



8th SESSION OF THE MEETING OF THE PARTIES
26 – 30 September 2022, Budapest, Hungary

“Strengthening Flyway Conservation in a Changing World”

**Conservation Brief for the CMS/AEWA International
Single Species Action Plan for the Conservation of the
Lesser Flamingo**

Phoeniconaias minor

Agreement on the Conservation of
African-Eurasian Migratory Waterbirds (AEWA)

**Conservation Brief for the CMS/AEWA International
Single Species Action Plan for the Conservation of the
Lesser Flamingo**

Phoeniconaias minor

(To be used in conjunction with the ISSAP published in December 2008 – please access [here](#))

May 2022

**Produced by the AEWA Technical Committee
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*Prepared with funding from the Department for Environment, Food and Rural
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OVERVIEW AND SUMMARY

The International Single Species Action Plan (ISSAP) for the conservation of the Lesser Flamingo was published in December 2008 as a joint plan of the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) and the Convention on Migratory Species (CMS). The 7th session of the Meeting of the Parties to AEWA in 2018 requested the AEWA Technical Committee to produce a shorter conservation brief for this ISSAP, since it was lacking an international coordination mechanism, in order to highlight any new scientific information and/or threats as well as to boost implementation and re-engage relevant range states. This Conservation Brief shall be used in conjunction with the full ISSAP.

The Lesser Flamingo (*Phoeniconaias minor*) is the most numerous species of flamingo in the world but is globally Near Threatened because of an apparent decline in overall numbers, their very narrow habitat requirements and the small number of breeding sites on which they are dependent. The species has bred at eight sites globally in the past decade while one of these (Lake Natron) holds over 75% of the total population. The global population has been estimated at c.2,220,000-3,240,000 individuals. Regional estimates include 25,000 to 30,000 individuals in West Africa, 1,500,000-2,500,000 in East Africa, 120,000-200,000 in Southern Africa and Madagascar, and 390,000 in south Asia. The overall population trend is decreasing owing to habitat degradation and disturbance, although some populations may be stable or have unknown trends.

Breeding occurs irregularly in response to the right conditions at key breeding sites on alkaline and saline lakes, usually rainfall induced. Since the action plan was published, successful breeding has been proven at Aftout es Saheli in Mauritania, while there has been regular breeding at Kamfers Dam in South Africa, induced by provision of an artificial island (although recent nesting has been on the lake shore).

The principal threats to the species are changes to the hydrology and other conditions at the key breeding and non-breeding sites. Recent threats have included from infrastructure and development such as the formerly proposed soda ash plant at Lake Natron in Tanzania, prolonged drought in Namibia and the significant rise in water levels at lakes such as Nakuru and Elementeita in Kenya. There is some conservation activity at nearly all the key sites with efforts being made to mitigate specific threats. The proposed industrial soda ash extraction in Lake Natron has been abandoned at least for now and the site has been the subject of some community-based conservation programmes. There is sporadic monitoring especially of breeding events. Breeding success was increased in Mauritania by the prevention of hunting and deterrence of predators (Moreno-Opo *et al.* 2011). In Namibia, efforts have been made to reduce collisions with power lines (NamPower/ Namibia Nature Foundation Strategic Partnership 2010) and there is an open AEWA Implementation Review Process case file on power line construction at Lake Elementeita to advise on avoiding impact on the Lesser Flamingo amongst other species. In Botswana, the breeding area at the Makgadikgadi salt pans was listed as a Flamingo sanctuary in 2009, and a management plan for this site has been developed (Kootsositse 2012). Several countries have produced National Action Plans including Mauritania, Senegal, Kenya and Tanzania.

Conservation priorities include:

More formal site protection and management to prevent disturbance and mortality is still required at key sites e.g., in Botswana, Mauritania and Ethiopia.

Lake Natron remains the single most critical site for this species globally. Much depends on water levels, but good monitoring is important, for example of sediment and pollutant inflow from surrounding rivers, and diversion of rivers for irrigation is a key threat. Good relationships with and benefits accruing to the local communities all around the lake are desirable – successful pilots on awareness raising, community development and sustainable agriculture need scaling up but implemented sensitively using those trusted

by the local people. Infrastructure improvements need careful mitigation to avoid attracting new settlement around the lake.

There remains a need for coordinated census work to better understand this dynamic population. Ideally aerial or other remote counts would be made at the same time with ground comparison where possible. Breeding events should be monitored, although it is challenging to access some for example in Botswana, and to get agreed estimates of numbers at Natron.

In the long term climatic and other environmental changes may render some current breeding sites unviable. The success of the project in South Africa gives encouragement that it may be possible to create new additional and replacement breeding colonies.

Ongoing international cooperation is best achieved through the establishment of an AEWA International Species Working Group (ISWG), and this is under active discussion as of 2022. A Coordinator should be identified to lead this network, and the Flamingo Specialist Group has a role in supporting this. It is important that all work on the species takes a long-term perspective and builds capacity and infrastructure for the work to be continued beyond immediate funding periods.

1. INTRODUCTION & BASIC DATA

- Conservation Brief for the CMS/AEWA International Single Species Action Plan for the Conservation of the Lesser Flamingo (*Phoeniconaias minor*). Full Action Plan at : https://www.unep-aewa.org/sites/default/files/publication/ts34_ssap_lesser_flamingo_0.pdf
- Compiled by Paul Buckley. Additional experts contributing: Nature Kenya Bird Committee, Timothy Mwinami (Kenya), Neil Baker, Emmanuel Mchimwa (Tanzania), Mark Anderson, Tania Anderson, Doug Harebottle (South Africa), Motshereganyi Kootsositse, Mark Muller (Botswana), Djibril Diallo, Geoffroy Citegese (Mauretania/West Africa), Yilma Abebe (Ethiopia), Jessica Kemper, Holger Kolberg (Namibia), Dr. Hiren B. Soni (Gujarat, India), Prof David Harper (Leicester University), Cathy King (IUCN Flamingo Specialist Group), Paul Rose (IUCN Flamingo Specialist Group/WWT)
- **Technical Committee adoption:** *Adopted by the AEWA Technical Committee in May 2022*
- The original International Species Action Plan was published in 2008 and adopted at MOP4 in 2008. It was originally published with timelines for implementation through to 2018 with the stated aim of stabilising the range and population of the species by 2020, and a focus on 12 key countries. It was extended through agreement of Resolution 7.5 at MOP 7 through the period from 2019 to 2028. Recommendations were to consider the production of this Conservation Brief, and to re-establish efforts to enhance international coordination. This was proposed at the time of the ISSAP publication and continues to a degree through the IUCN Flamingo specialist group.

Table 1. Review of Basic Data

Populations covered by the Plan:	East African population	Southern African population	West African population	SW Asia population
AEWA Table 1 category, also indicating possible change since ISSAP adoption (Y/N – if	A - 3c CITES Appendix II. CMS Appendix II.	A - 4 CITES Appendix II. CMS Appendix II.	A - 3a CITES Appendix II. CMS Appendix II.	Outside AEWA range CITES Appendix II. CMS Appendix II.
	No change	No change		

yes, indicate new versus old listing)			No change	
Change in global, regional and/or sub-regional Red List status (Y/N - if yes, indicate new versus old listing)	NT	NT	NT	NT
Change in Principal Range States, i.e. countries regularly hosting over 1% of the biogeographic population (Y/N). If yes list changes per population.	No change in principal states with breeding in Lake Natron in 2020. Significant fluctuation and movements with reduced numbers in Kenya due to rising lake levels	No change in principal states. Breeding has continued intermittently at Kamfers Dam in South Africa but has been less frequent in Namibia due to drought. Very large numbers in Botswana in 2019 - unclear if longer term trend.	No change in principal states. Breeding proven in Mauritania	No change in principal states

2. ACTION FRAMEWORK REVIEW

- **Adopted International Action Plan Goal and Purpose:**

Goal: Remove the Lesser Flamingo from the IUCN Red List of Threatened Species globally and in each of its four regional populations by 2020;

Indicator: Red List categorisation as a species of ‘Least Concern’;

Project purpose: Stabilise the size and distribution of regional and global non-breeding populations at 2009 levels by 2012;

Indicator: Population and distribution has been stabilised at 2009 levels by 2012.

The Table below is adapted from the original Action Plan action framework showing the **objectives**, associated **problems**, **results** and **actions** into the new action framework template adopted at MOP7 (shown below). Changes in the prioritization of actions based on the revised threat assessment and additional recommendations for action are shown **in red font**.

Table 2. Review of Action Framework (adapted from original ISSAP 2008)

<i>Objective: Stabilise the size and distribution of regional and global non-breeding populations at 2009 levels</i>						
Problem	Result	Action	Priority	Time scale (Revised)	Organisations responsible	Implementation status and recommendations
Inadequate protection for and poor management of key sites	Result 1 Ensuring that all breeding sites and key non-breeding sites are maintained in good ecological condition (All countries)	1.1. Designate key breeding and feeding sites as protected areas	Essential	Short 2022 or as soon as possible	Govt Cons authorities	Makgadikgadi (Bots) listed as a Flamingo sanctuary in 2009. In Botswana, adopt final regulations still to enact the sanctuary. Secure more formal protection for Aftout es Saheli, Mauritania. Review status and protected area status for all breeding sites in the species' range
		1.2. Identify baseline ecological and hydrological conditions for LF and ensure sites are maintained at or restored to favourable status	High Revise to Essential	Medium Ongoing	Govt Cons authorities, NGOs	Major changes at some sites in East Africa may not be resolvable – rising water levels due to catchment changes and perhaps also geological shifts Enact management and restoration activities at Aftout es Saheli
		1.3 Conduct EIAs and audits of existing operations at all key sites	Medium	Medium Ongoing	Govt Cons authorities	Major proposed changes at Lake Natron were subject to EIA as well as major campaigns critiquing the EIA.

						Other insidious land use changes not subject to EIA and no proactive assessments by Govt agencies known of For example, increasing drying of Lake Abijatta, Ethiopia due to irrigation in the Ziway catchment. Address water extraction in the Ziway catchments e.g. by promoting more water efficient irrigation methods, less water-intensive crops Seek to instigate cumulative EIAs to help to identify, assess and offer mitigation for such changes
		1.4 Identify and implement management needs for LF at key sites	Medium Revise to High	Medium Ongoing	Govt Cons authorities	Ongoing Park management eg Nakuru, Abijatta, Etosha Undertake more proactive consideration of mitigation measures for LF in all PA management plans
		1.5 Develop and implement integrated catchment	Medium	Medium 2023	Govt Cons authorities	Some assign rising water levels in East

		management plans for the key sites	Revise to Essential			Africa lakes to catchment deterioration. Effective work at Natron in integrating conservation into local land use and range management planning systems. Use the Natron example as a good model for other sites such as Abijatta in the Ziway catchment.
		1.6 Enhance habitat at suitable sites e.g. creation of breeding islands or wetland restoration)	Low ??	Long	Govt Cons authorities	Kamfers Dam (SA) – although island needs further restoration, the birds now nest on lakeshore. In long term consider such creation projects as they may be needed more widely
Excessive disturbance at key sites through informal human activity and licensed commercial threats	Result 2 Ensuring that key sites are not disturbed by human activity (All countries)	2.1. Prevent human disturbance through legislation and policy, planning, zonation and enforcement e.g. soda ash mining (esp. Tanzania, Botswana)	Essential	Short Ongoing	Govt Cons and local authorities	Achieved for Natron In Kenya birds now very widely dispersed and much more contact with humans in some sites eg sewage works. Assess need for and implement local mitigation where possible.

		2.2 Prevent other human disturbance e.g. aircraft, recreation through planning, zonation and enforcement	High	Short Ongoing	Govt Cons and local authorities	Active efforts at Kamfers Dam. Disturbance by Kenyan tourist flights at Natron needs cross-border agreements led by Government agencies.
		2.3 Raise awareness about conservation needs of the species at local and national levels	Medium	Medium 2024 Ongoing	Govt Cons and local authorities	Much work done at Natron, Kamfers Dam. National Plans very helpful in some places e.g. Tanzania, Mauritania. BirdLife <i>Think Pink</i> campaign effective. India – many campaigns and events. These can be replicated elsewhere. India - species should be on People’s Biodiversity Register (PBR).
		2.4 Help local communities to develop alternative livelihood practices to reduce disturbance (esp. India, Mauritania)	Medium Revise to High	Long Ongoing	Govt Cons and local authorities	Some work in Mauritania through implementation of National Action Plan, also Tanzania, also in Gujarat. This remains an important need at all sites as part of wider conservation programmes.

Regular mass die-offs and more localised pollution and disease events	Result 3: Reducing the effects on regional populations of toxicological and/or infectious diseases (All countries)	3.1 Establish an integrated health surveillance programme to assess the effects of mass die-offs on LF populations	Medium	Ongoing Ongoing	Govt Cons authorities NGOs	Some work done in Eastern and Southern Africa. Large numbers of birds also killed by entrapment in <i>Acacia</i> scrub at Bogoria, Kenya as higher water levels push the birds into thorn areas – numbers may be significant.
		3.2 Raise awareness about decision makers and industry about the risk of pollution to LF	Medium	Medium Ongoing	Govt Cons authorities	Water quality issues partly addressed at Kamfers Dam. Flamingo festival in Mumbai – 10,000 people attended
		3.3. Ensure that pollution guidelines/legislation reflecting the sensitivity of LF are developed and enforced	Medium	Short 2023	Govt Cons and local authorities	Kenya - Many more birds using e.g. sewage works to feed as main lakes become unsuitable.
Legal and illegal collecting of eggs and live birds for consumption or trade	Result 4: Ensuring that harvesting of eggs and trade in live specimens has no effect on the population	4.1 Maintain a ban on trade in LF specimens, parts and eggs where already in place	High	Ongoing	Govt Cons authorities	Controls exist in most countries. These should be maintained.
		4.2 Regulate strict licensing schemes based on assessment of the effect of any trade on LF populations (Tanzania)	High	Ongoing	Govt Cons authorities	It is now believed that egg harvesting and trade are not significantly affecting populations in Tanzania but requires monitoring.

Mortality caused by collisions with existing or new infrastructure	Result 5: Minimising collisions with man-made structures	5.1 Avoid crossing important LF flamingo habitats and flyways when routing new power lines, fences, masts and windfarms	Medium Revise to High	Short Ongoing	Govt Cons and planning authorities	Mitigation of power lines in Namibia and windfarm guidelines in South Africa. New infrastructure planned e.g. Lake Elmenteita, Kenya (which is subject to a review by UNEP-AEWA), Botswana.
Conservation is impeded by lack of knowledge of population, ecology and impacts of threats	Result 6: Filling knowledge gaps	6.1 Determine population sizes and trends by developing a monitoring strategy and protocols	High Revise to Essential	Ongoing	Govt Cons authorities NGOs Scientific institutions	Some work done on all of these activities but still no coordinated (aerial) count. Seek more coordinated counts and investigate whether using technologies such as drones and remote sensing technology may enable more cost-effective models in future
		6.2 Determine population delineation and movements by conducting satellite tracking and ringing studies	High	Ongoing	Govt Cons authorities NGOs Scientific institutions	Some tracking done e.g. showing movement within regions but no clear proof of large scale wider movements
		6.3 Collect systematic data on breeding success and recruitment	Medium	Medium Ongoing	Govt Cons authorities NGOs Scientific institutions	Some sites monitored for productivity e.g. Natron but hard and numbers uncertain. Other sites are even harder to reach e.g. Sua Pan, Botswana.

	6.4 Systematically collect data on breeding and feeding habitat requirements including the role of rainfall	High	Medium Ongoing	Govt Cons authorities NGOs Scientific institutions	Limited progress. Work in Kenya has shown how to assess conditions via remote methods.
	6.5 Understand catchment processes	Medium	Medium Ongoing	Govt Cons authorities NGOs Scientific institutions	Limited progress but enough known to guide better catchment planning
	6.6 Collect data on the role of diseases and poisons on population regulation	High	Ongoing	Govt Cons authorities NGOs Scientific institutions	Study of virus effect on algae at Lake Nakuru. Avian pox virus study at Kamfers Dam but little understanding of long-term impacts
	6.7 Model long term effects of climate change and diseases	High	Ongoing Urgent over next 2-3 years	Govt Cons authorities NGOs Scientific institutions	Limited progress High priority for coordinated project development by key science and research agencies
	6.8 Evaluate the relative importance of different threats	Medium	Short Ongoing	Govt Cons authorities NGOs Scientific institutions	Limited progress. This activity would only be possible as a consequence of many other pending research priorities identified in the ISSAP
	6.9 Collect data on the genetic relatedness within regional populations and exchange between populations	Medium	Medium Ongoing	Scientific institutions	Limited progress but evidence that there is little or no genetic distinction across

						populations (Parasharya et al 2015)
		6.10 Calculate the cultural and economic values of LF across its range	Medium	Ongoing 2025	Govt Cons authorities NGOs Scientific institutions	Limited progress although good understanding of wider economic drivers e.g. tourism, some work at Natron in relation to threats.
		6.11 Assemble a lesser flamingo bibliography	Medium Revise to Low	Ongoing	Govt Cons authorities NGOs Scientific institutions	Bibliographies do exist associated with websites and publications. A low priority action now.
		6.12 Assemble a database of funding sources	Medium Revise to Low	Ongoing	Govt Cons authorities NGOs Scientific institutions	These are known but may be most useful in the context of specific activities e.g. a coordinated count. A low priority action now although of course fundraising will remain critical.

3. BIOLOGICAL ASSESSMENT

Changes and/or pertinent new evidence noted in relation to:

- Delineation of populations; no major changes in delineation. Some greater knowledge of movements within populations, and evidence of some limited movement between different regions. These populations do not appear to be genetically distinct (Parasharya et al 2015).
- Distribution throughout the annual cycle; the species is subject to huge fluctuations in both breeding events and non-breeding distribution and movements. West African population seems to be stable overall but elsewhere recent changes such as declines in parts of Kenya and increased numbers in Botswana are not clear indicators of overall population change in the absence of adequate region wide monitoring.
- Habitat requirements: the critical nature of water levels and food availability in determining successful breeding are well established. Some changes are clearly linked to land use change, for example increasing drying of Lake Abijatta, Ethiopia due to irrigation. Others have unknown and possibly complex causes for example in the Kenya Rift valley. Some are potentially subject to impacts of climate change and very difficult to mitigate for.
- Survival and productivity. Some good studies but notoriously hard to access some sites and to record numbers. New technologies such as remote sensing, drones and use of proxy measurements are emerging, and could improve population knowledge, combined with detailed productivity studies where access permits.

Table 3. Population size and trend by country

Country	Breeding numbers (first row at time of ISSAP, 2 nd row most recent data)	Quality of data	Year(s) of the estimate	Breeding population trend in the last 10 years (or 3 generations)	Quality of data	Maximum size of migrating or non-breeding populations in the last 10 years (or 3 generations)	Quality of data	Year(s) of the estimate
Tanzania	c500,000 prs ¹	Poor	1994			549,327 - 633,215 ¹	Good Observed	2003-2007
	Minimum estimate 400,000 chicks ⁷	Poor	2018			Max count 1.6m ⁷	Poor	2017
Kenya						279,620 - 1,452,513 ¹	Good Observed	2003-2007
						IWC Max 231,542 (but widely fluctuating, very few in 2020) ^{3,5}	Poor	2021
Ethiopia	Breeding occurred 3,000 chicks ¹	GE	2005			3,269-24,021 ¹	Medium	2003-2007
						IWC Max 94,693 ³ Estimated 150-200,000 ⁶	Poor	2017 2021

Country	Breeding numbers (first row at time of ISSAP, 2 nd row most recent data)	Quality of data	Year(s) of the estimate	Breeding population trend in the last 10 years (or 3 generations)	Quality of data	Maximum size of migrating or non-breeding populations in the last 10 years (or 3 generations)	Quality of data	Year(s) of the estimate
Uganda						44-17,085 ¹	Good Observed	2003-2007
						IWC Max 2,543 ³	Poor	2016
East Africa								2003-2007
				Stable/Decreasing?	Reasonable	1.5-2.5 million ²	Good Estimate	2020
South Africa						1,794 – 55,550 ¹	Good Observed	2003-2007
	Bred since 2008 Max 13,000 chicks ⁴	Good	2009			Kamfers max 80,000 ⁴ 81,300 ⁴	Good Estimate (remote sensing)	2019 2009
Botswana	Estimates from 16,430 prs to 64,267prs ¹	GE	1999/2000			18-412 ¹		2003-2007

Country	Breeding numbers (first row at time of ISSAP, 2 nd row most recent data)	Quality of data	Year(s) of the estimate	Breeding population trend in the last 10 years (or 3 generations)	Quality of data	Maximum size of migrating or non-breeding populations in the last 10 years (or 3 generations)	Quality of data	Year(s) of the estimate
	'Bred' in 2017 and 2020 – no figures ^{4 8}	Poor	2020			Ground count (plus aerial still under analysis est.at 434,000-864,000 ⁸		2019
Namibia						5,468 - 55,995 ¹		2003-2007
	Apparently bred in 2013, 2020-21 ⁹	No estimates of numbers				IWC Max 50,482 ³	Poor	2016
Southern Africa								2003-2007
				Unclear	Reasonable	120-200,000 (Plus exceptional numbers in Botswana 2019)^{2 8}		2020
Mauritania						160-4,800 ¹	Good Observed	2003-2007

Country	Breeding numbers (first row at time of ISSAP, 2 nd row most recent data)	Quality of data	Year(s) of the estimate	Breeding population trend in the last 10 years (or 3 generations)	Quality of data	Maximum size of migrating or non-breeding populations in the last 10 years (or 3 generations)	Quality of data	Year(s) of the estimate
	4,800 pairs ¹⁰	Good	2011			IWC Max 8,900 ³		2016
Senegal						16-4361 ¹	Good Observed	2003-2007
						IWC Max 39,063 ³	Poor	2019
Guinea-Bissau						158-2,000 ¹		2003-2007
						IWC Max 220 ³	Poor	2016
Guinea						11,125 – 13,000 ¹		2003-2007
						IWC Max 1800 ³	Poor	2017
West Africa								2003-2007
				Probable increase	Reasonable	25,000 - 30,000²		2020
India						Est 390,000²	Poor	

Country	Breeding numbers (first row at time of ISSAP, 2 nd row most recent data)	Quality of data	Year(s) of the estimate	Breeding population trend in the last 10 years (or 3 generations)	Quality of data	Maximum size of migrating or non-breeding populations in the last 10 years (or 3 generations)	Quality of data	Year(s) of the estimate
						369,901 in Gujarat ¹		2004
	100,000 nests with 64,000 chicks Great Rann ¹¹		2021 (also successful in 2020 and at site in Little Rann) ¹¹	Stable?	Reasonable	IWC Max 64,188 ³ All India Count 88,906 ¹²	Poor	2016 2019
Overall				BLI estimate 20-29% decline in 3 generations²		(2.035m – 3.12m)²		

1 – cited in original ISSAP 2008 – original sources will vary

2 – BirdLife International Datazone

3 – International Waterbird Census species count totals 2016-2020

4 – Tania Anderson in litt.

5 – Timothy Mwinami in litt.

6 – Yilma Abebe In litt.

7 – Neil Baker and Nature Tanzania In litt.

8 – BirdLife Botswana In litt.

9 – Holger Kolberg In litt.

10 – Mereno-Opo (2012), Nature Mauritania In litt.

11 – Indian Express 24/01/21

12 – Bombay Natural History Society

*Recent IWC totals are IWC max count year – data rated as poor as likely not to be comprehensive, and annual totals fluctuate. Breeding records are recent events. Note irregular breeding and highly fluctuating numbers/estimates.

4. PROBLEM ANALYSIS

- Conduct rapid review of threats identified in original problem analysis based on possible new information and following the IUCN Red List Threat Classification Scheme¹, also noting threats no longer considered relevant for survival etc.

Table 4. Threat review

Threat identified in 2008 Action Plan (corresponding IUCN Code)	Identified for which population	Action Plan threat score (IUCN estimated score)	Revised threat assessment based on new evidence, if available
Habitat loss and degradation (2.1, 2.3, 7.2.3) - Altered hydrology and/or water quality -Wetland pollution -Extraction of salt and soda ash	All countries but esp Ethiopia, Kenya All countries but esp Botswana and Kenya Esp Tanzania and Botswana	Critical (Medium 6) Medium (Medium 7) High (Low 5)	Threats considered similar. Issues of altered hydrology noted in Kenya and Namibia – see footnote. Critical threat via soda ash in Natron averted for now. Long term changes from river diversion for irrigation, or increased sedimentation and pollution must be monitored and avoided.
Disruption of nesting colonies (6.3) -Disruption by inhabitants of nearby settlements -Disruption by low-flying aircraft -Disruption by avian predators	These often have local impacts but notes as important as per below: India, South Africa Botswana Botswana, Namibia	Medium (Low 5) Low (Low 4) High (Low 5)	No overall change identified. Since 2018 occasional disturbance by drones and helicopters at Kamfers Dam. Increasing Marabou population at Natron considered a local threat, as is disturbance by tourist planes.
Toxicological and infectious diseases (8.5) -Toxicological diseases -Infectious diseases	Potentially all countries but especially noted in Kenya	High (Medium 6) High (Medium 6)	In some areas much larger numbers feeding at sewage works than previously – unclear if this may increase incidence of toxins/disease
Harvesting of eggs or birds (5.1.1)	Only noted in Botswana, Ethiopia, Tanzania	Local (Low 4)	Small numbers caught and eaten at Kamfers Dam

¹ <https://www.iucnredlist.org/resources/threat-classification-scheme>

Competition with other species (8.2.1)	Only noted in Botswana, Ethiopia, India, South Africa (gulls, cormorants)	Local (Low 4)	
Collision with overhead wires and man-made structures (7.3)	Potentially all countries but noted in Botswana, Ethiopia, India, South Africa	Local (Future Low 5)	This is becoming a more widespread threat e.g., Kenya, Namibia and increasing in South Africa. Propose Medium 6

Possible new threats: short paragraph (2-3 sentences) highlighting any new threats to the species as a whole or to certain populations identified since the adoption of the Action Plan, if applicable.

- Major changes (increases) in water levels at a number of Rift Valley lakes especially in Kenya may be to do with man induced ecosystem modification through deforestation and sedimentation (7.3, 9.3.2) but possibly related to tectonic activity (10.2). Recent droughts esp. in Namibia may be related to long term climate change (11.2) (Future Medium 6)
- At Lake Bogoria, Kenya the increased proximity of the lake edge to *Acacia* thorn has led to many birds becoming entangled and killed while foraging at lake edge. Numbers not known but believed to number 'many thousands' (Mwinami pers.comm.).
- Threats/sub-threats not included above and considered to have only Local impacts in the ISAP are invasive plants, Construction of roads and buildings, disturbance by fishermen, salt pan workers, military exercises, pastoralists, disruption by terrestrial predators and hunters, illegal shooting, bird trade and egg collecting, disturbance at non-breeding sites. Some of these may be important locally and should be considered in National Action Plans.

5. CONTACTS & REFERENCES

5.1. Contacts

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