frequently utilised by large populations of shorebirds and flamingos. They hold immense potential to serve as alternative, vital habitats for roosting, nesting, and foraging. Satellite tracking of flamingos at Kanyakumari established a connection between southeast coastal wetlands of India, and Sri Lanka. The main objective of the ongoing project is the restoration of abandoned saltpans and the management of active saltpans as suitable habitats for migratory shorebirds, with a focus on the Greater Flamingo *Phoenicopterus roseus* as an indicator species. We monitored abandoned and functional saltpans in five villages of Kanyakumari district, an important site in the Central Asian Flyway, before and after restoration. The restoration measures included regulating water levels in the saltpans to enhance habitat quality, providing perching sites for sea terns, and introducing *Artemia* sp., an integral prey species, across four years. The total count method was used to enumerate Greater Flamingo abundance, supplemented by photo and video documentation. A significant increase in the number of flamingos from 700 before restoration to 2,500 after restoration was recorded. An increase in the number of several shorebird species was also observed. The results of this pilot study signify the need for extending restoration to other saltpans to contribute to global waterbird populations.

Flamingos and ducks: conflicts in managed areas

Sorrenti, Michele¹, V. Trocchi

¹Federazione Italiana della Caccia Ufficio Studi e Ricerche, Roma, Italy

Flamingos increased in last 20 years in Italy and particularly in Venice Lagoon and Po delta. In such area there is a strong tradition of hunting waterbirds and from decades are in place around 25 private shooting areas (Aziende Faunistico Venatorie -AFV), managed to attract and maintain ducks' presence, which increase and conserve a good value of biodiversity in the lagoon ecosystem. All such areas in autumn and winter host hundreds of thousands of waterbirds, both huntable and protected species. The increasing number of flamingos caused conflicts with managers of such areas, because of occupation of feeding and resting areas and consequent unavailability for ducks, coots and waders, underwater vegetation degradation, water quality deterioration backdrops and banks destruction. Such damage causes increase in costs to restore habitat useful for ducks, coots, geese and waders. Conflicts are difficult to solve because do not exist specific studies on this topic, and because Flamingo is a protected species. To better understand such conflict and to obtain quantitative and economic data we circulated a questionnaire to the owners of the private shooting areas through their association Ente Produttori Selvaggina (EPS). The aim is to assess a complete survey of the impact of flamingos in the ecosystems of private shooting areas of Venice Lagoon and Po delta, which results will be available around the month of August and will be analysed by the middle of October.

Development of a novel hand-rearing formula for American Flamingos (*Phoenicopterus ruber*) in Latin America

Tello, José A.^{1,2}

¹La Aurora Zoo, Guatemala

²Universidad San Carlos de Guatemala

Hand-rearing plays a crucial role in the conservation of wild species under professional care; proper nutrition is essential for the healthy development of individuals, maximizing the chances of species conservation. American flamingos (*Phoenicopterus ruber*) typically feed their chicks by producing a thick liquid from their crop, that contains essential nutrients for the development of their young. In zoos it is often necessary to hand-rear flamingo chicks, and various institutions have created their formulas to achieve natural development (Shannon, 2007). La Aurora Zoo is currently home to 32 American flamingos and in 2023 they had their first clutch. Five eggs were subsequently removed due to reports of egg predators around the enclosure, these were incubated, successfully hatched, and hand-reared using a formula based on the accessible diet items in Latin America. The formula contained water, herring, shrimp, egg yolk, Mazuri® small bird supplement, and Nestum® baby cereal. Bromatological analysis of the formula revealed a nutritional content of 25% dry matter, 42% protein, 27% fat, 2.27% fiber, 1.29% Ca and 0.5% P. The chicks were weighed every day before their first feeding and then fed daily with 20% of their body weight in formula through a hand syringe according to the hand-rearing technique suggested in the flamingo husbandry guidelines (Brown & King, 2005). From the tenth day flamingo kibble was added to the formula to increase the amount of Ca and Vit A, and ground kibble was also offered in a pool to encourage foraging. Average weight gains of 23 g/day were obtained during the first month and 38 g/day during the second month. The weight obtained during the first two months were within the average growth rates reported from 1,755 American flamingo chicks in Species 360 - ZIMS. We hope that these results serve as a future reference for Latin American institutions that challenges the production of chick formula in the ex-situ maintenance of this species.

Seven years of coordinated and contemporary census of the Greater Flamingo (*Phoenicopterus roseus*) along the Italian northern Adriatic coast in winter: population trend and land use in response to management choices

Verza, Emiliano¹, A. Sartori², R. Tinarelli³, M. Grion⁴, A. Ravagnani³, E. Stival⁵, C. Guzzon⁴

¹Sagittaria, Italy

²Società Veneziana di Scienze Naturali, Italy

³ASOER, Italy

⁴Astore-FVG, Italy

⁵Venezia Birdwatching, Italy

The presence of the Greater Flamingo (*Phoenicopterus roseus*) along the northern Adriatic coast in winter is a phenomenon that has strengthened in recent decades, with an increasing trend. The great mobility of the groups of this species within the study area (Friuli Venezia Giulia; Veneto; Emilia Romagna), has always prevented an effective evaluation of the phenomenon. Since 2018, five ornithological groups / associations have carried out a coordinated and contemporary census that highlights a dynamic situation and increase of the species. The data presented regard the population trend and the use of different wetland types involving different management approaches.

South Africa Lesser Flamingo Rehabilitation and Volunteer Crisis Management

Wilson, Lauren^{1,2}

¹Zoo Atlanta, Atlanta, GA, USA

²The Association of Zoos & Aquariums' Ciconiiformes, Phoenicopteriformes, & Pelicaniformes Taxonomic Advisory Group (AZA's CP&P TAG)

The lesser flamingo (*Phoeniconaias minor*) is listed as Near Threatened by the IUCN. So, in January of 2019, when one of the largest colonies of lesser flamingos in the world, and the only colony in South Africa, abandoned their nests and chicks it was imperative that humans intervene. While well-meaning, the residents of Kimberely, South Africa were woefully underequipped to care for and raise the nearly 2,000 eggs and chicks abandoned as a result of water reticulation issues and drought. The Association of Zoos and Aquariums' Ciconiiformes, Phoenicopteriformes, and Pelicaniformes Taxonomic Advisory Group (AZA's CP&P TAG), amongst other international zoological associations, stepped in to help. Between February 1 and May 26, 11 teams totaling over 50 individuals representing 25 AZA-accredited zoos and aquariums traveled to South Africa logging over 2.3 years of travel and work time combined. Of the almost 2,000 chicks rescued, nearly 800 were returned to the wild and approximately 50 remained in human care at Pan-African Association of Zoos and Aquariums (PAAZA) accredited facilities. This success story represents one of the largest flamingo rehabilitation efforts in history. Its scale is not only in the individual birds rescued and released but in what it can teach us about flamingo rehabilitation techniques and international collaboration.

Climate-influenced Temporal Shifts in the Reproductive Phenology of Captive Chilean Flamingos (*Phoenicopterus chilensis*) in North America

Wilson, Lauren¹, H. Mueller-Hill², R. Raveendran³, A.T. Peterson³, J.R. Mendelson III^{1,2}

¹Zoo Atlanta, Atlanta, GA, USA

²Georgia Institute of Technology, Atlanta, GA, USA

³University of Kansas, Lawrence, KS, USA

Climate change is driving widespread changes in avian phenology. We analyzed 60 years of breeding records from 18 North American zoos to examine temporal shifts in hatch dates of captive Chilean flamingos (*Phoenicopterus chilensis*) and their relationship to environmental variables and group size. Contrary to the well-documented trend of earlier breeding in response to warming temperatures, we observed a progressive delay in hatch dates, averaging 1.83 days per year. Linear mixed modeling identified increasing temperatures as the primary driver of this delay, suggesting potential physiological or behavioral modifications in response to changing climatic conditions. Additionally, larger flock sizes were associated with delayed breeding, possibly due to complex social dynamics influencing reproductive decision-making. These findings indicate that captive populations, despite controlled resource availability, are still influenced by environmental shifts, with implications for conservation management and breeding programs. Understanding how climate and social structure impact phenology in captive settings can also provide insights into broader ecological responses in wild populations.

Chilean Flamingo *Phoenicopterus chilensis* in the Sechura Desert of northern Peru

Williams, Robert S.R.¹, D.G. Ricalde¹, J.N.M. Flanagan¹,

¹Asociación TuTierra, Malecón Seoane 721, Pimentel, Lambayeque, Peru.

A breeding population of the Chilean Flamingo in the Sechura desert of coastal north Peru urges a new approach for its conservation and new research. While the species is an occasional, non-breeding, visitor to wetlands along the Peruvian coast, breeding was first documented in the Sechura desert in 2010, representing the most northerly known breeding site. Although yearly numbers fluctuate, this is largest breeding colony in Peru. This apparent shift in distribution, where a high Andean specialist has established a coastal breeding colony, possibly due to loss of breeding habitat in the Andes of southern Peru and adjacent countries, coupled with abundant food resources during and after heavy rainfall and El Niño events which form extensive temporary lagoons in the desert. Nest construction has been documented in March-April, with fledglings recorded between May-June. Threats to the population include: illegal hunting and egg collection, predation by gulls and vultures, mineral extraction, and climate change. For the last fifteen years, a working group of local community volunteers and conservationists has been monitoring and guarding this population, with census counts of over 15,000 individuals, and fledgling counts of over 7,000. The working group is designing an integrated research and conservation plan for the population which aims to clarify aspects of the population's ecology and strengthen community participation in its conservation.